

A Glossary of Soil Sciences

S. V. PATEL, M.Sc., Ph.D

B. A. GOLAKIYA, M.Sc. (Agri.), Ph.D

S.G.Savalia, M.Sc. (Agri.), Ph.D

H.P.Gajera, M.Sc. (Agri.)

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S. V. PATEL, M.Sc., Ph.D

Associate Research Scientist,
Department of Biochemistry

B. A. GOLAKIYA, M.Sc. (Agri.), Ph.D

Professor and Head
Department of Biochemistry

S.G.Savalia, M.Sc. (Agri.), Ph.D

Associate Research Scientist
Department of Agril Chem and Soil Science

H.P.Gajera, M.Sc. (Agri.)

Assistant Professor
Department of Biochemistry

Collage of Agriculture, Junagadh Agriculture University
Junagadh, 362001, GUJARAT, India



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Dr. B.K. Kikani
Vice-Chancellor

Junagadh Agricultural University
Junagadh-362 001

FOREWORD

Studies of soils have specialized into several branches of soil sciences. Science is specific even in its wordings. Terminology of any science faculty assumes its prime significance because it's a mirror of its advancement. As the faculty grows knowledge wise new terminologies infiltrate with its specified meanings. It's a never-ending process. Therefore it is always a part of the faculty improvement to prepare a glossary of that particular branch time by time. Soil science is not an exception in this regard.

I think we have glossaries of fertilizers and biofertilizers from the Indian publishers. But there is an empty space in our library racks for single volume exclusively dedicated to glossary of soil sciences. This particular document entitled "A Glossary of Soil Sciences" will fill up the gap and serve as a good reference book to all those who have some bearing with soil sciences.

Our group working at the department of Biochemistry in Junagadh Agricultural University consists of a versatile faculty members. Every year they are contributing valuable documents for publication. This is an outcome of their extra hours of working. They might have sacrificed several holidays and might have worked up to late nights to put up this useful collection. I congratulate them all for this effort and hope that they will continue their contribution in this direction.

Date : 23/06/2007

B.K. Kikani

Place : Junagadh - 362 001 (Gujarat)

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Dr.D.B.Kuchhadia
Director of Research &
Dean P.G. Studies.

Junagadh Agricultural University
Junagadh-362 001(Gujarat)

PREFACE

The dark word of soil is treaming with life. As such soil is a complex ecosystem. While studying the soils more than two dozen faculties have emerged as branches of soils sciences. Each branch has its own language/terminology. The group studying soil comprehensively often encounters a problem of understanding soil sciences. It seems useful to avail all these terminologies in a single volume.

In the above context this collection "A GLOSSARY OF SOIL SCIENCES" consists about 5200 terms related to the title. It Includes terminologies of the most of branches of soil sciences viz, Agricultural chemistry, Soil, Soil Science, Soil Genesis, Soil Survey, Soil Classification, Soil Ecology, Soil Microbiology, Soil Morphology, Soil Physics, Soil Chemistry, n Soil Fertility, Soil Minerology, Soil Colloids, Soil Pollution, Soil Analysis, Soil Mechanics, Soil -Water, Soil Conversation, Soil Salinity (Aqua genesis), Fertilizers, Biofertilizers and Formulae of all the branches etc. Of late, the terms related biodynamic agriculture, organic farming and soil health are also included.

In practice each and every branch of soil sciences takes mathematical band. So the branch wise collection of formulae are made available in this reference book. As such the team of Biochemistry Department of this University has done a commandable job for the people interested in the soil sciences.

(D.B.Kuchhadia)

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Contents

Glossary

1

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Glossary

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A horizon : The original top layer of mineral soil divided into A₁ (typically from 5 to 30 cm thick; generally referred to as topsoil with a high content of organic matter, dark colour and maximum biological activity) and A₂ horizons (usually 5 - 70 cm thick; similar texture to A₁ but paler in colour, poorer in structure and less fertile).

Abandoned Well : Abandoned Well - A water well that is no longer in use or any water well, the use of which has been accomplished or permanently discontinued.

ABC soil : A soil having an A, a B, and a C horizon.

Abiotic : Non-living thing. Usually refers to the physical and chemical components of an organism's environment. Also called inorganic.

Abiotic factors : Non living; moisture, soil, nutrients, fire, wind, temperature, climate

Ablation : Surface removal of ice or snow from a glacier or snowfield by melting, sublimation, and/or calving.

Ablation till : Loose, permeable till deposited during the final down-wasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Ablation Zone : Region in a glacier where there is a surface net removal of snow and/or ice by melting, sublimation, and/or calving.

Abrasion : The physical weathering of a rock surface by running water, glaciers or wind laden with fine particles. See Ventifact. OR

Physical wearing and grinding of a surface through friction and impact by material carried in air, water, or ice.

Abrupt boundary : Boundary 5 - 20 mm wide.

Absolute Date : Absolute Date - A statistical estimate of the true age of a mineral or rock in terms of years based on the rate of spontaneous decay of radioactive isotopes.

Absolute Humidity : Measurement of atmospheric humidity. Absolute humidity is the mass of water vapor in a given volume of air (this measurement is not influenced by the mass of the air). Normally expressed in grams of water vapor per cubic meter of atmosphere at a specific temperature.

Absolute Zero : Temperature of -273.15° Celsius. At this temperature atomic motion stops.

Absorption : Movement of ions and water into an organism as a result of metabolic processes, frequently against an electrochemical potential gradient (active) or as a result of diffusion along an activity gradient (passive).

Absorption : The physical uptake of water and/or ions by a substance. For example, soils absorb water. OR Uptake of matter or energy by a substance

Absorption : (1) Process of taking in and being made part of an existing amount of matter.

(2) Interception of electromagnetic radiation or sound.

Absorption (Atmospheric) : Atmospheric absorption is defined as a process in which solar radiation is retained by a substance and converted into heat energy. The creation of heat energy also causes the substance to emit its own radiation. In general, the absorption of solar radiation by substances in the Earth's atmosphere results in temperatures that get no higher than 1800° Celsius. According to Wien's Law, bodies with temperatures at this level or lower would emit their radiation in the longwave band.

Absorption Field : A system of properly sized and constructed narrow trenches partially filled with a bed of washed gravel or crushed stone into which perforated or open joint pipe is placed. The discharge from the septic tank is distributed through these pipes into trenches and surrounding soil. While seepage pits normally require less land area to install, they should be used only where absorption fields are not suitable and well-water supplies are not endangered.

Abstract Space : Geographic model or representation of the real world. For example, maps and globes are abstractions of the real world or concrete space.

Abysal Fan : Fan shaped accumulation of sediment from rivers that is deposited at the base of a submarine canyon within a ocean basin.

Abysal Plain : Another name for ocean floor.

AC soil : A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Accelerated Erosion : An increased rate of erosion caused by humans.

Acceptable Daily Intake (ADI) : Acceptable Daily Intake (ADI) - Chemical ingestion level determined by combining the maximum No-Observed-Adverse-Effect-Level (NOAEL) with the addition of an uncertainty (safety) factor. Chemicals with ADI levels usually are not considered or suspected to be carcinogens. This classification results from toxicity data collected during prolonged ingestion studies conducted on a number of animals.

Accessory Minerals : Minerals occurring in small quantities in a rock whose presence or absence does not affect the true nature of the rock.

Acclimation : Slow adjustment of an organism to new conditions in its environment.

Accretion : The growth of the continental masses over geologic time via the addition of marine sediments. These sediments are added on to the edges of the continents through tectonic collision with other oceanic or continental plates.

Accumulation : The build-up or increase of one or more constituents in the soil at a given position as a result of translocation. The build-up may be a residue due to the translocation of material out of the horizon or may be due to an addition of material. Usually refers to soluble substances and clay particles. OR Surface addition of snow to a glacier or snowfield.

Accumulation of carbonates(k) : This symbol indicates an accumulation of alkaline-earth carbonates, commonly calcium carbonate.

Accumulation of gypsum(y) : This symbol indicates an accumulation of gypsum.

Accumulation of jarosite(j) : Jarosite is a potassium or iron sulfate mineral that is commonly an alteration product of pyrite that has been exposed to an oxidizing environment. Jarosite has hue of 2.5Y or yellower and normally has chroma of 6 or more, although chromas as low as 3 or 4 have been reported.

Accumulation of salts more soluble than gypsum(z) : This symbol indicates an accumulation of salts that are more soluble than gypsum.

Accumulation of silica(q) : This symbol indicates an accumulation of secondary silica.

Accumulation of silicate clay(t) : This symbol indicates an accumulation of silicate clay that either has formed within a horizon and subsequently has been translocated within the horizon or has been moved into the horizon by illuviation, or both. At least some part of the horizon should show evidence of clay accumulation either as coatings on surfaces of peds or in pores, as lamellae, or as bridges between mineral grains.

Accumulation of sodium(n) : This symbol indicates an accumulation of exchangeable sodium.

Accumulation Zone : (1) Region in a glacier where there is a surface net addition of snow.

(2) Part of a hillslope that has a net gain of material leading to a progressive raising of the slope's surface.

Acequia : (Crop science) an irrigation ditch or canal.

Acetogenic bacterium : Prokaryotic organism that uses carbonate as a terminal

electron acceptor and produces acetic acid as a waste product.

Acetyleneblock assay : Estimates denitrification by determining release of nitrous oxide (N₂O) from acetylene-treated soil.

Acetylenereduction assay : Estimates nitrogenase activity by measuring the rate of acetylene reduced to ethylene.

Acetylenereduction assay : Estimates nitrogenase activity by measuring the rate of acetylene reduced to ethylene.

Acicular : Needle shaped.

Acid : (1) Substance having a pH less than 7. (2) Substance that releases hydrogen ions (H⁺).

Acid : A substance that dissolves in water with the formation of hydrogen ions, contains hydrogen which may be replaced by metals to form salt, and/or is corrosive.

Acid Deposition : Atmospheric deposition of acids in solid or liquid form on the Earth's surface. Also see acid precipitation

Acid peats : GSG classification—These soils show little horizon development, their main feature being the accumulation of a surface horizon of almost black, strongly acid, peaty organic matter which is maintained near saturation with water. The peat is generally well decomposed and sticky, but significant amounts of fibrous roots and partly decomposed plant remains occur near the surface. The lower part is commonly clayey or gravelly grading into the underlying mineral material.

Acid Precipitation : Atmospheric precipitation with a pH less than 5.6. Normal pH of precipitation is 5.6.

Acid Rain : Rain with a pH less than 5.6. Normal pH of precipitation is 5.6.

Acid Rock : An igneous rock that contains more than 60 per cent silica and free quartz.

Acid Shock : A sudden acidification of runoff waters from the spring melting of accumulated snow in the middle latitudes because of the winter deposition of acidic precipitation.

Acid soil : Soil with a pH value less than 7.0.

Acid sulfate soils : Pyrite-rich marine clays, muds and sands that have become extremely acid following exposure or drainage as sulfur compounds are oxidised and converted to sulfuric acid.

Acidic : Any substance with a pH below 7.

Acidic : Soils with a pH less than 7.0 in water. While some plants thrive in acid soils, others don't and require lime to make the soil more alkaline. This term is also used as a Subgroup distinction for a number of Soil Orders in the Australian Soil Classification (Isbell, 1996). It refers to soils with a B2 horizon that on the whole is strongly acid.

Acidic Solution : Any water solution that is acidic (pH less than 7) or has more hydrogen ions (H⁺) than hydroxide ions (OH⁻). Also see basic solution and neutral solution.

Acidification : Process whereby soil becomes acid (pH < 7) because acid parent material is present or in regions with high rainfall, where soil leaching occurs. Acidification can be accelerated by human activities (use of fertilisers, deposition of industrial and vehicular pollutants).

Acidification : The process whereby soils become acidic over time as a result of

- The parent material;
- The addition of nitrogen to the soil by either fertiliser or legumes (where nitrogen is converted to nitrate);
- And/or the leaching of the soil by rainfall.

Acidity : The hydrogen ion activity in the soil solution expressed as a pH value. OR The quantitative capacity of water to neutralize a base, expressed in ppm or mg/L calcium carbonate equivalent. The number of hydrogen atoms that are present determines this. It is usually measured by titration with a standard solution of sodium hydroxide

Acidophile : Organism that grows best under acid conditions (down to a pH of 1).

Acre : A unit of measurement of land. It is equal to the area of land inside a square that is about 209 feet on each side (43,560 square feet).

Acre furrow slice : A mass of soil occupying one acre of area to a depth of plowing commonly given as six inches. An acre furrow slice is about 2,000,000 pounds, varying with the bulk density of the soil.

Acre : 43,560 sq. Ft. Of land.

Acrefoot : (Crop science) the volume of water that would cover one acre to a depth of one foot.

Acre-foot : Acre-foot - Volume of water (325,851 gallons of water) required to cover one acre of land with 12 inches of water.

Actinomycete : Nontaxonomic term applied to a group of high G + C base composition, Grampositive bacteria that have a superficial resemblance to fungi. Includes many but not all organisms belonging to the order Actinomycetales.

Actinomycete : Nontaxonomic term applied to a group of high G + C base composition, Gram-positive bacteria that have a superficial resemblance to fungi. Includes many but not all organisms belonging to the order Actinomycetales.

Actinomycete : A group of microorganisms that usually produce a characteristic branched mycelium. These organisms are responsible for the earthy smell of compost.

Actinomycetes : A group of organisms intermediate between the bacteria and the true fungi, mainly resembling the latter because they usually produced branched mycelium.

Actinorhizae : Associations between actinomycetes and plant roots

Activated sludge : Sludge particles produced in raw or settled wastewater (primary effluent) by the growth of organisms (including zoogeal bacteria) in aeration tanks in the presence of dissolved oxygen. The term "activated" comes from the fact that the particles are teeming with fungi, bacteria, and protozoa. Activated sludge is different from primary sludge in that the sludge particles contain many living organisms which can feed on the incoming wastewater.

Activation energy : Amount of energy required to bring all molecules in one mole of a substance to their reactive state at a given temperature.

Active acidity : A term used to describe the soil acidity that is in the soil solution. It is the acidity that is measured by a common soil test and is expressed as pH.

Active carrier : An individual who has an overt clinical case of a disease and who can transmit the infection to others.

Active Layer : Upper zone of soil in higher latitude locations that experiences daily and seasonal freeze-thaw cycles.

Active Remote Sensing : Form of remote sensing where the sensor provides its own source of electromagnetic radiation to illuminate the object under study. Radar is an example of an active remote sensing device.

Active site : Region of an enzyme where substrates bind.

Active Status : Active Status - A water well which is in use.

Active transport : The transport of solute molecules across a membrane against an electrochemical gradient; it requires a carrier protein and the input of energy

Actual Evapotranspiration : Is the amount of water that is actually removed from a surface due to the processes of evaporation and transpiration.

Actual Mixing Ratio : Another term used to describe mixing ratio.

Actual vapor pressure : The partial pressure exerted by the water vapor present in a parcel. Water in a gaseous state (i.e. water vapor) exerts a pressure just like

the atmospheric air. Vapor pressure is also measured in millibars.

Adaptation : (1) Evolutionary adaptation - a genetically based characteristic expressed by a living organism. Particular adaptations found in populations become frequent and dominant if they enhance an individual's ability to survive in the environment.

(2) Physiological adaptation - change in an organism's physiology as a result of exposure to some environmental condition.

Adaptive Radiation : The evolution of a number of new species from one or a few ancestor species over many thousands or millions of years. Normally occurs after a mass extinction creates a number of vacant ecological niches or when a radical change in the environment produces new ecological niches.

Adenosine triphosphate (ATP) : Common energy donating molecule in biochemical reactions. Also an important compound in transfer of phosphate groups.

Adg : (Animal science) average daily gain. The amount of body weight gain in a day.

Adiabatic : A process in which heat does not enter or leave a system. In the atmospheric sciences, adiabatic processes are often used to model internal energy changes in rising and descending parcels of air in the atmosphere. When a parcel of air rises it expands because of a reduction in pressure. If no other non-adiabatic processes occur (like condensation, evaporation and radiation), expansion causes the parcel of air to cool at a set rate of 0.98° Celsius per 100 meters. The opposite occurs when a parcel of air descends in the atmosphere. The air in a descending parcel becomes compressed. Compression causes the temperature within the parcel to increase at a rate of 0.98° Celsius per 100 meters.

Adiabatic Cooling : The cooling of a rising parcel of air due to adiabatic processes.

Adjuvant : Material added to an antigen to increase its immunogenicity. Common examples are alum, killed *Bordetella pertussis*, and an oil emulsion of the antigen, either alone (Freund's incomplete adjuvant) or with killed mycobacteria (Freund's complete adjuvant).

ADP : Adenosine diphosphate. See ATP.

Adsorption : Process by which atoms, molecules, or ions are taken up and retained on the surfaces of solids by chemical or physical binding.

Adsorption Complex : The various substances in the soil that are capable of adsorption, these are mainly clay or humus

Advection : Advection - Process by which chemicals and heat are transported along with the bulk motion of flowing gas or liquid.

Advection Fog : Fog generated when winds flow over a surface with a different

temperature. Two types of advection fog exist. When warm air flows over a cold surface it can produce fog through contact cooling. Cold air blowing over a warm moist surface produces a form of advection fog known as evaporation fog.

Advisory : A report giving information on beach contamination status and often recommending action to be taken

Aeolian : Pertaining to wind action. OR Geomorphic process involving wind. Alternative spelling eolian.

Aeolian Deposits : Fine sediments transported and deposited by wind; they include loess, dunes, desert sand and some volcanic ash.

Aeolian Landform : Is a landform formed from the erosion or deposition of weathered surface materials by wind. This includes landforms with some of the following geomorphic features: sand dunes, deflation hollows, and desert pavement. Alternative spelling eolian landform.

Aerate, aeration : To aerate compost or soil is to introduce air into the compost or soil

Aerated static pile : A compost pile that is not turned (static), but is aerated through ventilation pipes that run through the pile. These may be PVC pipes with holes drilled into them

Aeration : The process by which atmospheric air enters the soil. The rate and amount of aeration depends on the size and continuity of the pore spaces and the degree of water logging.

Aeration : The process of adding air to water. In wastewater treatment, air is added to freshen wastewater and to keep solids in suspension.

Aeration (gas exchange) : The process of replacing air in the soil with air from the atmosphere. In well-aerated soil, air in the soil is similar in composition to air above the soil. Poorly aerated soils contain a higher content of carbon dioxide and a lower content of oxygen than the atmosphere above the soil. Aeration is important because plant roots and aerobic soil organisms consume oxygen and release carbon dioxide during respiration.

Aeration of soil : Amount of air-filled pores in the soil, expressed as the volume difference between total porosity and actual soil moisture. Optimum soil aeration is 30% but strongly depends on the structure and packing state of soil particles; 15-20% is normally satisfactory for the growth of grasses and cereals; below 10% is not good for plant growth.

Aeration tank : The tank where raw or settled wastewater is mixed with return sludge and aerated. This is the same as an aeration bay, aerator, or reactor.

Aeration, soil. : The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly

aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aerenchyma : Plant tissue incorporating large, gasfilled spaces.

Aerial Photograph : A photograph of the Earth's surface taken from an airplane or some other type of airborne equipment.

Aerial Photography : Form of remote sensing that captures images of objects using photographic cameras and film from platforms in the atmosphere.

Aeric : This term refers to soils that are rapidly drained throughout the whole profile. The B horizons are weakly coherent and porous and are often brightly coloured. This term is used as a suborder to describe Podosols in the Australian Soil Classification (Isbell 1996).

Aerobe : An organism that requires free oxygen for growth.

Aerobic : (1) Presence of molecular oxygen.

(2) Occurring only in the presence of molecular oxygen.

(3) Growing in the presence of molecular oxygen. OR Soils in which free oxygen is abundant and chemically oxidising processes prevail. This usually occurs in well drained soils with good structure. OR Containing air, containing oxygen, occurring in the presence of oxygen

Aerobic : In the presence of, or requiring, oxygen.

Aerobic anoxygenic photosynthesis : Photosynthetic process in which electron donors such as organic matter or sulfide, which do not result in oxygen evolution, are used under aerobic conditions

Aerobic decomposition : The oxidation of organic matter into carbon dioxide and water by microorganisms in the presence of air.

Aerobic Organism : Organisms living or becoming active in the presence of molecular oxygen.

Aerobic respiration : A form of respiration whereby microorganisms consume oxygen and produce carbon dioxide and water and release energy for their life processes.

Aerotolerant anaerobes : Microbes that grow under both aerobic and anaerobic conditions, but do not shift from one mode of metabolism to another as conditions change. They obtain energy exclusively by fermentation.

Aestivation : State of dormancy during the summer.

Affinities : Affinities - In biology, the relationship that exists between two individuals or groups of individuals that closely resemble one another but that do not belong to the same taxon; dependent on resemblance in the whole plan of structure and indicating community of origin.

Aflatoxin : A polyketide secondary fungal metabolite that can cause cancer

AFP : Air filled porosity; the air capacity of a compost.

Africanized honey bee : "Killer bees." a threat to people involved in outdoor activities throughout the state including hiking, hunting, fishing, and farming.

Aftershock : Smaller earth tremors that occur seconds to weeks after a major earthquake event.

Agar : Complex polysaccharide derived from certain marine algae that is a gelling agent for solid or semisolid microbiological media. Agar consists of about 70% agarose and 30% agarpectin. Agar can be melted at temperature above 100°C; gelling temperature is 4050°C.

Agarose : Nonsulfated linear polymer consisting of alternating residues of Dgalactose and 3,6anhydroLgalactose. Agarose is extracted from seaweed, and agarose gels are often used as the resolving medium in electrophoresis.

AGE . : Elapsed time in calendar years. Because the cosmic production of C-14 has varied during the Quaternary, radiocarbon years (expressed as ky B.P.) must be corrected by using tree-ring and other data. Abbreviations used for corrected ages are: ka (kilo anno or years in thousands) or Ma (millions of years). Abbreviations used for intervals are: yr (years), ky (thousands of years). radiocarbon ages = yr B.P. Calibrated ages are calculated from process assumptions, relative ages fit in a sequence, and correlated ages refer to matching units. (See also yr B.P., HOLOCENE, PLEISTOCENE, QUATERNARY, PEDOCHRONOLOGY).

Agglutinates : The visible aggregates or clumps formed by an agglutination reaction

Agglutination reaction : The formation of an insoluble immune complex by the cross-linking of cells or particles

Aggradation : Readjustment of the stream profile where the stream channel is raised by the deposition of bed load.

Aggradation . : A modification of the earth's surface in the direction of uniformity of grade by deposition.

Aggregate : Soil aggregate consisting of two or more soil particles bound together by various forces. A unit of soil structure consisting of primary soil particles held together by cohesive forces or by secondary soil materials such as iron oxides, silica or organic matter. Aggregates may be natural, such as *peds*, or formed by tillage, such as *crumbs* and *clods*.

Aggregate stability : The ability of soil aggregates to resist degradation. An aggregate is many soil particles held together in a small mass. In a "well-aggregated soil" the aggregates and pores between them hold up well to forces

such as rain, wind, and compaction. (Compare to slake test.)

Aggregate, soil : Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Aggregate : Many soil particles held in a single mass or cluster to form a soil structural element, such as a sand-sized particle, gravel-sized particle, crumb, clod, block, or prism.

Aggregates : Discrete clusters of particles formed naturally or artificially and including such particles as crumbs, granules, clods, fecal pellets, fragments of fecal pellets and concretions.

Aggregation : A mass or body of individual units or particles. Healthy soil has good aggregation. As microorganisms and worms feed, they form polysaccharides which act like glue to hold individual soil particles together, creating groups, or aggregates, of particles. This loose formation allows soil to hold both water and air, and does not restrict the growth of roots.

Agribusiness : Producers and manufacturers of agricultural goods and services, such as fertilizer and farm equipment makers, food and fiber processors, wholesalers, transporters, and retail food and fiber outlets.

Agricultural Waste : Waste materials produced from the raising of plants and animals, including manures, bedding, plant stalks, hulls, leaves and vegetable matter.

Agronomy : That part of agriculture devoted to the production of crops and soil management - the scientific utilization of agricultural land.

Ai : (Animal science) artificial insemination. Impregnating an animal through artificial means, not through natural breeding.

Air Classification : The separation of mixed waste materials using a moving stream of air; light wastes are carried upward while heavy components drop out of the stream.

Air Mass : A body of air whose temperature and humidity characteristics remain relatively constant over a horizontal distance of hundreds to thousands of kilometers. Air masses develop their climatic characteristics by remaining stationary over a source region for a number of days. Air masses are classified according to their temperature and humidity characteristics.

Air Pollution : Toxication of the atmosphere through the addition of one or more harmful substances in the air. Substance must be in concentrations high enough to be hazardous to humans, other animals, vegetation, or materials. Also see primary pollutant and secondary pollutant.

Air Pressure : See atmospheric pressure.

Airborne transmission : The type of infectious organism transmission in which the pathogen is truly suspended in the air and travels over a meter or more from the source to the host.

Akinetes : Specialized, nonmotile, dormant, thick-walled resting cells formed by some cyanobacteria.

Alb an : albic horizon.

Albedo : Is the reflectivity of a surface.

Alcoholic fermentation : A fermentation process that produces ethanol and CO₂ from sugars.

Aleutian Low : Subpolar low pressure system found near the Aleutian Islands. Most developed during the winter season. This large-scale pressure system spawns mid-latitude cyclones.

Alfalfa weevil : A small, dark brown weevil that is problem in alfalfa.

Alfisols : Other soils that do not have a plaggen epipedon and that have either:

An argillic, kandic, or natric horizon; or

A fragipan that has clay films 1 mm or more thick in some part.

Alga (plural, algae) : Phototrophic eukaryotic microorganism. Algae could be unicellular or multicellular. Bluegreen algae are not true algae; they belong to a group of bacteria called cyanobacteria.

Algae : Any of various primitive, chiefly aquatic, one- or multi-celled, nonflowering plants that lack true stems, roots, and leaves, but usually contain chlorophyll. Algae convert carbon dioxide and inorganic nutrients, such as nitrogen and phosphorus, into organic matter through photosynthesis and form the basis of the marine food chain. Common algae include dinoflagellates, diatoms, seaweeds, and kelp.

Algae : Plant like marine organisms that range in size from microscopic phytoplankton to the giant kelp that can be found washed ashore on our beaches. Algae contains chlorophyll, the same pigment used by land plants to perform photosynthesis.

Algae Bloom : A bloom, or rapid growth, of phytoplankton in the upper layers of the ocean, often due to an influx of nutrients, such as a sediment plume or seasonal upwelling.

Algal bloom : A condition which occurs when excessive nutrient levels and other physical and chemical conditions facilitate rapid growth of algae. Algal blooms may cause changes in water color. The decay of the algal bloom may reduce

dissolved oxygen levels in the water.

Alien Species : Species that is not naturally found in a region.

Aliphatic : Organic compound in which the main carbon structure is a straight chain.

Alkali (sodic) soil : A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alkaline : (1) Having a pH greater than 7.

(2) Substance that releases hydroxyl ions (OH⁻).

Alkaline : A basic reaction in which the pH reading is above 7.0

Alkaline (basic). : Above pH 7.

Alkaline Lake : Alkaline Lake - Lakes having alkaline water, water with pH greater than 7, and thought to be about 9; pH of 1 is completely acidic and pH of 14 is completely alkaline.

Alkaline soil, alkalinity : Alkaline soils have laboratory measured pH values >8.5. Alkalinity may inhibit the growth of plants.

Alkaline soil. : Any soil that has a pH greater than 7.3. (See Reaction, Soil.)

Alkaline substance : Chemical compounds in which the basic hydroxide (OH⁻) ion is united with a metallic ion, such as sodium hydroxide (NaOH) or potassium hydroxide (KOH). These substances impart alkalinity to water and are employed for neutralization of acids. Lime is the most commonly used alkaline material in wastewater treatment.

Alkalophile : Organism that grows best under alkaline conditions (up to a pH of 10.5).

Alkene : Straight chain or branched organic structure that contains at least one double bond.

Allele : Alternative forms of a gene. Each form produces a unique inheritable characteristic.

Allelopathy : A particular form of amensalism found in plants. In this interaction, one species produces and releases of chemical substances that inhibit the growth of another species.

Allochthonous flora : Organisms that are not indigenous to the soil but that enter soil by precipitation, diseased tissues, manure, and sewage. They may persist for some time but do not contribute in a significant way to ecologically significant transformations or interactions.

Allogenic Succession : A succession caused by a change in environmental conditions that is unrelated to the activities of the developing plant community.

Allopatric Speciation : The evolution of a new species because of the isolation of a small group of individuals from the other members of a population.

Allophane : Hydrated aluminosilicate substance ordinarily found associated with clay minerals.

Allosteric site : Site on the enzyme other than the active site to which a nonsubstrate compound binds. Binding may result in a conformational change at the active site so that the normal substrate cannot bind to it.

Allosteric site : Site on the enzyme other than the active site to which a nonsubstrate compound binds. This may result in a conformational change at the active site so that the normal substrate cannot bind to it.

Allotype : Allelic variants of antigenic determinant(s) found on antibody chains of some, but not all, members of a species, which are inherited as simple Mendelian traits.

Alluvial : Pertaining to material or processes associated with transportation and or subaerial deposition by concentrated running water.

Alluvial Fan : Alluvial Fan - A low, outspread, relatively flat to gently sloping mass of loose rock material, shaped like an open fan or segment of a flattish cone, deposited by a stream at a place where it issues from a narrow valley onto a plain.

Alluvial Fan : Large fan shaped terrestrial deposit of alluvial sediment on which a braided stream flows over. Form as stream load is deposited because of a reduction in the velocity of stream flow.

Alluvial Pan or Alluvial Cone : Sediments deposited in a characteristic fan or cone shape by a mountain stream as it flows on to a plain or flat open valley.

Alluvial Plain : A flat area built up of alluvium.

Alluvial Soil : A general term for those soils developed on a fairly recent alluvium.

Alluvial Terraces : Flat elevated benches composed of unconsolidated alluvium found either side of a stream channel. Formed when a stream down cuts into its floodplain.

Alluviation. : The process of building up of sediments by a stream at places where stream velocity is decreased. The coarsest particles settle first and the finest particles settle last.

Alluvium : Alluvium - Clay, silt, sand, gravel, or similar unconsolidated material deposited by a stream or other body of running water, as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, as a cone or fan at

the base of a slope.

Alluvium : Sediment that originates from a stream. OR Unconsolidated clastic material subaerially deposited by running water, including gravel, sand, silt, clay, and various mixtures of these

ALLUVIUM (recent) : Soil particles, such as sand, silt, and clay that have been eroded from uplands and been deposited on flood plains by modern day streams.

Alluvium : Material, such as sand, silt, or clay, deposited on land by streams.

Alpha hemolysis : A greenish zone of partial clearing around a bacterial colony growing on blood agar.

Alpha Particle : Alpha Particle - A positively charged, sub-atomic particle, a product of radioactive decay, similar to the nucleus of a helium atom, having 2 protons and 2 neutrons.

Alphaproteobacteria : - One of the five subgroups of proteobacteria, each with distinctive 16S rRNA sequences. This group contains most of the oligotrophic proteobacteria; some have unusual metabolic modes such as methylotrophy, chemolithotrophy, and nitrogen fixing ability. Many have distinctive morphological features

Alpine Glacier : Small glacier that occupies a U-shaped valley on a mountain. Also called a mountain glacier.

Alpine humus soils : GSG classification— Characterised by a marked accumulation of well-humified organic matter that is intimately incorporated in the mineral soil to form thick surface horizons of profiles otherwise showing little horizon development.

Alpine Permafrost : Form of permafrost that exists at high altitudes in mountainous environments.

Alpine Tundra : High altitude biome dominated by a few species of dwarf shrubs, a few grasses, sedges, lichens, and mosses. Productivity is low in this biome because of the extremes of climate. Quite similar to tundra.

Alternative complement pathway : An antibody-independent pathway of complement activation that includes the C3-C9 components of the classical pathway and several other serum protein factors (e.g., factor B and properdin)

Alternative Hypothesis (H1) : Is a hypothesis that has been suggested because it is believed to be false or because it is to be used as a starting point for science 09/26/2006 20:30 ng to organize arguments.

Altitude : Vertical distance above sea-level.

Altostratus Clouds : Middle altitude cloud that is colored from white to gray. This cloud is composed of a mixture of water droplets and ice crystals. It appears

in the atmosphere as layers or patches that are well rounded and commonly wavelike. Found in an altitude range from 2,000 to 8,000 meters.

Altostratus Clouds : Gray-looking middle altitude cloud that is composed of water droplets and ice crystals. Appears in the atmosphere as dense sheet like layer. Can be recognized from stratus clouds by the fact that you can see the sun through it. Found in an altitude range from 2,000 to 8,000 meters.

Alum : Astringent crystalline double sulfate of an alkali. $K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$. Used in the processing of pickles and as a flocking agent. Excess aluminum in the environment can be hazardous.

Alveolar macrophage : A vigorously phagocytic macrophage located on the epithelial surface of the lung alveoli where it ingests inhaled particulate matter and microorganisms

AM (arbuscular mycorrhizae) : The group of endomycorrhizal fungi important in non-woody plants, including many agricultural crops. Sometimes called vesicular-arbuscular mycorrhizae (VAM).

Ambient temperature : Temperature of the surroundings.

Amendment (soil amendment) : A material used to alter the chemical or physical properties of a soil and to make the soil more productive. Soil amendments generally are materials other than fertilizers and include substances such as limestone, gypsum, and peatmoss.

Amendment (Soil) : A material that is added to soil to improve chemical or physical characteristics or as a means of treating a waste material.

Amensalism (antagonism) : Interaction between organisms where one organism is adversely affected and the other organism is unaffected, like antibiosis and allelopathy.

Ames test : A test that uses a special Salmonella strain to test chemicals for mutagenicity and potential carcinogenicity.

Amino Acid : An organic compound containing both the amino (NH_2) and carboxyl ($COOH$) groups. Amino acid molecules combine to form proteins, therefore they are a fundamental constituent of living matter. They are synthesized by autotrophic organisms, principally green plants.

Amino acid activation : The initial stage of protein synthesis in which amino acids are attached to transfer RNA molecules.

Amino acids : Complex acidic compounds containing a molecule of ammonia (NH_2). Large numbers of these linked together form the protein molecule.

Amino group : An NH_2 group attached to a carbon skeleton as in the amines and amino acids.

Aminoacyl or acceptor site (A site) : The site on the ribosome that contains an aminoacyl-trna at the beginning of the elongation cycle during protein synthesis; the growing peptide chain is transferred to the aminoacyl-trna and lengthens by an amino acid.

Aminoglycoside antibiotics : A group of antibiotics synthesized by *Streptomyces* and *Micromonospora*, which contain a cyclohexane ring and amino sugars; all aminoglycoside antibiotics bind to the small ribosomal subunit and inhibit protein synthesis.

Ammonia : Chemical compound composed of nitrogen and hydrogen (NH_3). Component of the nitrogen cycle. Immediately released from organic matter upon decomposition.

Ammonia Fixation : Adsorption of ammonium ions by clay minerals, rendering them insoluble and non-exchangeable.

Ammonia oxidation : Test drawn during manufacturing process to evaluate the ammonia oxidation rate for the nitrifiers.

Ammonification : Liberation of ammonium (ammonia) from organic nitrogenous compounds by the action of microorganisms.

Ammonite : Ammonite - Any ammonoid cephalopod belonging to the order Ammonitida, characterized by a thick, ornamented shell with sutures (seams) having finely divided lobes and saddles. Range: Jurassic to Cretaceous.

Ammonium : Chemical compound composed of nitrogen and hydrogen (NH_4). Component of the nitrogen cycle. Product of organic matter decomposition. Can be fixed to clay minerals and later exchanged.

Ammonoid : Ammonoid - An order of extinct cephalopods, characterized by an external shell that is symmetrical, chambered and coiled.

Amoeba (plural, amoebae) : Protozoa that can alter their cell shape, usually by the extrusion of one or more pseudopodia.

Amoeboid movement : Moving by means of cytoplasmic flow and the formation of pseudopodia (temporary cytoplasmic protrusions of the cytoplasm)

Amoozemeter : A tool that uses a constant head of water to measure the rate of water movement in a saturated soil, and thus estimates saturated hydraulic conductivity.

Amphibian : Group of vertebrate animals that can inhabit both terrestrial and aquatic habitats. This group of animals consists of frogs, newts, and salamanders. These organisms live at the land/water interface and spend most of their life in water. Descended from fish and ancestors to reptiles.

Amphibole : A group of double chained inosilicate minerals whose basic chemical

unit is the tetrahedron (SiO_4). They are common rock forming minerals and are found in most igneous and metamorphic rocks. They form at low temperatures with the presence of water in the crystallization environment. There are about 60 recognized mineral types in this group.

Amphibolic pathways : Metabolic pathways that function both catabolically and anabolically

Amphipod : Amphipod - Any crustacean belonging to the order Amphipoda, characterized by fixed eyes and lack of a carapace.

Amphitrichous : A cell with a single flagellum at each end

Amphotericin B : An antibiotic from a strain of *Streptomyces nodosus* that is used to treat systemic fungal infections; it also is used topically to treat candidiasis.

Amygdaloidal Agates : Amygdaloidal Agates - Agate nodules, usually almond-shaped, that form in basaltic or andesitic rocks.

Anabolism : Metabolic processes involved in the synthesis of cell constituents from simpler molecules. An anabolic process usually requires energy.

Anadromous : Migrating upstream to freshwater streams to spawn.

Anadromus : Anadromus - Returning from the sea to freshwater to spawn, like Pacific salmon.

Anaerobe : An organism that lives and reproduces in the absence of dissolved oxygen, instead deriving oxygen from the breakdown of complex substances.

Anaerobic : (i) Absence of molecular oxygen. (ii) Growing in the absence of molecular oxygen, such as anaerobic bacteria. (iii) Occurring in the absence of molecular oxygen, as a biochemical process.

Anaerobic : Anaerobic - Lacking oxygen.

Anaerobic : (1) Absence of molecular oxygen.

(2) Occurring only in the absence of molecular oxygen.

(3) Growing in the absence of molecular oxygen.

Anaerobic : Without oxygen. Anaerobic organisms, including some soil bacteria, need oxygen-free environments such as saturated soils. Facultative anaerobes can function as either aerobes or anaerobes depending on environmental conditions. See aerobic.

Anaerobic Organism : One that lives in an environment without molecular oxygen.

Anaerobic respiration : Metabolic process whereby electrons are transferred from an organic, or in some cases, inorganic compounds to an inorganic acceptor molecule other than oxygen. The most common acceptors are nitrate, sulfate, and

carbonate.

Anamorph : Asexual stage of fungal reproduction in which cells are formed by the process of mitosis.

Anaplerotic reactions : Reactions that replenish depleted tricarboxylic acid cycle intermediates.

Andesite : Andesite - A dark fine-grained basic igneous rock, usually with hornblende, pyroxene, biotite and calcic feldspar.

Andisols : Soil order (type) of the United States Department of Agriculture Comprehensive Soil Classification System. These soils develop from parent materials that are volcanic in origin.

Anemometer : Mechanical instrument used to measure wind speed. These instruments commonly employ three methods to measure this phenomenon: 1) A device with three or four open cups attached to a rotating spindle. The speed of rotation is then converted into a measurement of wind speed; 2) A pressure plate that measures the force exerted by the moving wind at right angles; 3) An instrument consisting of a heated-wire where electrical resistance (temperature of the wire) is adjusted to account for heat lost by air flow. The faster the wind the greater the heat loss and thus the more energy that is required to keep the wire at a constant temperature. As a result, wind speed is measured through the drain of electrical current.

Anergy : A state of unresponsiveness to antigens. Absence of the ability to generate a sensitivity reaction to substances that are expected to be antigenic.

Aneroid Barometer : Barometer that measures atmospheric pressure via the expansion and contraction of a sealed hollow cell which is partially depleted of air.

Angiosperms : Group of vascular plants who encase their seeds in a mature ovary or fruit.

Angle of Incidence : Angle at which the sun's rays or insolation strike the Earth's surface. If the sun is positioned directly overhead or 90° from the horizon, the incoming insolation strikes the surface of the Earth at right angles and is most intense.

Angle of Repose : Measurement commonly used in civil engineering. It is the maximum angle at which a material can be inclined without failing. Geomorphologists use this measurement for determining the stability of slope to mass movements.

Angular blocky structure : A cube-shaped ped where soil particles are arranged around a point, bounded by six relatively flat, roughly equal faces. See also sub-angular blocky.

Angular orphans. : Angular fragments separated from weathered, well-rounded cobbles in colluvium derived from conglomerate.

Anhydrobiosis : Life history strategy to tolerate desiccation in which organisms lose water, initiating lower physiological activity; upon rehydration the organism becomes active again.

Anhydrous : Anhydrous - Having no water in a chemical compound.

Animal : Organisms that belong to the kingdom Animalia. General characteristics of these organisms include: eukaryotic cell type, mitochondria, and a complex nervous system. This group of life includes organisms like sponges, jellyfishes, arthropods (insects, shrimp, and lobsters), mollusks (snails, clams, oysters, and octopuses), fish, amphibians (frogs, toads, and salamanders), reptiles (turtles, lizards, alligators, crocodiles, snakes), birds, and mammals (kangaroos, bats, cats, rabbits, elephants, whales, porpoises, monkeys, apes, and humans).

Animalia : Group, at the kingdom level, in the classification of life. Multicellular organisms that have a eukaryotic cell type, mitochondria, and a complex nervous system.

Anion : An ion having a negative charge. OR An ion carrying a negative atomic charge.

Anion Exchange : Anion Exchange - Chemical process where negative ions of one chemical are preferentially replaced by negative ions of another chemical.

Anion Exchange Capacity : The total amount of anions that a soil can adsorb, usually expressed as mmolc per kg soil.

Anisotropic : 1. General: possessing different physical properties in different directions 2. General: having physical properties that depend on direction 3. Minerals or parts of soils: alternately bright and dark between crossed polars when the microscope stage is rotated. The bright position is due to the formation of interference colors. SEE INTERFERENCE COLORS.

Annelid : Phylum of segmented aquatic and terrestrial worms. Each segment has its own excretory and sensory elements, with specialized functions (e.g. Reproduction) associated with specific segments.

Annotation : The process of determining the location of specific genes in a genome map after it has been produced by nucleic acid sequencing.

Annual : Any plant which completes its entire life cycles and dies within one year or less.

Aquifer a stratum of earth or permeable rock that stores significant quantities of water.

Associated milk producers, inc. (ampi) (dairy science) a farmer-owned milk cooperative that purchases milk from new mexico dairy producers. Southern region headquarters in arlington, texas.

Annual Plant : A plant that completes its life cycle within one year.

Annular Space : Annular Space - The space between the well bore and the outside of the well casing.

Anoxic : An environment without oxygen.

Anoxic. (see also gleyed soil). : A soil having a low redox potential.

Anoxygenic photosynthesis : Type of photosynthesis in green and purple bacteria in which oxygen is not produced.

Antagonist : Biological agent that reduces the number or diseaseproducing activities of a pathogen.

Antarctic Circle : Latitude of 66.5° South. The northern limit of the area of the Earth that experiences 24 hours of darkness or 24 hours of day at least one day during the year.

Antarctic High : A region of high pressure that occupies central Antarctic throughout the year. This pressure system is responsible for very cold temperatures and extremely low humidity.

Anthridium : Male gametangium found in the phylum Oomycota (Kingdom Stramenopila) and phylum Ascomycota (Kingdom Fungi).

Anthrax : An infectious disease of animals caused by ingesting *Bacillus anthracis* spores. Can also occur in humans and is sometimes called woolsorter's disease.

Anthropogenic : Generated by humans. Used to indicate soil conditions, disturbances, or stresses that are created by people.

Anthroposols : These soils result from human activity e.g. Mine spoil where origin soils may be buried and new parent material introduced. A Soil Order of the Australian Soil Classification (Isbell, 1996). OR ASC Soil Order classification—Soils resulting from human activities.

Antibiosis : Inhibition or lysis of an organism mediated by metabolic products of the antagonist; these products include lytic agents, enzymes, volatile compounds, and other toxic substances.

Antibiotic : Organic substance produced by one species of organism that in low concentrations will kill or inhibit growth of certain other organisms.

Antibiotic resistance : When antibiotics are incorrectly used (to treat bacteria that are not sensitive to the specific antibiotic or to treat viruses, which NEVER respond to antibiotics) and are not taken for the full term prescribed (usually

from 5 to 21 days, depending on the specific antibiotic and disease being treated), surviving pathogenic organisms develop immunity to the antibiotic and pass it along to descendants and might choose to pass the trait along to unrelated bacteria via a process known as horizontal gene transfer.

Antibody : Protein that is produced by animals in response to the presence of an antigen and that can combine specifically with that antigen. A glycoprotein produced in response to the introduction of an antigen; it has the ability to combine with the antigen that stimulated its production. Also known as an immunoglobulin (Ig).

Antibodydependent cellmediated cytotoxicity (ADCC) : The killing of antibody-coated target cells by cells with Fc receptors that recognize the Fc region of the bound antibody. Most ADCC is mediated by NK cells that have the Fc receptor or CD16 on their surface.

Antibodymediated immunity : See humoral immunity

Anticline : Anticline - A fold in bedded rock in which the beds dip (slant) away from one another. OR A fold in rock layers that forms an arch. OR The base triplet on a trna that is complementary to the triplet codon on mrna.

Anticyclone : An atmospheric pressure system consisting of an area of high pressure and outward circular surface wind flow. In the Northern Hemisphere winds from an anticyclone blow clockwise, while Southern Hemisphere systems blow counterclockwise.

Antigen : Substance that can incite the production of a specific antibody and that can combine with that antibody. A foreign (nonself) substance (such as a protein, nucleoprotein, polysaccharide, or sometimes a glycolipid) to which lymphocytes respond; also known as an immunogen because it induces the immune response.

Antigenbinding fragment (Fab) : "Fragment antigen binding." A monovalent antigen-binding fragment of an immunoglobulin molecule that consists of one light chain and part of one heavy chain, linked by interchain disulfide bonds.

Antigenic determinant site (epitope) : See epitope

Antigenic drift : A small change in the antigenic character of an organism that allows it to avoid attack by the immune system.

Antigenic shift : A major change in the antigenic character of an organism that alters it to an antigenic strain unrecognized by host immune mechanisms.

Antigenpresenting cells : Antigen-presenting cells (apcs) are cells that take in protein antigens, process them, and present antigen fragments to B cells and T cells in conjunction with class II MHC molecules so that the cells are activated. Macrophages, B cells, dendritic cells, and Langerhans cells may act as apcs.

Antimetabolite : A compound that blocks metabolic pathway function by competitively inhibiting a key enzyme's use of a metabolite because it closely resembles the normal enzyme substrate.

Antimicrobial agent : An agent that kills microorganisms or inhibits their growth

Antisense RNA : A single-stranded RNA with a base sequence complementary to a segment of another RNA molecule that can specifically bind to the target RNA and inhibit its activity.

Antiseptic : Agent that kills or inhibits microbial growth but is not harmful to human tissue.

Ap HORIZON : The A horizon is the surface of the soil. The 'p' denotes disturbance by man e.g. Ploughing, deep ripping. Mc Donald et al. (1990).

Apedal : These soils are either single grained (incoherent) or massive (coherent). Peds are not apparent when the soil is moderately moist OR In the moderately moist to moist state, none of the soil material occurs in the form of peds; it is massive or single-grained and when disturbed, separates into fragments or primary particles.

Aphelion : It is the point in the Earth's orbit when it is farthest from the sun (152.5 million kilometers). Aphelion occurs on the 3rd or 4th of July.

Aphids : Problem in almost all crops. Pierce leaves and suck out plants' juices.

API separator : A facility developed by the Committee on Disposal or Refinery Wastes of the American Petroleum Institute for separation of oil from wastewater in a gravity differential and equipped with means for recovering the separated oil and removing sludge

Aplanospore (aplanospor) : A nonflagellated, nonmotile spore that is involved in asexual reproduction

Apoenzyme : The protein part of an enzyme that also has a nonprotein component.

Apoptosis : Programmed cell death. The fragmentation of a cell into membrane-bound particles that are eliminated by phagocytosis. Apoptosis is a physiological suicide mechanism that preserves homeostasis and occurs during normal tissue turnover. It is responsible for cell death in pathological circumstances, such as exposure to low concentrations of xenobiotics and infections by HIV and various other viruses.

Aprepressor : An inactive form of the repressor protein, which becomes the active repressor when the corepressor binds to it

Apothecium : Open ascoma of fungi in the phylum Ascomycota.

Applied Physical Geography : The field of Applied Physical Geography uses

theoretical information from the various fields of Physical Geography to manage and solve problems related to natural phenomena found in the real world.

Aquatic : With reference to water.

Aquatic invertebrates : Aquatic animals without internal skeletal structures, such as insects, mollusks, and crayfish.

Aquic : These soils have stagnant water on the soil surface and/or can be saturated in some part of the upper 0.5 m of the profile, more or less continuously for 2 to 3 months. In this condition, the soil is free of dissolved oxygen. Gley (bluey-grey) colours are often an indication of prolonged saturation. The definition is used as a Suborder distinction for Podosols and Vertosols in the Australian Soil Classification (Isbell, 1996).

Aquic conditions : a soil-water regime, mostly too wet (reducing conditions, waterlogged) for parts of the year. See Chapter 7.

Aquiclude : Aquiclude - A geologic formation or stratum that confines water in an adjacent aquifer. It has a permeability of zero. OR A material which will not transmit water.

Aquifer : A subsurface formation that stores or transmits water in recoverable quantities and can be used as a source of well water for domestic and agricultural use.

Aquifer : An underground geological formation or group of formations containing usable amounts of groundwater that can supply wells and springs.

Aquifer Recharge : Surface area that provides water for an aquifer.

Aquitard : Aquitard - A geologic formation or stratum that retards water movement significantly. It has a permeability of zero.

Arable land : Agricultural land that is cultivated by ploughing, usually to 20 or 30 cm depth. More than 30 cm represents deep ploughing.

Aragonite : Aragonite - The orthorhombic form of calcium carbonate that crystallizes at near-surface temperatures from about 80 to 100 degrees Fahrenheit (25-35 degrees Celsius).

Arbuscular mycorrhiza (AM) : Mycorrhizal type that forms highly branched arbuscules within root cortical cells.

Arbuscule : Special "treeshaped" structure formed within root cortical cells by arbuscular mycorrhizal fungi.

Archaea : Evolutionarily distinct group (domain) of prokaryotes consisting of the methanogens, most extreme halophiles and hyperthermophiles, and Thermoplasma.

Archaea : Is a group of recently discovered organisms that resemble bacteria. However, these organisms are biochemically and genetically very different from bacteria. Some species of the domain Archaea live in the most extreme environments found on the Earth.

Archaeobacteria : Older term for the Archaea. OR Term used to describe organisms that belong to the biological domain Archaea.

Archean : Geologic eon that occurred from 2500 to 3800 million years ago. During this time period, the first single-celled prokaryote organisms evolved and developed.

Archipelago : A group of islands that have an arc shaped distribution. These islands are usually of volcanic origin and are associated with subduction zones.

Arctic Circle : Latitude of 66.5° North. The southern limit of the area of the Earth that experiences 24 hours of darkness or 24 hours of day at least one day during the year.

Area :

Area reclaim (in tables) : An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Area Studies Tradition : Academic tradition in modern Geography that investigates an area on the Earth from a geographic perspective at either the local, regional, or global scale.

Arenic : Soils in which at least the upper 0.5 m of the profile is non-gravelly and of sandy texture throughout. It is also loosely or weakly coherent (see consistence) and may have aeolian (wind-blown) cross-bedding. This term is used in the Australian Soil Classification (Isbell, 1995) to describe Rudosols and Tenosols.

Arête : Sharp topographic ridge that separates cirques on a mountain that is or has been glaciated.

Argic horizon : A subsoil horizon consisting of distinct lamellae that are sharply defined, horizontal to sub-horizontal layers that have a higher clay content than adjacent sandy or sandy loam material, usually 5 to 10 mm thick. Consistence is stronger and the colour usually darker and more reddish or brownish than the surrounding soil. This term is used as a definition for Calcarosols, Kandosols and Tenosols in the Australian Soil Classification (Isbell, 1996). OR A subsoil horizon consisting of distinct lamellae

Argillan : (See Clay Film.)

Argillic horizon : A subsoil horizon characterized by an accumulation of illuvial clay. Commonly denoted as bt or btg horizons. OR a diagnostic of clay accumulation often designated as Bt. See Chapter 2 of Soils in Our Environment.

Arid : A term applied to a region or climate in which precipitation is too low to support crop production.

Aridisols : Other soils that:

Have: An aridic soil moisture regime; and An ochric or anthropic epipedon; and One or more of the following with the upper boundary within 100 cm of the soil surface: a cambic horizon with a lower depth of 25 cm or more; a cryic temperature regime and a cambic horizon; a calcic, gypsic, petrocalcic, petrogypsic, or salic horizon; or a duripan; or An argillic or natric horizon; or Have a salic horizon; and Saturation with water in one or more layers within 100 cm of the soil surface for 1 month or more during a normal year; and A moisture control section that is dry in some or all parts at some time during normal years; and No sulfuric horizon that has its upper boundary within 150 cm of the mineral soil surface.

Aridisols : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. Aridisols are commonly found in dry environments that are low in organic matter and rich in deposited salts.

Arkose : A type of sedimentary sandstone that contains a large quantity of weathered feldspar grains. This type of sedimentary rock forms in arid conditions.

Aromatic : Organic compounds which contain a benzene ring, or a ring with similar chemical characteristics.

Artesian Water : Groundwater that is confined by two impermeable layers beneath the Earth's surface.

Artesian Well : A well where the water rises and flows out to the surface because of hydrostatic pressure.

Arthroconidium : A thallic conidium released by the fragmentation or lysis of hypha. It is not notably larger than the parental hypha, and separation occurs at a septum.

Arthropod : Arthropod - Any organism belonging to the phylum Arthropoda, characterized by a segmented body, jointed legs, a digestive tract and, in most cases, a chitinous shell that is periodically molted to allow growth. Modern-day arthropods include: spiders, insects, crustaceans, scorpions and horseshoe crabs.

Arthrospore : A spore resulting from the fragmentation of a hypha

Artificial Recharge : Artificial Recharge - The unnatural addition of surface waters to groundwater. Recharge could result from reservoirs, storage basins, leaky canals, direct injection of water into an aquifer, or by spreading water over a large land surface.

Artificially acquired active immunity : The type of immunity that results from immunizing an animal with a vaccine. The immunized animal now produces its own antibodies and activated lymphocytes. OR The type of immunity that results

from introducing into an animal antibodies that have been produced either in another animal or by in vitro methods. Immunity is only temporary

Asc : Australian Soil Classification—It is a multi-category scheme with classes defined on the basis of diagnostic horizons or materials and their arrangement in vertical sequence as seen in an exposed soil profile.

Ascocarp : A multicellular structure in ascomycetes lined with specialized cells called asci in which nuclear fusion and meiosis produce ascospores. An ascocarp can be open or closed and may be referred to as a fruiting body.

Ascogenous hypha : A specialized hypha that gives rise to one or more asci.

Ascoma (plural, ascomata) : Fungal fruiting body that contains ascospores; also termed an ascocarp.

Ascospore : Spores resulting from karyogamy and meiosis that are formed within an ascus. Sexual spore of the Ascomycota.

Ascus (plural, asci) : Saclike cell of the sexual state formed by fungi in the phylum Ascomycota containing ascospores.

Aseptic : Free from living germs of disease, fermentation or putrefaction.

Aseptic technique : Manipulating sterile instruments or culture media in such a way as to maintain sterility.

Asexual Reproduction : Any process of reproduction that does not involve the fusion of gametes.

Ash : The white or grayish powder remaining after material has been combusted at 500°C plus or minus 50° in the presence of excess air.

Aspect : The compass direction of a slope.

Assessing soil quality : Estimating the functional capacity of soil by comparing a soil to a standard such as an ecological site description, a similar soil under native vegetation, a reference soil condition, or quality criteria. The objective of the assessment dictates the standard to be used. (Compare to monitoring.)

Assimilate : To take in, similar to eating food.

Assimilation : (1) Absorption and creation of food resources.

(2) Organic metabolic products of food digestion. Usually the various organic constituents of the organism.

Assimilative capacity : The amount of pollutants that a water body may absorb while maintaining corresponding water quality standards, including protection of aquatic life and human health.

Assimilatory nitrate reduction : Conversion of nitrate to reduced forms of nitrogen, generally ammonium, for the synthesis of amino acids and proteins.

Association, soil. : A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Associative dinitrogen fixation : Close interaction between a freeliving diazotrophic organism and a higher plant that results in an enhanced rate of dinitrogen fixation.

Associative symbiosis : Close but relatively casual interaction between two dissimilar organisms or biological systems. The association may be mutually beneficial but is not required for accomplishment of a particular function.

Asthenosphere : Zone in the Earth's mantle that exhibits plastic properties. Located below the lithosphere at between 100 and 200 kilometers.

Astronomy : Field of knowledge that studies the nature, motion, origin, and constitution of celestial bodies.

Atmosphere : The atmosphere is the vast gaseous envelope of air that surrounds the Earth. Its boundaries are not easily defined. The atmosphere contains a complex system of gases and suspended particles that behave in many ways like fluids. Many of its constituents are derived from the Earth by way of chemical and biochemical reactions.

Atmospheric Pressure : Weight of the atmosphere on a surface. At sea-level, the average atmospheric pressure is 1013.25 millibars. Pressure is measured by a device called a barometer.

Atmospheric Stability : Relative stability of parcels of air relative to the atmosphere that surrounds them. Three conditions are generally described: stable, unstable, and neutral.

Atoll : A ring shaped reef composed largely of coral. These features are quite common in the tropical waters of the Pacific Ocean.

Atom : Smallest unit of an element that still maintains its chemical characteristics.

Atomic Energy : Energy released from an atomic nucleus because of a change in its subatomic mass.

Atomic Mass Number : Combined number of an atom's protons and neutrons.

Atomic Number : Number of protons in the nucleus of an atom.

Atomic Weight : Combined weight of an atom's electrons, protons, and neutrons.

ATP : Adenosine triphosphate. Chemical energy generated by substrate oxidations is conserved by formation of high-energy compounds such as adenosine diphosphate (ADP) and adenosine triphosphate (ATP) or compounds containing the thioester bond.

Attached growth processes : Wastewater treatment processes in which the

microorganisms and bacteria treating the wastes are attached to the media in the reactor. The wastes being treated flow over the media. Trickling filters, bio-towers, and RBCs are attached growth reactors. These reactors can be used for removal of BOD, nitrification, and denitrification.

Atterberg limits : water content of manipulated soil at different consistency. See Liquid limit, Plastic limit. OR The moisture content at which a soil passes from a semi-solid to a plastic state (plastic limit, PL) and from a plastic to a liquid state (liquid limit, LL). The plasticity index (PI) is the numerical difference between the LL and the PL.

Attributes of soil change : Quantifiable properties used to describe the nature of soil change, including drivers, types, rates, reversibility, and pathways of change.

Augered Well : Augered Well - A well that is constructed by using an auger to bore the hole and extract materials

Augite : Augite - A monoclinic pyroxene mineral composed of calcium magnesium silicate with considerable aluminum and iron; an important component of basalts and andesites.

Aulacogen : Aulacogen - A fault-bounded trough or graben that developed as a rift between two more or less parallel faults.

Aug : (Animal science) animal unit month. The amount of forage required by a mature cow (or other grazing animal) and her calf for one month.

Aureole : Halo or ring around a feature.

Aurora : Multicolored lights that appear in the upper atmosphere (ionosphere) over the polar regions and visible from locations in the middle and high latitudes. Caused by the interaction of solar wind with oxygen and nitrogen gas in the atmosphere. Aurora in the Northern Hemisphere are called aurora borealis and aurora australis in the Southern Hemisphere.

Autochthonous flora : See oligotrophs.

Autochthonous organism : see oligotrophs.

Autogenic Succession : Succession where the plant community causes the environment to change and this modification drives the succession.

Autogenous infection : An infection that results from a patient's own microbiota, regardless of whether the infecting organism became part of the patient's microbiota subsequent to admission to a clinical care facility

Autoimmune disease : A disease produced by the immune system attacking self-antigens. Autoimmune disease results from the activation of self-reactive T and B cells that damage tissues after stimulation by genetic or environmental triggers.

Autoimmunity : Autoimmunity is a condition characterized by the presence of serum autoantibodies and self-reactive lymphocytes. It may be benign or pathogenic. Autoimmunity is a normal consequence of aging; is readily inducible by infectious agents, organisms, or drugs; and is potentially reversible in that it disappears when the offending "agent" is removed or eradicated.

Autolysins : Enzymes that partially digest peptidoglycan in growing bacteria so that the peptidoglycan can be enlarged

Autolysis : Spontaneous lysis.

Autoradiography : Detecting radioactivity in a sample, such as a cell or gel, by placing it in contact with a photographic film.

Autotroph : Organism which uses carbon dioxide as the sole carbon source.

Autotroph : An organism that produces food molecules inorganically by using a light or chemical based sources of external energy. This organism does not require outside sources of organic food energy for survival. Also see chemical autotrophs and photosynthetic autotrophs. OR Organism which uses carbon dioxide as the sole carbon source.

Autotrophic nitrification : Oxidation of ammonium to nitrate through the combined action of two chemoautotrophic organisms, one forming nitrite from ammonium and the other oxidizing nitrite to nitrate.

Autotrophic Organism : Organisms that utilize carbon dioxide as a source of carbon and obtain their energy from the sun or by oxidizing inorganic substances such as sulfur, hydrogen, ammonium, and nitrate salts. The former include the higher plants and algae and the latter various bacteria, cf. HETEROTROPHIC

Autotrophy : A unique form of metabolism found only in bacteria. Inorganic compounds (e.g., NH_3 , NO_2^- , S_2 , and Fe^{2+}) are oxidized directly (without using sunlight) to yield energy. This metabolic mode also requires energy for CO_2 reduction, like photosynthesis, but no lipid-mediated processes are involved. This metabolic mode has also been called chemotrophy, chemoautotrophy, or chemolithotrophy.

Autumnal Equinox : One of the two periods when the declination of the sun is at the equator. The autumnal equinox occurs on September 22 or 23.

Auxotroph : A mutated prototroph that lacks the ability to synthesize an essential nutrient and therefore must obtain it or a precursor from its surroundings.

Available : In general, a form capable of being assimilated by a growing plant.

Available Elements : The elements in the soil solution that can readily be taken up by plant roots.

Available Nutrients : See available elements

Available soil water : That part of the water in the soil that can be absorbed by plant roots, that can be held between field capacity and the moisture content at which plant growth ceases.

Available Water : That part of the water in the soil that can be taken up by plant roots. OR Portion of the capillary water that is available for plant root uptake.

Available Water Capacity : The weight percentage of water which a soil can store in a form available to plants. It is equal to the moisture content at field capacity minus that at the wilting point. OR

The capacity of soils to hold water available for use by most plants, usually defined as water between -33 kPa and -1500 kPa. In a 2 meter profile, or a more shallow limiting layer, the values are as following:

Very low	0-3 in	0-7.5 cm
Low	3-6 in	7.5-15cm
Moderate	6-9 in	15-23 cm
High	9-12 in	23-30 cm
Very high	More than 12 in	More than 30cm

Available water capacity (available moisture capacity) : The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as

Class :	Inches/inch
Very low :	0 to 3
Low :	3 to 6
Moderate :	6 to 9
High :	9 to 12
Very high :	More than 1

Available water capacity (AWC) : Loosely, the amount of water available for plants to use. Specifically, the volume of water released from soil between the time the soil is at field capacity (the maximum water held in soil against the pull of gravity) until the time it is at the wilting point (the amount of water held too tightly in soil for commonly grown crops to extract). Loamy soils and soils high in organic matter have the highest AWC.

Available water holding capacity : The capacity of soil to hold water between field capacity and the wilting point of plants. It is the pool from which growing plants obtain the water necessary for plant growth.

Available water. : The soil water that can be withdrawn by plant roots or the water that is held in soils (or released to plants) between the field capacity and the wilting percentage.

Available waterholding capacity : The ability to hold that part of the water in the soil that can be absorbed by plant roots. Available water is the difference between field capacity and permanent wilting point.

Average Global Temperature : Average annual temperature of the Earth's entire surface atmosphere.

Avulsion : Avulsion - A sudden separation of land by flood or an abrupt change in the course of a stream, as by a stream breaking through a meander or natural levee or by a change in current when a stream deserts its old channel for a new one.

AWT : Advanced Waste Treatment - any process of water renovation that upgrades treated wastewater to meet reuse requirements.

Axenic : Literally "without strangers." A system in which all biological populations are defined, such as a pure culture.

Axial filament : The organ of motility in spirochetes. It is made of axial fibrils or periplasmic flagella that extend from each end of the protoplasmic cylinder and overlap in the middle of the cell. The outer sheath lies outside the axial filament.

Azimuth : A system that measures direction clockwise from North over 360°.

Azonal soil : A soil without developed horizons.

Azores High : See Bermuda High.

B

B cell, also known as a B lymphocyte : A type of lymphocyte derived from bone marrow stem cells that matures into an immunologically competent cell under the influence of the bursa of Fabricius in the chicken and bone marrow in nonavian species. Following interaction with antigen, it becomes a plasma cell, which synthesizes and secretes antibody molecules involved in humoral immunity.

B Horizon : Soil horizon normally found below the A horizon and above the C horizon. This layer is characterized by the following features:

- (1) Enrichment of clay because of illuviation from the A horizon.
- (2) Enrichment of iron and aluminum oxides because of illuviation of these materials from the A horizon. In some cases the precipitation of iron can cause the development of a hardpan.
- (3) Accumulation of calcium carbonate, calcium sulfate, and other salts.
- (4) Higher bulk density because of the illuvial deposition of clay particles OR The layer of soil below the A horizons, usually of finer texture (ie, more clayey), denser and stronger in colour. Thickness ranges from 10 cm to 2 m thick and is divided into B₁ and B₂ horizons..

B.S. : An abbreviation for Base Saturation.

Bachtritoid : Bachtritoid - A straight cephalopod belonging to the subclass bactritoidea, characterized by a shell of relatively uniform shape, having a small globular to oval-shaped protoconch and a much larger cone-shaped, actual conch.

Bacillus : Bacterium with an elongated, rod shape.

Back-barrier beach : A narrow, elongate, intertidal, sloping landform that is generally parallel with the shoreline located on the lagoon or estuary side of the barrier island, or spit. Compare - Barrier Island.

Back-barrier flat : A subaerial, gently sloping landform on the lagoon side of the barrier beach ridge composed predominantly of sand washed over or through the beach ridge during tidal surges (modified from Jackson, 1997). Compare - Washover-fan Flat.

Background Extinction : Normal extinction of species that occurs as a result of changes in local environmental conditions. Also see mass extinction.

Background level : Amount of a substance expected to occur naturally in the

environment.

Backplain : Large flat at some distance from the stream channel which often has a high watertable and receives fine sediment from overbank deposition; in some cases biological (peat) accumulation occurs.

Backscattering : Portion of solar radiation directed back into space as a result of particle scattering in the atmosphere.

Backshore : Area behind the shore. This coastal feature is located between the beach berm and the backshore slope.

Backshore slope : Sloping bank landward of the shore. This coastal feature is composed of relatively non-mobile sediments.

Backslope : The hillslope profile position that forms the steepest and generally linear, middle portion of the slope.

Backswamp : Marshy low lying area in a stream's floodplain. Commonly found behind levees.

Backwash : The return water flow of swash. This sheet of water flows back to ocean because of gravity.

Backwashing : Reversing the flow of water back through the filter media to remove entrapped solids.

Bacteremia : The presence of viable bacteria in the blood.

Bacteria : All prokaryotes that are not members of the domain Archaea. OR Microscopic organisms that live on water and on land. They help break down organic materials into simpler nutrients in a process called decay. Bacteria release nutrients to the soil.

Bacterial artificial chromosome (BAC) : A cloning vector constructed from the E. Coli F-factor plasmid that is used to clone foreign DNA fragments in E. Coli

Bacterial Photosynthesis : A light-dependent, anaerobic mode of metabolism. Carbon dioxide is reduced to glucose, which is used for both biosynthesis and energy production. Depending on the hydrogen source used to reduce CO₂, both photolithotrophic and photoorganotrophic reactions exist in bacteria.

Bacterial-dominated food web : A soil food web in which the ratio of fungal biomass to bacterial biomass is less than one.

Bactericide : An agent that kills bacteria

Bacteriochlorophyll : Lightabsorbing pigment found in green sulfur and purple sulfur bacteria.

Bacteriocin : Agent produced by certain bacteria that inhibits or kills closely related isolates and species.

Bacteriocin : Agent produced by certain bacteria that inhibits or kills closely related isolates and species.

Bacteriophage : Virus that infects bacteria, often with destruction or lysis of the host cell.

Bacteriorhodopsin : A protein containing retinal found in the membranes of certain extremely halophilic Archaea and which is involved in light-mediated ATP synthesis.

Bacteriostatic : Inhibiting the growth and reproduction of bacteria.

Bacteriovorous : Feeding on bacteria.

Bacteroid : Altered form of cells of certain bacteria. Refers particularly to the swollen, irregular vacuolated cells of rhizobia in nodules of legumes. A modified, often pleomorphic, bacterial cell within the root nodule cells of legumes; after transformation into a symbiosome it carries out nitrogen fixation.

Badlands : (1) Term used to describe a part of South Dakota.

(2) Term used to describe a semi-arid landscape that has been influenced by heavy fluvial erosion. Characterized by deep ravines and gullies, sharp ridges, and a generally barren surface.

Baeocytes : Small, spherical, reproductive cells produced by pleurocapsalean cyanobacteria through multiple fission.

Bajada : Consecutive series of alluvial fans forming along the edge of a linear mountain range. Surface of this feature undulates in a rolling fashion as one moves from the center of one alluvial fan to another. Normally occurs in arid climates.

Balance : Soils function best as a growing media when physical, biological, and chemical factors are all within desirable ranges. Soil within these ranges are referred to as balanced.

Balanced growth : Microbial growth in which all cellular constituents are synthesized at constant rates relative to each other

Banding : applying fertilizer or other amendment into the soil (7-15 cm, or 2.7-6 in, deep) in a thin narrow strip (band), as beside or beneath a planted row of seeds or plants.

Banding : Application of fertilizer in a concentrated linear zone in the soil, commonly along side the rows of crops. Contrast with broadcasting, which is wide zone application of fertilizer commonly across the surface of the soil or placed or tilled into the soil in an area or zone between rows of crops.

Bank-Caving : Collapse of stream bank material into a stream channel.

Bankfull height : The flow in a stream that just fills the stream channel to the top

of its banks and the point where the water begins to overflow onto a flood plain.

Bar : (1) Coarse grained deposit of sediment from a stream or ocean currents.

(2) A unit of measurement for quantifying force. Equivalent to 1,000,000 dynes per square centimeter.

Barchan Dune : Crescent shaped sand dune that has its long axis transverse to the wind and its crescent tips pointed downwind.

Barite : Barite - Orthorhombic, slightly soluble barium sulfate.

Barometer : Instrument that measures atmospheric pressure.

Barophile : An organism able to live optimally at high hydrostatic pressure.

Barotolerant - : An organism able to tolerate high hydrostatic pressure, although growing better at normal pressures.

Barrier Beach : A long and narrow beach of sand and/or gravel that runs parallel to the coastline and is not submerged by the tide.

Barrier beach : A narrow, elongate, coarse-textured, intertidal, sloping landform that is generally parallel with the beach ridge component of the barrier island, or spit and adjacent to the ocean. Compare - Barrier Island. (Jackson, 1997; Peterson, 1981).

Barrier cove : A subaqueous area adjacent to a barrier island or submerged barrier beach that forms a minor embayment or cove within the larger basin. Compare - Cove, Mainland Cove.

Barrier island : A long, narrow, sandy island that is above high tide and parallel to the shore that commonly has dunes, vegetated zones, and swampy terrains extending lagoonward from the beach. Compare - barrier beach. (modified from Jackson, 1997)

Barrow : (Animal science) a male pig castrated before reaching sexual maturity.

Basal body : The cylindrical structure at the base of procaryotic and eucaryotic flagella that attaches them to the cell.

Basal medium : A(n) (unsupplemented) medium which allows the growth of many types of microorganisms which do not require any special nutrient supplements, e.g. Nutrient broth.

Basal Sliding : The sliding of a glacier over the surface it rests on. Caused by the gradient of the slope and the weight of the glacier's mass.

Basal till : Compact glacial till deposited beneath the ice.

Basalt : A fine grained igneous rock forming lava flows or minor intrusions. It is composed of plagioclase, augite and magnetite; olivine may be present.

Basalt : A dark colored fine grained igneous rock formed from mafic magma.

Basalt Plateau : Extensive continental deposits of basaltic volcanic rock.

Basaltic Magma : Mafic magma that forms basaltic igneous rocks.

Base : (1) Substance having a pH greater than 7.

(2) Substance that releases hydroxide ions (OH⁻).

Base : A substance which dissociates (separates) in aqueous solution to yield hydroxyl ions, or one containing hydroxyl ions (OH⁻) which reacts with an acid to form a salt or which may react with metal to form a precipitate.

Base composition : Proportion of the total bases consisting of guanine plus cytosine or thymine plus adenine base pairs. Usually expressed as a guanine + cytosine (G + C) value, e.g. 60% G+C.

Base Flow : Rate of discharge in a stream where only the throughflow and groundwater flow from subsurface aquifers contribute to the overall flow.

Base Level : The subterranean elevation below which a stream cannot vertically erode sediment. For many streams this hypothetical elevation is sea-level.

Base saturation : The extent to which the exchange sites of a material are occupied by exchangeable basic cations; expressed as % of the cation exchange capacity.

Base saturation % : The percentage of the soil exchange sites (CEC) occupied by 5 Basic Cations, such as potassium (K), calcium (Ca), magnesium (Mg), hydrogen (H), and sodium (Na). The base saturation percentages are calculated for each cation, then added up to determine base saturation.

Base saturation percentage (base cation saturation) : - the degree to which the adsorption complex of a soil is saturated with basic cations (cations other than hydrogen and aluminum), usually expressed in percentage.

Base saturation. : The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Base status : Is a ratio relating the major nutrient cations (Ca, Mg, K and Na) to the clay percentage in the soil. It is used as an indicator of soil fertility and is expressed in cmol (+) kg⁻¹ clay. It is calculated by multiplying the sum of the reported basic cations by 100 and dividing by the clay percentage of the sample.

Three classes are defined dystrophic - if the sum is less than 5 (indicating low inherent fertility and/or strongly weathered profile); mesotrophic - if the sum is between 5 and 15 inclusive (indicating moderate inherent fertility and/or moderately weathered profile); and eutrophic if it is greater than 15 (indicating

relatively high inherent fertility and/or low degree of profile weathering). It is used for some Great Group distinctions within the Australian Soil Classification (Isbell, 1996).

Baseflow : Baseflow - Part of streamflow derived from groundwater flowing into a stream.

Baseline : The initial soil condition before monitoring soil quality over time. Subsequent measurements on the same soil are compared to the baseline measurement.

Basement Rock : Very old granite and metamorphic rocks found in continental crust. These rocks make up the continental shield.

Basic : Substance having a pH greater than 7. OR This term is used to describe Tenosols, Organosols and Rudosols in the Australian Soil Classification (Isbell, 1996). It refers to soils that are not strongly acid or calcareous.

Basic Rock : An igneous rock that contains less than 55% silica.

Basic Solution : Any water solution that is basic (pH greater than 7) or has less hydrogen ions (H⁺) than hydroxide ions (OH⁻). Also see acidic solution and neutral solution.

Basidioma (plural, basidiomata) : Fruiting body that produces basidia; also termed a basidiocarp.

Basidiospore : Spore resulting from karyogamy and meiosis that is formed on a basidium. Sexual spore of the Basidiomycota.

Basidium (plural, basidia) : Clublike cell of the sexual state formed by fungi in the phylum Basidiomycota.

Basin : A topographic rock structure whose shape is concave downwards.

Batch culture : A culture of microorganisms produced by inoculating a closed culture vessel containing a single batch of medium

Batch process : A treatment process in which a tank or reactor is filled, the wastewater (or solution) is treated or a chemical solution is prepared and the tank is emptied. The tank may then be filled and the process repeated. Batch processes are also used to cleanse, stabilize or condition chemical solutions for use in industrial manufacturing and treatment processes.

Batholith : A large mass of subsurface intrusive igneous rock that has its origins from mantle magma.

Batter : The excavated or constructed face of a dam wall, cutting or embankment.

Bauxite : Bauxite - An earthy or oolitic, hydrated aluminum oxide.

Bauxitic horizon : One which contains more than 20% (visual abundance estimate) of bauxite nodules or concretions which are mostly uncemented. It has a minimum thickness of 0.1 m.

Bay : A body of sheltered water found in a crescent shaped coastal configuration of land.

Bay bottom : The nearly level or slightly undulating central portion of a submerged, low-energy, depositional estuarine embayment characterized by relatively deep water (1.0 to >2.5 m). Compare - Lagoon Bottom.

Bayhead Beach : An extensive deposit of sand and/or gravel in the form of a beach at the back of a bay.

Bay-Mouth Bar : A narrow deposit of sand and/or gravel found across the mouth of a bay.

Bcell antigen receptor (BCR) : A transmembrane immunoglobulin complex on the surface of a B cell that binds an antigen and stimulates the B cell. It is composed of a membrane-bound immunoglobulin, usually igd or a modified igm, complexed with another membrane protein (the Ig-a/Ig-b heterodimer).

Beach : The terrestrial interface area in between land and a water body where there are accumulations of unconsolidated sediments like sand and gravel. These deposits are laid down by the action of breaking waves.

Beach Drift : The lateral movement of sediments on a beach when the angles of swash and backwash differ.

Beach ridge : A low, essentially continuous mound of beach or beach-and-dune material heaped up by the action of waves and currents on the backshore of a beach, which is beyond the present limit of storm waves. These ridges roughly parallel the relict or present shoreline.

Bearing : A system that measures in reference to the cardinal points of a compass in 90 degree quadrants.

Beaufort Wind Scale : Descriptive system that determines wind speed by noting the effect of the wind on the environment. Originally developed for use at sea by Admiral Beaufort of the British Navy in 1806.

Bed : Sedimentary structure that usually represents a layer of deposited sediment.

Bed Load : Portion of the stream load that is carried along the stream bed without being permanently suspend in the flowing water.

Bedding Plane : A layer in a series of sedimentary beds that marks a change in the type of deposits.

Bedding planes. : Fine stratifications, less than 5 millimeters thick, in

unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding surface/plane - : In sedimentary or stratified rocks, the division planes which separate each successive layer or bed from the one above or below. It commonly marks a visible change in lithology or color. Agi

Bedding system. : A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedding. : Straw, woodchips, sawdust, paper, or other carbonaceous organic matter added to barn floors to absorb liquids from animal excrement and urine. Bedding increases the carbon:nitrogen ratio of farm manures.

Bedload : Sediment or other material that slides, rolls, or bounces along the streambed or channel bed of flowing water.

Bedrock. : The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Beet curly top virus : Occurs in Chile. Causes severe stunting and chlorosis. Results in reduced yields. Spread by leafhoppers.

Beet leafhoppers : Spread beetle curly top virus in Chile.

Bellerophontid : Bellerophontid - A genus (the type of the family Bellerophontidae) of extinct Paleozoic gastropod mollusks having a somewhat coiled, plain spiral shell.

Belousov-Zhabotinskii Reaction : Belousov-Zhabotinskii Reaction - An autocatalytic or self-propagating reaction that is manifested by expanding concentric or circular rings.

Bench : A strip of relatively level earth or rock breaking the continuity of a slope. Usually separated by a rock scarp. *Inside* refers to the upper slope component. *Outside* refers to the lower slope component above the scarp.

Bench scale analysis : Also known as: "bench test". A method of studying different ways of treating wastewater and solids on a small scale in a laboratory. While some competitors of Alken-Murray Corporation will experiment with treatments by selling a product that they "hope" will work and then advising the client to change products every month as one treatment after another fails to deliver the desired results, Alken-Murray will examine information provided on the appropriate diagnostic survey form, by either the client or authorized distributor, to select standard products, blends of standard products or totally customized blends for the authorized distributor to test against freshly collected samples of pollution from the client's project, with tests performed locally in the distributor's laboratory. Sometimes a distributor will test up to 25 different

treatment options to finally achieve a sufficiently high quality result to deliver a confidence level sufficient to ensure that the positive bench test results will scale up to deliver similar results when scaled up to pilot or full-scale application. If Alken-Murray and its authorized distributor cannot achieve this result from bench scale testing as many potential treatments as Valerie could devise from initially submitted information, the distributor will usually enlist the aid of an accredited, independent drinking water or environment pollution testing laboratory, paid for by the client, to see if some undisclosed or previously unencountered compounds are inhibiting bacterial performance. If nothing new is disclosed from these new chemical analysis, the client is advised to consider alternative treatments (incineration, chemical reaction, filtering, etc.) from other vendors, but if one or more new pollutants ARE discovered, Alken-Murray research staff examine the chemistry of the new pollutants to study its shape for possible attach by enzymes that have been discovered in previous screenings. If Sigma-Aldrich or another laboratory chemical supply company carries the chemical(s) in pure form, Alken-Murray will purchase enough to prepare a broth media, featuring the new pollutant(s) as sole source of organic carbon, so that any growth or reproduction will indicate potential talent for digesting the new pollutant(s). Following filter-sterilizing or autoclaving, ten mL of the broth is dispensed into sterile, fifteen mL, screw-cap test tubes. Each tube is then inoculated with a single colony picked from a 24-hour-old TSA plate growth of a stock Alken-Murray collection strain, selected for demonstrating the ability to digest related or similarly shaped chemical compounds, in the past. Inoculated test tubes are incubated at their optimal temperature for up to 7 days, with a well-mixed sample tested spectrophotometrically for signs of growth and reproduction daily. Five mL from the original 10 mL broth media in a test tube showing strong growth is inoculated into 100 ml of fresh broth media, using the same recipe with the pollutant(s) as sole organic carbon source, contained in a 250 mL Erlenmeyer flask, incubated at the selected strain's optimum temperature, with shaking at 200 rpm. A chemical analysis protocol is selected to enable measurement of the pollutant(s) in the broth media. Appropriate samples are withdrawn to perform chemical analyses on the pollutant(s) in the media and the growth rate of the inoculated strain in each flask. If pollutant(s) disappear at a similar rate as the growth rate of the culture, the strain is then tested for synergy with other strains known to be required to digest known pollutants in client's polluted site, with these results guiding actual new custom formulas sent to distributor to test with fresh samples of client's pollution project. If final results of one of the new formulas delivers a confidence level sufficient to ensure that positive bench test results will scale up properly to a full-scale application, a new Alken-Murray product is officially named and the sale is made. This close cooperation between Alken-Murray Corporation and its authorized disttubutors is responsible for our strong reputation for a high success rate worldwide.

Bench terrace. : A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Benchmark soil : A benchmark soil is one of large extent, holds a key position in the soil classification system, or is of special significance to farming, engineering, forestry, livestock production, or other uses. The purpose of benchmark soils is to focus data collection and research efforts on soils that have the greatest potential for expansion of data and interpretations.

Beneficial element. : An element that may enhance yields, improve plant growth, or be required by a few plants, but not all plants. Cobalt, silicon, aluminum, sodium, selenium, and other elements.

Beneficial use : The uses of a water resource that are protected by state laws called water quality standards. Uses include aquatic life, recreation, human consumption, and fish or wildlife habitat.

Beneficial use : Use of a product with a defined benefit, such as biosolids used as soil amendment. Disposal, such as landfilling or incineration, is not beneficial use.

Benthic : Benthic - Pertaining to the sea floor.

Benthic : Living in or on the bottom of a body of water. OR Of, or relating to the bottom of an aquatic environment

Benthic zone : The sediment OR The lower region of a body of water including the bottom.

Benthos : Collectively, all organisms living in, on, or near the bottom substrate in aquatic habitats (examples are oysters, clams, burrowing worms).

Bentonite : Bentonite - A processed clay material composed principally of the mineral montmorillonite. It has a great affinity for fresh water and when hydrated will increase its volume more than seven times. Water/bentonite suspensions are essentially impermeable.

Bentonite Grout : Bentonite Grout - Consists of powdered sodium bentonite clay and clean water in the proportion of not less than 1 pound of powdered bentonite to 1 gallon of water. Bentonite grout may be used in all geologic formations. Bentonite pellets and granular bentonite may also be used as a seal material without forming a slurry.

Benzene : An aromatic hydrocarbon which is a colorless, volatile, flammable liquid. Benzene is obtained chiefly from coal tar and is used as a solvent for resins and fats in dye manufacture.

Bergschrund : A deep crevasse commonly found at the head of an alpine glacier.

Forms when the glacial ice pulls away from the mountain side.

Berm : Low hill of sand that forms along coastal beaches.

Bermuda High : High pressure system that develops over the western subtropical North Atlantic. Also called Azores High.

Best Management Practice : An engineered structure or management activity, or combination of these, that eliminates or reduces an adverse environmental effect of a pollutant.

Best management practice (bmp) : A structural or nonstructural method, activity, maintenance procedure, or other management practice used singularly or in combination to reduce nonpoint source inputs to receiving waters in order to achieve water quality protection goals. Examples include animal waste management systems, conservation tillage systems, vegetated filter strips, etc.

Best management practices (BMPs) : Management practices (such as nutrient management) or structural practices (such as terraces) designed to reduce the quantities of pollutants – such as sediment, nitrogen, phosphorus, and animal wastes – that are washed by rain and snow melt from farms into nearby receiving waters, such as lakes, creeks, streams, rivers, estuaries, and ground water.

Best usage : The most appropriate uses of a body of water as designated by the Environmental Management Commission given the characteristics of the water body and surrounding area. Best uses may include use for public water supplies; protection and propagation of fish, shellfish, and wildlife; recreation in and on the water; as well as uses for agriculture, industry, and navigation.

Beta hemolysis : A zone of complete clearing around a bacterial colony growing on blood agar. The zone does not change significantly in color.

Beta Particle : Electron emitted from the nucleus of a radioactive isotope. Also see alpha particle and gamma rays.

Betaproteobacteria : One of the five subgroups of proteobacteria, each with distinctive 16S rRNA sequences. Members of this subgroup are similar to the alpha-proteobacteria metabolically, but tend to use substances that diffuse from organic matter decomposition in anaerobic zones.

Bfp : (Dairy science) basic formula price, determined by the U.S. Department of Agriculture, that serves as a basis for pricing milk in the United States. The bfp is calculated monthly based on previous bfp and the price of cheese.

Bh HORIZON : A subsoil horizon notation whereby the 'B' refers to the B Horizon and the 'h' to the humic horizon. Organic matter and aluminium compounds are strongly dominant (with very little or no trace of iron compounds). This term is used as a definition for the Podsol Order in the Australian Soil Classification

(Isbell, 1996).

Bhs HORIZON : A subsoil horizon notation whereby the 'B' refers to the B Horizon and the 'hs' to the humosesquic horizon. Iron and organic compounds (often referred to as 'coffee rock') are prominent within the horizon and the organic compounds are distributed as streaks, patches or lumps. Humosesquic is used as a (Bhs horizon) definition for the Podsol Order in the Australian Soil Classification (Isbell, 1996).

Bicarbonates : Salts containing the anion HCO_3^- . When acid is added, this ion breaks into H_2O and CO_2 , and acts as a buffer.

Biennial : A plant that completes its life cycle in two years. OR A plant that lives for up to two years under outdoor conditions, flowers and produces seed the second year.

Biennial Plant : Plant species that completes its life in two growing seasons.

Bifurcation Ratio : Quantitative ratio determined between the parts of systems that display branching. For example, trees have a main stem that bifurcates into smaller and smaller branches. The ratio between the branches that are derived from a larger branch or main stem is the bifurcation ratio.

Big Bang : Theory that suggests that about 15 billion years ago all of the matter and energy in the Universe was concentrated into an area smaller than a atom. At this instant, matter, energy, space and time did not exist. Then suddenly, the Universe began to expand at an incredible rate and matter, energy, space and time came into being. As the Universe expanded, matter began to coalesce into gas clouds, and then stars and planets. Some scientists believe that this expansion is finite and will one day cease. After this point in time, the Universe will begin to collapse until a Big Crunch occurs.

Big Crunch : Collapse of the Universe into its original form before the Big Bang. At the end of this process matter, energy, space, and time will not exist.

Binal symmetry : The symmetry of some virus capsids (e.g., those of complex phages) that is a combination of icosahedral and helical symmetry.

Binary fission : Division of one cell into two cells by the formation of a septum. It is the most common form of cell division in bacteria.

Binary fission : Division of one cell into two cells by the formation of a septum. It is the most common form of cell division in bacteria.

Binomial nomenclature : System of having two names, genus and specific epithet, for each organism.

Bioaccumulation : Accumulation of a chemical substance in living tissue. OR The increase in concentration of a substance in living organisms, as they take in

contaminated air, water, or food, due to slow metabolization and excretion. The term usually indicated a higher concentration inside of an organism as opposed the ambient level.

Bioassay : A laboratory assay (test) using a biological test organism.

Bioavailability : The availability of chemicals to potentially biodegradative microorganisms.

Bioavailable : Available for biological uptake

Biocatalysis : Chemical reactions mediated by biological systems (microbial communities, whole organisms or cells, cell-free extracts, or purified enzymes aka catalytic proteins).

Biochemical Oxidation Demand (B.O.D.) : A measure of the oxygen consumed in organic rich water by aerobic microorganisms for metabolic functions. OR Amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter. In particular: - The requirement for molecular oxygen by microbes during oxidation of biological substances in sewage. The BOD test measures the oxygen consumed (in mg/L) over 5 days at 20 degrees C

Biocide : A chemical that is toxic to microorganisms. Biocides are often used to eliminate bacteria and other single-cell organisms from water. O.R. Systems use them to kill organisms that grow inside the water uptake lines.

Biodegradability : The potential of an organic component for conversion into simpler structures by enzymatic activity.

Biodegradable : Substance capable of being decomposed by biological processes.

Biodegradable : Complex compounds that can be broken into simpler chemical compounds by microorganisms or larger particles into smaller particles. Organic materials are biodegradable

Biodegradation : The breakdown of organic substances by microorganisms

Biodiversity : In a natural environment undisturbed from outside influences, there is a variety of plant and animal life, ranging from the very small to the very large. Nature has created a natural system for pest and disease control. However, when we only utilize a limited variety in our landscapes, the system of checks and balances breaks down. In general, the more diverse we can make our gardens, the healthier they will be.

Biofilm : Microbial cells encased in an adhesive, usually a polysaccharide material, and attached to a surface. Organized microbial systems consisting of layers of microbial cells associated with surfaces, often with complex structural and functional characteristics. Biofilms have physical/chemical gradients that influence microbial metabolic processes. They can form on inanimate devices (catheters,

medical prosthetic devices) and also cause fouling (e.g., of ships' hulls, water pipes, cooling towers).

Biofilm : A slime layer which naturally develops when bacteria attach to an inert support that is made of a material such as stone, metal, or wood. There are also non-filamentous bacteria that will produce an extracellular polysaccharide that acts as a natural glue to immobilize the cells. In nature, nonfilament-forming microorganisms will stick to the biofilm surface, locating within an area of the biofilm that provides an optimal growth environment (i.e., pH, dissolved oxygen, nutrients). Since nutrients tend to concentrate on solid surfaces, a microorganism saves energy through cell adhesion to a solid surface rather than by growing unattached and obtaining nutrients randomly from the medium. *Pseudomonas* and *Nitrosomonas* strains are especially well known for their ability to form a strong biofilm.

Bioflocculation : The clumping together of fine, dispersed organic particles by the action of certain bacteria and algae.

Biogeochemical cycling : The oxidation and reduction of substances carried out by living organisms and/or abiotic processes that results in the cycling of elements within and between different parts of the ecosystem (the soil, aquatic environment, and atmosphere).

Biogeochemical Cycling : Cycling of a single element, compound or chemicals by various abiotic and biotic processes through the various stores found in the biosphere, lithosphere, hydrosphere, and atmosphere.

Biogeochemistry : Study of microbially mediated chemical transformations of geochemical interest, such as nitrogen or sulfur cycling.

Biogeography : Field of physical geography that studies the spatial pattern of living organisms.

Bioinsecticide : A pathogen that is used to kill or disable unwanted insect pests. Bacteria, fungi, or viruses are used, either directly or after manipulation, to control insect populations.

Biologic transmission : A type of vector-borne transmission in which a pathogen goes through some morphological or physiological change within the vector.

Biological : With microorganisms or microlife - A substance containing microlife

Biological Amplification : Increase in concentration of toxic fat-soluble chemicals in organisms at successively higher trophic levels of a grazing food chain or food web because of the consumption of organisms at lower trophic levels.

Biological contaminants : Living organisms such as viruses, bacteria, fungi, and mammal and bird antigens that can cause harmful health effects to humans.

Biological control : Controlling plants, diseases, and animal pests using natural enemies; or inhibiting the reproduction of pests by methods that result in the laying of infertile eggs, etc.

Biological diversity : (Wildlife science) richness and abundance of species, and variety of natural communities. Both the number of species and the number of individuals within each species are important in considering the extent of biological diversity in an area. Also referred to as biodiversity.

Biological life : A state of living microorganisms

Biological oxidation : Decomposition of complex organic materials by microorganisms through oxidation.

Biological Oxygen Demand (BOD) : The amount of oxygen used in the biochemical oxidation of organic matter; an indication of compost maturity and a tool for studying the composting process.

Biological soil crust : Also called microbiotic, microphytic, cryptobiotic or cryptogamic crusts. A living community of bacteria, microfungi, cyanobacteria, green algae, mosses, liverworts, and lichens that grow on or just below the soil surface. Biological crusts can heavily influence the morphology of the soil surface, stabilize soil, fix carbon and nitrogen, and can either increase or decrease infiltration. The percent cover and the components of the crust can vary across short distances. Identification of biological crust organisms is simplified through the use of three broad morphological groups: The cyanobacteria group includes cyanobacteria and green algae. The moss group includes short and tall mosses, but not club moss mats, such as those in northern latitudes, or spike moss. The lichen group includes crustose, gelatinous, squamulose, foliose, and fruticose lichen, as well as liverworts.

Biological Weathering : The disintegration of rock and mineral due to the chemical and/or physical agents of an organism.

Bioluminescence : The production of light by living cells, often through the oxidation of molecules by the enzyme luciferase

Biomagnification : Increase in the concentration of a chemical substance as it progresses to higher trophic levels of a food chain.

Biomagnification : Increase in the concentration of a chemical substance as it progresses to higher trophic levels of a food chain.

Biomass : A) the weight of a given organism in a volume of soil that is one m squared at the surface and extending down to the lower limit of the organism's penetration. B) the weight of organisms in a given area or volume. OR The amount of living material in an organism.

Biomass : A mass or clump of living organisms feeding on the wastes in

wastewater, dead organisms and other debris.

Biome : Largest recognizable assemblage of animals and plants on the Earth. The distribution of the biomes is controlled mainly by climate.

Bioregion : A unique region on the Earth that has distinct soils, landforms, watersheds, climates, native plants, and animals, and/or other particular natural characteristics.

Bioremediation : Use of microorganisms to remove or detoxify toxic or unwanted chemicals from an environment.

BIOREMEDIATION : The process by which living organisms act to degrade or transform hazardous organic contaminants. Use of microorganisms to remove or detoxify toxic or unwanted chemicals from an environment.

Bio-remediation : Conversion of toxic substances to non-toxic substances by microlife

Biosolid : The residues of wastewater treatment. Formerly called sewage sludge.

Biosphere : Zone incorporating all forms of life on earth. The biosphere extends from deep in sediment below the ocean to several thousand meters elevation in high mountains.

Biostimulation : A process that increases activity of microorganisms biodegrading contaminants. For example, addition of nutrients, oxygen, or other electron donors and acceptors.

Biostimulation : Any process that increases the rates of biological degradation, usually by the addition of nutrients, oxygen, or other electron donors and acceptors so as to increase the number of indigenous microorganisms available for degradation of contaminants.

Biostratigraphy : Biostratigraphy - The study and classification of rocks and their history based on their fossils.

Biosynthesis : Production of needed cellular constituents from other, usually simpler, molecules.

Biota : All living organisms in a region or ecosystem whether plant, animal, or other.

Biotechnology : Use of living organisms to carry out defined physiochemical processes having industrial or other practical application.

Biotic : (1) Referring to life.

(2) Influences caused by living organisms.

Biotic Potential : Maximum rate that a population of a given species can increase

in size (number of individuals) when there are no limits on growth rate.

Biotite : Rock forming mineral of the mica group.

BioTower : An attached culture system. A tower filled with a media similar to ratchet or plastic rings in which air and water are forced up a counterflow movement in the tower.

Biotransformation : **Alteration of the structure of a compound by a living organism or enzyme.**

Biotransformation : Conversion of a substance into other compounds by organisms: including biodegradation.

Biotrophic : Nutritional relationship between two organisms in which one or both must associate with the other to obtain nutrients and grow. OR Organisms that derive their energy from living cells (Lewis, 1973)

Biotrophic : Nutritional relationship between two organisms in which one or both must associate with the other to obtain nutrients and grow.

Bioturbation : Bioturbation - The mixing of sediments by living organisms such as worms, clams, or arthropods that make burrows in soft sediment. OR A movement of soil material within the soil profile by animals or plants

Bioventing : The process of supplying oxygen in situ to oxygen deprived soil microbes by forcing air through unsaturated contaminated soil at low flow rates. This stimulates biodegradation and minimizes stripping volatiles into the atmosphere. Frequently used to remediate soil under structures since it is relatively non-invasive.

Bird : Group of warm blooded vertebrate animals whose body is covered with feathers.

Birefringence : The numerical difference in value between the highest and lowest refractive index of a mineral. This is not synonymous with interference colors. SEE INTERFERENCE COLORS.

Bisequum. : Two soils in vertical sequence, each soil containing an eluvial horizon and its underlying B horizon.

Bisequum. : Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bivalve : Bivalve - Any animal with a two-valved shell, such as a clam, mussel or oyster.

Bk HORIZON : A subsoil horizon notation whereby the 'B' refers to the B Horizon and 'k' to an accumulation of carbonates (usually calcium carbonate) within the associated horizon.

Black Body : Is a body that emits electromagnetic radiation, at any temperature, at the maximum possible rate per unit surface area. This body also absorbs all electromagnetic radiation that is intercepted by it.

Black Earth : Term synonymous with Chernozem used (e.g. in Australia) to describe self-mulching black clays. OR GSG classification – Black, heavy clay, alkaline to neutral soil with wide, deep cracks when dry.

Black fly : Problem with horses. Thought to spread vestibular stomatitis.

Black smoker : Thermal vent emitting very hot (270-380 °C) water and minerals

Blastomycosis : An acute or chronic mycosis which usually affects man and animals (e.g. Dogs). Blastomycosis is caused by a fungus called *Blastomyces dermatitidis* and occurs in North America, Africa and Israel. Infection apparently occurs by inhalation of spores from the fungus although *B. Dermatitidis* has proved difficult to isolate from environmental habitats.

Bleached horizon : Horizons that are paler than adjacent horizons. They are best viewed when the soil is dry. A bleach is generally associated with the A2 horizon although it is not restricted to this layer. It generally occurs on top of a much less permeable subsoil, pan or hard rock. A conspicuously bleached horizon is one in which 80% or more of the horizon is bleached. A sporadic bleach occurs irregularly throughout the horizon or as blotches at the interface of the A and B horizons (Northcote, 1979). This horizon is the most leached part of a soil. Organic matter, clay, iron, aluminium and nutrient elements have all been removed, leaving an accumulation of silica giving the horizon its whitish colour. Field observations have established that bleached horizons are often saturated with water and their occurrence is usually an indication of periodic waterlogging. This can indicate sodic subsoils where there is a strong texture contrast between A and B horizons

Blinding : The clogging of the filtering medium of a microscreen or a vacuum filter when the holes or spaces in the media become sealed off due to a buildup of grease or the material being filtered.

Blizzard : Winter severe weather condition characterized by strong wind, blowing snow, and cold temperatures.

Blocky : Many sided with angular or rounded corners, used for describing peds.

Blocky structure : A cube shaped ped. See also sub-angular blocky and angular blocky.

Blowout : A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed. OR A closed depression formed in the land surface by wind erosion removing material and depositing it on adjacent land.

Blowout Depression : Saucer shaped depressions created by wind erosion. At the leeward end of the feature there usually is a deposit of sand. Blowouts are found in coastal beach areas and in arid and semiarid regions of the world. These features are smaller than a deflation hollow.

Bluegreen alga : See cyanobacterium.

Blue-green algae : Algae that often cause problems in lakes because some produce chemicals that are toxic to animals, including humans. They often form thick floating mats of blue-green scum as they die.

Bluff : Bluff - A high bank with a broad, steep cliff face overlooking a plain or a body of water.

BMP : Best Management Practices (BMP) are operating methods that ensure the proper land application of biosolids for protection of the environment. BMP include agronomic loading rates, slope limitations, soil pH limitations, buffer zones, public access restrictions, grazing deferments, soil conservation practices, restrictions for saturated and frozen soils, protection of endangered species and other site restrictions.

BMP system : A combination of individual bmps into a "system" that functions to reduce the same pollutant.

Boar : (Animal science) a sexually mature male hog.

BOD : Biochemical Oxygen Demand - the rate at which microorganisms use the oxygen in water or wastewater while stabilizing decomposable organic matter under aerobic conditions. In decomposition, organic matter serves as food for the bacteria and energy results from this oxidation.

BOD test : A procedure that measures the rate of oxygen use under controlled conditions of time and temperature. Standard test conditions include dark incubation at 20 C for a specified time (usually 5 days).

Body Wave : Type of seismic wave that travels through the interior of Earth.

Bog : Waterlogged, spongy ground, consisting of mosses containing acidic, decaying vegetation such as sphagnum, sedges, and heaths, that may develop into peat.

Bog Iron Ore : A ferruginous deposit in bogs and swamps formed by oxidizing algae, bacteria or the atmosphere on iron in solution.

Boiling point : The temperature at which the vapor pressure of a liquid equals the pressure of its surface. The liquid will then vaporize. If the pressure of the liquid varies, the actual boiling point varies. For water the boiling point is 212 degrees Fahrenheit or 100 degrees Celsius.

Boll weevil : Cotton pest.

Bolson : Is a closed desert basin with no drainage outlet, surrounded by mountains.

Bolus : A small handful of soil which has been moistened and kneaded into a soil ball which just fails to stick to the fingers.

Bora : Term used to describe a katabatic wind in Yugoslavia.

Bore hole - : A circular hole drilled into the earth, often to a great depth, as a prospective oil well, or for exploratory purposes. Agi

Boreal Forest : High to mid-latitude biome dominated by coniferous forest. Predominant vegetation of this biome is various species of spruce, fir, pine, and cedars. Also called Taiga.

Bored Well : Bored Well - Synonymous with an augered well or a well dug with a bucket-drill.

Borrow area : An area or excavation from which soil, clay, sand, rock or gravel has been excavated for a specific purpose.

Bottom land : The normal flood plain of a stream, subject to flooding.

Bottomset Bed : Horizontal deltaic deposit of alluvial sediment composed of fine silt and clay.

Boudin, boudinage . : From a French word for sausage, describes the way that layers of rock break up under extension. Imagine the hand, fingers together, flat on the table, encased in soft clay and being squeezed from above, as being like a layer of rock. As the spreading clay moves the fingers (sausages) apart, the most mobile rock fractions are drawn or squeezed into the developing gaps.

Boulder : Boulder - A detached rock mass having a diameter greater than 10 inches, being somewhat rounded or otherwise distinctly shaped by abrasion during transport.

Boulder : Large fragment of rock that has a diameter greater than 256 millimeters (200 millimeters in the United Kingdom).

Boulder clay : Unstratified glacial deposits laid down directly beneath the ice or dropped from the surface as the ice melted; boulder clay and till are synonymous terms for this unsorted material which ranges from rock flour to rocks and boulders of great size, according to the nature of the bedrock

Boulders : Rock fragments larger than 2 feet (60 centimeters) in diameter.

Boundaries : The boundary between soil horizons defines the nature of the change from one horizon to that below. It is specified by two terms—one a measure of the width of the transition zone between the two horizons, the other a description of its shape.

Boundary : Boundary - A specific point in a specific sequence of stratified rock

that serves to separate time units, for example, the Pennsylvanian-Permian boundary.

Bowen Reaction Series : Model that explains the origin of the various types of igneous rocks. It suggests that the presence or absence of particular minerals in igneous rocks depends on the temperature of crystallization and on the magma's original chemical composition.

Boxidation pathway : The major pathway of fatty acid oxidation to produce NADH, FADH₂, and acetyl coenzyme A

Brachiopod : Brachiopod - Any marine, bivalve animal having shells unequal in size and shape.

Brackish : Environment that is influenced by seawater with a salinity less than 35 parts per thousand (usually caused by the presence of an inflow of fresh water).

Brackish water : Water that is neither falls in the category of salt water, nor in the category of fresh water.

Braided : Braided - Branching and rejoining repeatedly to form an intricate pattern or network of small interlacing stream channels.

Braided Stream : Shallow stream channel that is subdivided into a number of continually shifting smaller channels that are separated by bar deposits.

Breaker : The quick collapse of an overextended water wave as it approaches the shoreline. The collapse occurs when the ratio of wave height to wavelength exceeds 1:7. This phenomenon also produces swash.

Breccia : Coarse grained sedimentary rock composed of cemented angular rock fragments.

Brecciated : Brecciated - Pertaining to sedimentary rocks that are made up of largely angular fragments.

Breeding stock : (Animal science) sexually mature male and female livestock that are retained to produce offspring.

Brine : Highly salty and heavily mineralized water, containing heavy metal and organic contaminants.

British Thermal Unit (Btu) : Measurement unit for heat. It is the amount of energy required to raise the temperature of one pound of water one degree from 62 to 63° Fahrenheit. One Btu is equal to 252 calories and to 1055 joules.

Brix : The level of complex sugars and nutrients in a growing plant.

Broadbase terrace : A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a

dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Broadcast : fertilizer is uniformly spread on the soil surface. It may or may not be incorporated into the soil.

Bromeliad : Plants of the bromeliad family (Bromeliaceae). These plants grow from the dry deserts of the subtropics to equatorial tropical rain forests. Many bromeliads grow high up on the branches and trunks of trees in the tropical rainforest. Based on growth habits and other characteristics, Bromeliaceae is divided into the subfamilies Pitcairnioideae, Tillandsioideae, and Bromelioideae.

Broom snakeweed : Perennial. Same family as the sunflower. Shrub-like plant that competes with range vegetation and is poisonous to livestock.

Brown clays : GSG classification—see *Grey, Brown and Red Clays*.

Brown earths : GSG classification—Uniform yellowish, reddish or brown, moderately acid to neutral light loams to clay with a crumb or fine sub-angular blocky structure, showing little profile differentiation.

Brown hardpan soils : GSG classification—see *Red and Brown Hardpan Soils*.

Brown podzolic soils : GSG classification—Acid, predominantly brownish to yellowish soils, lacking or with a weak A₂ horizon and generally have weakly to moderately differentiated profiles with merging horizons.

Brown rot fungus : Fungus that attacks cellulose and hemicellulose in wood, leaving darkcolored lignin and phenolic materials behind.

Brownfield : An abandoned, idled, or under-used industrial or commercial facility where expansion or redevelopment is complicated by a real or perceived environmental contamination.

Brownian Motion : Brownian Motion - The random movement of colloidal particles through a liquid or gas.

Browns : The term “browns” is used to denote organic materials high in carbon, more specifically, materials whose carbon to nitrogen ratio is higher than 30:1. (Materials high in nitrogen are referred to as “greens”). Achieving a carbon-to-nitrogen ratio of about 30:1 is one factor in creating favorable conditions for backyard pile composting.

Brunisol Soil : Soil order (type) of the Canadian System of Soil Classification. This soil type is associated with forest vegetation. It is usually poorly developed and immature. The most identifying trait of this soil is the presence of a brown B horizon.

Brush : Commonly refers to undesirable shrubs and small trees.

Bryozoan : Bryozoan - A minute animal of the phylum Bryozoa, commonly called

moss animals because the colonies they form and live in resemble small clumps of moss.

Bs HORIZON : A subsoil horizon notation whereby the 'B' refers to the B horizon and the 's' to the sesquic horizon. Iron compounds are strongly dominant or codominant (with aluminium) and there is little evidence of organic matter. Sesquic is used as a Great Group definition for the Podsol Order in the Australian Soil Classification (Isbell, 1996).

Bst : (Dairy science) bovine somatotropin, commonly referred to as growth hormone. Produced naturally by the cow, stimulates metabolic functions related to growth and milk production.

BTEX : Benzene, toluene, ethylbenzene, and xylenes

Budding : Asexual reproduction (usually for yeast) beginning as a protuberance from the parent cell that grows and detaches to form a smaller, daughter cell.

Buffer : A substance that prevents a rapid change in pH when acids or alkalis are added to the soil, these include clay, humus and carbonates.

Buffer : A solution or liquid whose chemical makeup neutralizes acids or bases without a great change in pH.

Buffer pH : A measurement of soil acidity, using a specific extract that is resistant or buffered to changes in pH. The value is applied in the calculation of soil lime requirement.

Buffering : The capacity of a compost product to work well with soils of various pH ranges. Or the capacity of any substance functioning well in a wide range of pH

Buffering capacity : The soils ability to resist change in pH. Soils with a high clay and organic matter content have a higher buffering capacity and can tolerate the addition of acidifying fertilisers over an extended period, or at a higher rate of addition without becoming too acid. But once it is acid, the soil will require a large amount of lime or dolomite to reverse the effect. The amount of lime or dolomite required varies from soil to soil depending on the pH (Baker and Eldershaw, 1993).

Bugs : Usually MBS uses the term to refer to the microorganisms active in compost or soil, but occasionally it is used in reference to insects.

Bulk Density : Mass per unit volume of undisturbed soil, dried to constant weight at 105°C (221°F). Usually expressed as g/cc.

Bulk density : the mass (weight) of dry soil per unit bulk volume.

Bulk Density : A measure of the weight of the soil per unit volume (g/cc), usually given on an oven-dry (110° C) basis

Bulk density (D_b or BD) : The density of soil, i.e., the weight of soil divided by its volume. The BD of agricultural soils normally ranges from 1.0 to 1.6 g/cm³.

Bulk density, soil : Mass of dry soil per unit bulk volume (combined volume of soil solids and pore space).

Bulking Agent : Material, usually carbonaceous such as sawdust or woodchips, added to a compost system to maintain airflow by preventing settlement and compaction of the waste. OR Material added to a compost system to maintain airflow by reducing compaction

Bulking sludge : Clouds of billowing sludge that occur throughout secondary clarifiers and sludge thickeners when sludge becomes too light and will not settle properly. In the activated sludge process, bulking is usually caused by filamentous bacteria. Alken-Murray can cure this condition by applying Alken Nu-Bind and Clear-Flo 7015 to the system.

Bull : (Animal science) an uncastrated male bovine.

Buried genetic horizon(b) : This symbol is used in mineral soils to indicate identifiable buried horizons with major genetic features that were developed before burial. Genetic horizons may or may not have formed in the overlying material, which may be either like or unlike the assumed parent material of the buried soil. This symbol is not used in organic soils, nor is it used to separate an organic layer from a mineral layer.

Buried soil. : A developed soil that was once exposed but is now overlain by a more recently formed soil.

Burst size : The number of phages released by a host cell during the lytic life cycle.

Butanediol fermentation : A type of fermentation most often found in the family Enterobacteriaceae in which 2,3-butanediol is a major product; acetoin is an intermediate in the pathway and may be detected by the Voges-Proskauer test.

Butte : Butte - A conspicuous, usually isolated, generally flat-topped hill with relatively steep slopes often capped by a resistant layer of rock.

Bypass flow : See preferential flow.

Byssus : Byssus - The temporary attachment of a bivalve to an object, composed of many thread-like ligaments secreted through the valves.

C

C Horizon : Soil horizon normally found below the B horizon and above the R horizon. This layer is composed of weathered bedrock that has not been yet significantly affected by the pedogenic processes. OR Layers below the B horizon which may be weathered, consolidated or unconsolidated parent material little affected by biological soil-forming processes.

Cabochons : Cabochons - Unfaceted gems usually having oval shapes, although they may be round, square, heart-shaped, tear-drop shaped, or of many other shapes, but usually having a completely rounded surface.

Cadmium to Zinc Ratio (CdZn Ratio) : Ratio of the elements used to study heavy metal accumulation by animals.

Cainozoic : Geological period 65 million years ago to present. OR Geological time period that groups a number of the recent epochs (i.e. Tertiary and Quaternary - approximately 65 million years ago (mya) - pre

Calcareous : It describes a soil that has sufficient calcium carbonate to cause effervescence after the application of a few drops of hydrochloric acid. The calcium carbonate can either be in the form of carbonate segregations or fine earth. Calcareous is used as a descriptive term for Ferrosols, Hydrosols, Organosols, Rudosols and Tenosols in the Australian Soil Classification (Isbell, 1996).

Calcareous red earths : GSG classification—Red, massive, sandy to loamy soils, porous and “earthy” in fabric, with some free carbonates in the lower part of the profile.

Calcareous sands : GSG classification—Sands that show no profile development beyond some accumulation of organic matter in the surface horizon when they have been fixed by vegetation for sufficient time.

Calcareous soil : A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Calcarosols : ASC Soil Order classification—Soils that are either calcareous throughout the solum or at least directly below the A₁ horizon.

Calcic : These soils have a Bk horizon or a subsurface layer containing 2 - 20% soft carbonate and 0-20% hard calcrete fragments and/or carbonate nodules. This term is used to describe a number of Soil Orders in the Australian Soil Classification

(Isbell, 1996).

Calcic horizon : a diagnostic mineral horizon of carbonate accumulation. Indicated by the letter k.

Calcification : Used by some to refer to the processes of calcium carbonate accumulation. OR A dry environment soil-forming process that results in the accumulation of calcium carbonate in surface soil layers.

Calcisponge : Calcisponge - A sponge with a skeleton of spicules composed of calcium carbonate.

Calcite : Crystalline calcium carbonate, CaCO_3 . Crystallizes in the hexagonal system, the main types of crystals in soils being dog-tooth, prismatic, nodular, fibrous, granular, and compact. OR Calcite - Hexagonal calcium carbonate, cf. aragonite.

Calcium Carbonate : Compound consisting of calcium and carbonate. Calcium carbonate has the following chemical structure CaCO_3 .

Calcrete : A layer where cemented carbonate accumulation has occurred. The material must be hard in a pan or in the substrate. This definition does not describe the common soft carbonate nor the carbonate accumulated in nodules or concretions. This term is used to describe a number of soils in the Australian Soil Classification (Isbell, 1996). OR Any cemented terrestrial carbonate accumulation that may vary significantly in morphology and degree of cementation. Encompasses a wide range of calcareous material.

Calcrete pan : A moderately, strongly or very strongly cemented layer of calcrete which is either continuous, or if discontinuous or broken, consists of at least 90% of hard calcrete fragments.

Caldera : A large circular depression in a volcano.

Caldera Volcano : Explosive type of volcano that leaves a large circular depression. Some of these depressions can be as large as 40 kilometers in diameter. These volcanoes form when wet granitic magma quickly rises to the surface of the Earth.

Calf crop : (Animal science) the number or percentage of calves produced in a herd within a given year relative to the number of cows and heifers exposed to breeding.

Calibration . : When used in conjunction with soil tests refers to research that is performed to interpret soil tests and to correlate crop growth and yields to recommendations based on soil tests.

Caliche . : A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

Calorie : Quantity of energy. Equals the amount of heat required to raise 1 gram of pure water from 14.5° to 15.5° Celsius at standard atmospheric pressure.

Calvin cycle : Biochemical route of carbon dioxide fixation in many autotrophic organisms.

Calving : The loss of glacier mass when ice breaks off into a large water body like an ocean or a lake.

Cambic horizon : a weakly developed diagnostic subsoil horizon. Indicated by the letter w.

Cambrian : Geologic period that occurred from 570 to 505 million years ago. During this period, invertebrates become common in the oceans and the Burgess Shale was formed.

Cambrian Explosion : Great diversification of multicellular life forms in the Earth's oceans that started during the Cambrian about 570 million years ago.

Canadian High : High pressure system that develops in winter over central North America.

Canadian Shield : Very old igneous and metamorphic shield rock that covers much of northern Canada. Created more than two to three billion years ago.

Canadian System of Soil Classification : A hierarchical system that is used in Canada to classify soils. This system has five levels: order, great group, subgroup, family, and series. At the order level, nine types of soils are recognized: brunisol, chernozem, cryosol, gleysol, luvisol, organic, podzol, regosol, and solonchic.

Canopy : The uppermost spreading branchy layer of vegetation.

Canopy Drip : Redirection of a proportion of the rain or snow falling on a plant to the edge of its canopy.

Canyon : Steep-sided valley where depth is considerably greater than width. These features are the result of stream erosion.

Capillarity : The process by which moisture moves in any direction through the fine pore spaces and as films around particles.

Capillary Action : Movement of water along microscopic channels. This movement is the result of two forces: the adhesion and absorption of water to the walls of the channels; and cohesion of water molecules to each other.

Capillary Fringe : The zone just above the water-table that remains practically saturated with water.

Capillary Fringe : Capillary Fringe - Zone of partially saturated material just above the water table. The depth of the fringe depends upon the size and distribution of the pore spaces within the geologic framework.

Capillary Moisture : That amount of water that is capable of movement after the soil has drained. It is held by adhesion and surface tension as films around particles and in the finer pore spaces.

Capillary water : Water in capillary pores influenced by forces that hold water in soils against a tension usually greater than 60cm. Capillary water can move upwards against gravity.

Capsid : Protein coat of a virus.

Capsomere : An individual protein subunit of the virus capsid

Capsule : Compact layer of polysaccharide exterior to the cell wall in some bacteria.

Carapace : Carapace - A bony or chitinous shell covering the back of an animal, such as the shell of a crab or the dorsal shell of a turtle.

Carbic materials : Organic debris accumulated by colluvial and alluvial processes when torrential rain occurs following bushfires, i.e. Charcoal.

Carbohydrate : Any chemical compound which consists of only carbon (C), oxygen (O), and hydrogen (H) elements, for examples, sugars, starches, and cellulose are carbohydrates. Also the ratio of hydrogen to oxygen atoms in carbohydrates is usually 2:1. OR Is an organic compound composed of carbon, oxygen, and hydrogen atoms. Some examples are sugars, starch, and cellulose.

Carbon Cycle : The sequence of transformations in which carbon dioxide is converted to organic forms by plants through photosynthesis, organic carbon is recycled through a series of living organisms, and carbon is ultimately returned to its original state (gaseous CO₂) through organic matter decomposition and biological respiration. Living organisms use carbon compounds as energy sources (respiration) and as building blocks for biological molecules essential for their bodies and life functions. The carbon cycle is also important because plant nutrients follow carbon through the organic phases of this cycle, so the carbon cycle overlaps and interacts with many nutrient cycles. OR Storage and cyclic movement of organic and inorganic forms of carbon between the biosphere, lithosphere, hydrosphere, and atmosphere

Carbon Dioxide : Common gas found in the atmosphere. Has the ability to selectively absorb radiation in the longwave band. This absorption causes the greenhouse effect. The concentration of this gas has been steadily increasing in the atmosphere over the last three centuries due to the burning of fossil fuels, deforestation, and land-use change. Some scientists believe higher concentrations of carbon dioxide and other greenhouse gases will result in an enhancement of the greenhouse effect and global warming. The chemical formula for carbon dioxide is CO₂.

Carbon fixation : Conversion of carbon dioxide or other singlecarbon compounds

to organic forms such as carbohydrates.

Carbon Monoxide : A colorless, odorless, and tasteless gas that is produced by the incomplete burning of fossil fuels. The chemical formula for carbon dioxide is CO.

Carbon to Nitrogen Ratio (CN Ratio) : Ratio representing the quantity of carbon (C) in relation to the quantity of nitrogen (N) in a soil or organic material; determines the composting potential of a material and serves to indicate product quality.

Carbonaceous matter : Organic matter with a high proportion of carbon and low proportions of other plant nutrients. Generally having a carbon:nitrogen ratio greater than 35:1.

Carbonate : Compound consisting of a single atom of carbon and three atoms of oxygen. Carbonate has the following chemical structure CO₃.

Carbonate hardness : Hardness of water caused by carbonate and bicarbonate by-products of calcium and magnesium.

Carbonates : Chemical compounds related to carbondioxide. Calcium carbonate is added to pure waters to prevent damage to conveyance pipes which would loose cement (also calcium carbonate) without it.

Carbonation : Is a form of chemical weathering where carbonate and bicarbonate ions react with minerals that contain calcium, magnesium, potassium, and sodium.

Carboniferous : Geological time period of 360 to 290 million years ago. A number of sedimentary basins of this age occur in Victoria, where the red (purple) beds are a distinctive feature

Carbonnitrogen (C/N) ratio : Ratio of the mass of organic carbon to the mass of nitrogen in soil or organic material.

Carbonnitrogen ratio : The weight ratio of carbon to nitrogen in organic matter. Used as a term to project whether nitrogen will be mineralized from the organic matter and made available for plants to absorb or immobilized from the soil and made unavailable to plants.

Carbon-to-nitrogen ratio (cn) : The relative amount of carbon to nitrogen, e.g., a 2:1 ratio means that there is twice as much carbon as nitrogen. Bacteria, like all living organisms, require quite a bit of carbon and comparatively less nitrogen. By providing them with materials that provide these elements in the correct proportion, they thrive, grow, and multiply. Therefore, they can decompose your compost pile at their highest speed. Achieving a carbon-to-nitrogen ratio of about 30:1 is one factor in creating favorable conditions for backyard pile composting.

Carboxyl group : A COOH group attached to a carbon skeleton as in the carboxylic

acids and fatty acids.

Carboxysomes : Polyhedral cellular inclusions of crystalline ribulose biphosphate carboxylase (rubisco), the key enzyme of the Calvin cycle

Carcinogen : Substance which causes the initiation of tumor formation. Frequently a mutagen.

Cardinal Points : The four main navigational directions (North, East, South, and West) found on a compass or a map.

Carnivore : Heterotrophic organism that consumes living animals or the parts of living animals for food. Examples of carnivores include lions, cheetahs, leopards, frogs, snakes, hawks, and spiders. A carnivore can also be called a secondary consumer or tertiary consumer. Also see herbivore, detritivore, scavenger, and omnivore.

Carrying Capacity (K) : The maximum size of population of a single species that a certain habitat can support.

Cartography : Field of knowledge that studies map construction. The act of creating a map.

Cascading System : This is a system where we are primarily interested in the flow of energy and/or matter from one element to another and understand the processes that cause this movement. In a cascading system, we do not fully understand quantitative relationships that exist between elements related to the transfer of energy and/or matter.

Cash crop : A crop grown on land for income or for consumption by humans.

Casing : Casing - A tubular retaining structure installed in the excavated hole to maintain the well opening.

Castings : Manure, i.e., excretion, of earthworms. Earthworm castings are high in nutrients for plants and microorganisms

Catabolism : Biochemical processes involved in the breakdown of organic compounds, usually leading to the production of energy.

Catabolite repression : Transcription level inhibition of a variety of inducible enzymes by glucose or other readily used carbon source.

Catadromus : Catadromus - Returning to the sea from freshwater to spawn, like the European eel.

Catalyst : Substance that promotes a chemical reaction by lowering the activation energy without itself being changed in the end. Enzymes are a type of catalyst.

Catalyst : Substance that promotes a chemical reaction by lowering the activation energy without itself being changed in the end. Enzymes are a type of catalyst

Catastrophism : General theory that suggests that certain phenomena on the Earth are the result of catastrophic events. For example, the Biblical Flood is responsible for sedimentary rock formations and the extinction of the dinosaurs.

Catch Basin : An opening on the side of street which is the entrance to the storm drain

Catch basin : See debris basin

Catch crop . : A crop that is grown to lessen leaching of nutrients during a period of time when a cash crop is not on the land.

Catena : A sequence of soils developed from similar parent material under similar climatic conditions but whose characteristics differ because of variations in relief and drainage.

Cation : Particle with positive charge; reactions between anions and cations create electrical forces. OR Cation - A positively charged chemical.

Cation exchange : Interchange between a cation in solution and another cation in the boundary layer between the solution and surface of negatively charged material such as clay or organic matter.

Cation Exchange Capacity (CEC) : The total potential of soils for adsorbing cations, expressed in millimoles of charge per kg (mmolc/kg) of soil. Determined values depend somewhat on the method employed. Compost: a routine measure of the binding potential of a soil; measures the soil's ability to remove negative ions from metals and other compounds, allowing the ions to form insoluble compounds and precipitate in the soil; determined by the amount of organic matter and the proportion of clay to sand; the higher the CEC, the greater the soil's ability to bind metals. OR The ability of a soil or other solid to exchange cations (positive ions such as calcium) with a liquid.

Cation . : An ion having a positive electrical charge.

Cationexchange capacity : . The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (ph 7.0) or at some other stated ph value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Cave : A natural cavity or recess that is roughly positioned horizontally to the surface of the Earth.

Cavitation : Process of intense erosion due to the surface collapse of air bubbles found in constricted rapid flows of water. Causes the detachment of material from a surface.

CD95 pathway : The CD95 receptor is found on many nucleated eucaryotic cells. When the receptor is bound to a specific ligand (CD95L), the CD95-CD95L complex

activates several cytoplasmic proteins that initiate a cellular suicide cascade leading to apoptosis

Celadonite : Celadonite - An earthy or scaly green mica that forms as an alteration product in basic igneous rock.

Cell : A cell is the smallest self-functioning unit found in living organisms. Each cell is enclosed by an outer membrane or wall and contains genetic material (DNA) and other parts to carry out its life functions. Some organisms such as bacteria consist of only one cell, but most of the organisms found on the Earth are made up of many cells.

Cell cycle : The sequence of events in a cell's growth-division cycle between the end of one division and the end of the next. In eucaryotic cells, it is composed of the G1 period, the S period in which DNA and histones are synthesized, the G2 period, and the M period (mitosis).

Cell membrane : See cytoplasmic membrane.

Cell wall : Layer or structure that lies outside the cytoplasmic membrane; it supports and protects the membrane and gives the cell shape.

Cellmediated immunity : The type of immunity that results from T cells coming into close contact with foreign cells or infected cells to destroy them; it can be transferred to a nonimmune individual by the transfer of cells.

Cellular : Composed of cells. Process occurring between or within cells.

Cellular slime molds : Slime molds with a vegetative phase consisting of amoeboid cells that aggregate to form a multicellular pseudoplasmodium; they belong to the division Acrasiomycota.

Cellulitis : A diffuse spreading infection of subcutaneous skin tissue caused by streptococci, staphylococci, or other organisms. The tissue is inflamed with edema, redness, pain, and interference with function.

Cellulose : Glucose polysaccharide (with beta1,4linkage) that is the main component of plant cell walls. Most abundant polysaccharide on earth.

Celsius Scale : Scale for measuring temperature. In this scale, water boils at 100° and freezes at 0°.

Cement rock. : Shaly limestone used in the manufacture of cement.

Cementation or induration(m) : This symbol indicates continuous or nearly continuous cementation. It is used only for horizons that are more than 90 percent cemented, although they may be fractured. The cemented layer is physically root-restrictive. The predominant cementing agent (or the two dominant cementing agents) may be indicated by adding defined letter suffixes, singly or in pairs. The horizon suffix km indicates cementation by carbonates; qm, cementation by silica;

sm, cementation by iron; ym, cementation by gypsum; kqm, cementation by lime and silica; and zm, cementation by salts more soluble than gypsum.

Cemented : Massive and either hard or brittle depending on the content of cementing substances such as calcium carbonate, silica, oxides of iron and aluminum, or humus.

Cenozoic : Cenozoic - An era geologic time, from the beginning of the Tertiary period to the present, beginning about 65 million years ago; characterized by the evolution and abundance of mammals, advanced mollusks and birds, and by plants that have seeds.

Cenozoic : Geologic era that occurred from 65 million years ago to today.

Central Vent : The main passage way by which volcanic magma travels to the Earth's surface.

Centripetal Force : Force required to keep an object moving in a circular pattern around a center of rotation. This force is directed towards the center of rotation. Common in meteorological phenomena like tornadoes and hurricanes.

Cephalopod : Cephalopod - Any marine mollusk belonging to the class Cephalopoda, characterized by a definite head, with the mouth surrounded by part of the foot that is modified into a lobe with tentacles or arm-like appendages with hooklets or suckers or both. The external shell, if present, as in nautiloids, is univalve and resembles a hollow cone; it may be straight, curved, or coiled and is divided into chambers; the shell is internal in present-day cephalopods such as octopuses, squids, and cuttlefishes and their fossil ancestors, such as the belemnites. Nautiloids and ammonoids are extinct and generally valuable as index fossils. Range: Cambrian to present.

Cephalosporin : - A group of β -lactam antibiotics derived from the fungus *Cephalosporium*, which share the 7-aminocephalosporanic acid nucleus.

Cess Pools : This system is similar to a septic tank. in performance. Sewage water usually seeps through the open bottom and portholes in the sides of the walls. These can also clog up with overuse and the introduction of detergents and other material which slow up the bacterial action.

CFU : Colony forming units. Viable micro-organisms (bacteria, yeasts & mould) capable of growth under the prescribed conditions (medium, atmosphere, time and temperature) develop into visible colonies (colony forming units) which are counted. The term colony forming unit (CFU) is used because a colony may result from a single micro-organism or from a clump / cluster of micro-organisms.

CFU/gdw : Colony forming units per gram of dry weight

Chain Reaction (Nuclear) : A large number of nuclear fissions, taking place within a certain mass of a fissionable isotope, that release a great quantity of energy in a

short time.

Chalcedony : Chalcedony - Layered, colorless to gray cryptocrystalline silica; the term agate is used if the mineral is colored.

Chalk : The term refers to either (a) soft white limestone which consists of very pure calcium carbonate and leaves little residue when treated with hydrochloric acid, and sometimes consists largely of the remains of foraminifera, echinoderms, mollusks, and other marine organisms, or (b) The upper or final member of the Cretaceous system.

Chamber : A relatively large circular or ovoid pore with smooth walls and an outlet through channels or planar pores.

Channel : A tubular-shaped pore.

Channery soil : A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chaparral : A type of plant community common to areas of the world that have a Mediterranean climate (for example, California and Italy). It is characterized by shrubs, shrubby thickets and small trees that are adapted to seasonal dry conditions. Also called Mediterranean Scrubland.

Chaperonin : A protein that aids in the correct folding of other proteins and the assembly of multisubunit structures.

Check dams : Small sediment storage dams built in the channels of steep gullies to stabilize the channel bed. A common use is to control channelized debris flow frequency and volume. Check dams are expensive to construct and are therefore usually only built where important installations, such as a camp or unique spawning area, lie downslope. Chatwin, et. Al

Chelate (chelator) : Organic chemical that forms ring compound in which a metal is held between two or more atoms strongly enough to diminish the rate at which it becomes fixed by soil, thereby making it more available for plant and microbial uptake. OR Organic substances that cause the chemical process of chelation.

Chelation : the formation of strong bonds between metals and organic compounds. Some chelates are insoluble, such as in soil humus.

Chemical : In science, chemicals are elementary substances such as oxygen, hydrogen, nitrogen, etc. In the context of home composting, however, the word "chemical" is often used to describe a philosophy considered to be in opposition to the organic philosophy. In general, the chemical philosophy encourages people to force nature to do what they want by applying synthetic pesticides and fertilizers which may get the temporary results they want, but may harm or not enhance

the general soil condition and environment.

Chemical Autotroph : Organism that uses the external energy found in chemical compounds to produce food molecules. The process used to produce food by these organisms is known as chemosynthesis.

Chemical Energy : Energy consumed or produced in chemical reactions.

Chemical fertilizer . : A common nondefinitive term used to identify manufactured fertilizers or some concentrated, soluble fertilizers of natural origin. Used in contrast to organic fertilizer.

Chemical oxygen demand (C.O.D) : The amount of oxygen utilized in the chemical reactions that occur in water as a result of the addition of wastes. Cod is a measure of the pollutional strength of chemical waste on dissolved oxygen in water. OR A measure of the oxygen needed to oxidize organic and inorganic compounds in water.

Chemical pollution : Introduction of chemical contaminants into a water body.

Chemical precipitation : Precipitation induced by addition of chemicals; the process of softening water by the addition of lime and soda ash as the precipitants.

Chemical Reaction : Reaction between chemicals where there is a change in the chemical composition of the elements or compounds concerned.

Chemical Weathering : Breakdown of rock and minerals into small sized particles through chemical decomposition.

Chemoautotroph : Organism that obtains energy from the oxidation of reduced inorganic compounds or elements and obtains carbon from carbon dioxide.

Chemoautotroph : An organism that obtains its energy from the oxidation of chemical compounds and uses only organic compounds as a source of carbon. Example: nitrifiers.

Chemostat : Continuous culture device usually controlled by the concentration of limiting nutrient and dilution rate.

Chemostat : Continuous culture device usually controlled by the concentration of limiting nutrient and dilution rate.

Chemosynthesis : Process in which specific autotrophic organisms extract inorganic compounds from their environment and convert them into organic nutrient compounds without the use of sunlight. Also see photosynthesis.

Chemotaxis : Oriented movement of a motile organism with reference to a chemical agent. May be positive (toward) or negative (away) with respect to the chemical gradient.

Chemotroph : An organism that obtains its energy from the oxidation of chemical

compounds.

Chemotrophs : Organisms that obtain energy from the oxidation of chemical compounds

Chernozem Soil : (1) Soil order (type) of the Canadian System of Soil Classification. This soil is common on the Canadian Prairies.

(2) Type of soil commonly found in grassland environments. These soils are often black in color and have a well developed A horizon rich in humus.

Chernozems : GSG classification – Similar to Black Earths, but of lower clay content and more friable, having porous structural units. The profile shows weak horizon differentiation with gradual boundaries. Soil reaction is neutral to alkaline.

Chert : Chert - A hard, compact layer of sedimentary rock, commonly called flint.

Chinook Wind : The name of a North American wind that occurs on the leeward side of mountains. This wind is warm and has a low humidity.

Chisel : (Crop science) a farm implement used to break through and shatter compacted or otherwise impermeable layers of soil.

Chiseling : Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Chitin : A tough, resistant, nitrogen-containing polysaccharide forming the walls of certain fungi, the exoskeleton of arthropods, and the epidermal cuticle of other surface structures of certain protists and animals.

Chlamydiae : Members of the genus Chlamydia: gram-negative, coccoid cells that reproduce only within the cytoplasmic vesicles of host cells using a life cycle that alternates between elementary bodies and reticulate bodies.

Chlamydospore : Thickwalled resting structure that forms from the cell wall of a fungal hypha; usually formed under conditions where the hypha is no longer able to function optimally.

Chlamydospore : Thick-walled resting structure that forms from the cell wall of a fungal hypha; usually formed under conditions where the hypha is no longer able to function optimally.

Chloramines : Compounds formed by the reaction of hypochlorous acid (or aqueous chlorine) with ammonia.

Chloramphenicol : A broad-spectrum antibiotic that is produced by *Streptomyces venezuelae* or synthetically; it binds to the large ribosomal subunit and inhibits the peptidyl transferase reaction

Chlorination : The application of chlorine to water or wastewater, generally for the purpose of disinfection, but frequently for accomplishing other biological or

chemical results.

Chlorine-contact chamber : The part of a water treatment plant where effluent is disinfected by chlorine.

Chlorite : a nonexpanding clay mineral having a silica tetrahedral, an alumina octahedral, a silica tetrahedral, and a magnesium hydroxide (brucite) octahedral layer, has a 2:2 or 2:1:1 crystal structure.

Chlorofluorocarbons (CFCs) : Is an artificially created gas that has become concentrated in the Earth's atmosphere. This very strong greenhouse gas is released from aerosol sprays, refrigerants, and the production of foams. The basic chemical formula for chlorofluorocarbons is $CF_x Cl_x$.

Chlorophyll : Green pigment required for photosynthesis.

Chlorophyll a : Green pigment present in all plant life and necessary for photosynthesis. The amount in water samples depends on the amount of algae and is therefore used as a common indicator of water quality.

Chloroplast : Organelle in a cell that contains chlorophyll and produces organic energy through photosynthesis. OR Chlorophyll-containing organelle of photosynthetic eukaryotes.

Chlorosis : The formation of pale green or yellow leaves in plants, resulting in the failure of chlorophyll to develop. It is often caused by a deficiency in an essential element. OR The loss of chlorophyll from plant leaves.

Chocolate soils : GSG classification—Brownish, acid, friable, moderately pedal to fine blocky structured, clay loam soils with weak to moderate horizon differentiation.

Chondrichthyes : Chondrichthyes - A class comprising cartilaginous fishes with well-developed jaws and including the sharks, skates, rays, chimaeras, and extinct related forms.

Chroma : The relative purity of a color directly related to the dominance of the determining wavelength. One of the three variables of color.

Chromatin : The DNA-containing portion of the eucaryotic nucleus; the DNA is almost always complexed with histones. It can be very condensed (heterochromatin) or more loosely organized and genetically active (euchromatin).

Chromatography : Any technique used to separate different species of molecules (or ions) by subjecting them to two different carrier phases: mobile and stationary phases. OR Chromatograph - Separation of dyes by a permeable membrane.

Chromogen : A colorless substrate that is acted on by an enzyme to produce a colored end product. OR Producing color; a chromogenic colony is a pigmented

colony.

Chromophore group : A chemical group with double bonds that absorbs visible light and gives a dye its color.

Chromosol : Soil Order of the Australian Soil Classification (Isbell, 1996). Soils with a clear or abrupt textural change at the B2 horizon where the pH is 5.5 (water) or greater in the upper B2 horizon. The B2 horizon is often brightly coloured

Chromosols : ASC Soil Order classification—Soils with a clear or abrupt textural B horizon where the major half of the b₂ horizon is not strongly acid.

Chromosome : Genetic element carrying information essential to cellular metabolism. Prokaryotes have a single chromosome, consisting of a circular DNA molecule. Eukaryotes contain more than one chromosome, each containing a linear DNA molecule complexed with specific proteins.

Chromosomes : The bodies that have most or all of the cell's DNA and contain most of its genetic information (mitochondria and chloroplasts also contain DNA and genes). OR Organic structure that carries an organism's genetic code (DNA).

Chronic carrier : An individual who harbors a pathogen for a long time

Chronosequence : A sequence of soils that changes gradually from one to the other with time.

Chronosequence : sequence of events over time.

Chrysolaminarin : The polysaccharide storage product of the chrysophytes and diatoms.

Chytrid : Fungal organism in the phylum Chytridiomycota that consists of a spherical cell from which short thin filamentous branches (rhizoids) grow that resemble fine roots.

Cilia : Threadlike appendages extending from the surface of some protozoa that beat rhythmically to propel them; cilia are membrane-bound cylinders with a complex internal array of microtubules, usually in a 9 x 2 pattern.

Ciliate : Protozoan that moves by means of cilia on the surface of the cell.

Ciliates : A class of protozoans distinguished by short hairs on all or part of their bodies.

Cilium (plural, cilia) : Short, threadlike appendages that extend from the surface of some protozoa and beat rhythmically to propel them.

Cinder Cone Volcano : A small volcano, between 100 and 400 meters tall, made up of exploded rock blasted out of a central vent

at a high velocity. These volcanoes develop from magma of basaltic to intermediate

composition.

Circle of Illumination : A line that bisects areas on the Earth receiving sunlight and those areas in darkness. Cuts the spherical Earth into lighted and dark halves.

Circum-Pacific Belt : A zone circling the edge of the Pacific Ocean basin where tectonic subduction causes the formation of volcanoes and trenches. Also called the ring of fire.

Cirque : Glacially eroded rock basin found on mountains. Most alpine glaciers originate from a cirque.

Cirque Glacier : Small glacier that just occupies a cirque.

Cirrocumulus Clouds : Patchy white high altitude cloud composed of ice crystals. Found in an altitude range from 5,000 to 18,000 meters.

Cirrus Clouds : High altitude cloud composed of ice crystals. The appearance of these clouds is white feather like patches, filaments or thin bands. Found in an altitude range from 5,000 to 18,000 meters.

Citric Acid : Derived from citrus fruit or by fermentation of crude sugar, also used as antioxidant, sequestrant, dispersing agent. Helps adjust pH. No toxicity in diluted amounts.

Citric acid cycle : See tricarboxylic acid cycle.

Cladodont : Cladodont - Pertaining to a genus of primitive Carboniferous sharks distinguished by teeth with a tall central cusp, a broad base, and one or more pairs of lateral tubercles.

Clamp connection : Small branch of a fungal hypha that connects two compartments separated by a septum and helps to maintain a dikaryon in each hyphal compartment; characteristic of fungi in the phylum Basidiomycota.

Clarification : A process in which suspended material is removed from a wastewater. This may be accomplished by sedimentation, with or without chemicals, or filtration

Clarifier : Settling tank, sedimentation basin. A tank or basin in which wastewater is held for a period of time, during which the heavier solids settle to the bottom and the lighter material will float to the water surface.

Class 1 milk : (Dairy science) milk that is used for fluid use.

Class A Biosolids : Material that has met the Class A pathogen reduction requirements or equivalent treatment by a Process to Further Reduce Pathogens (PFRP) in accordance with 40 CFR 503. Processes include composting, heat drying, heat treatment, thermophilic aerobic digestion, beta or gamma ray irradiation and pasteurization.

Class B Biosolids : Material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with 40 CFR 503. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Classification : (i) Arrangement of organisms into groups based on mutual similarity or evolutionary relatedness. (ii) Systematic arrangement of soils into groups or categories on the basis of their characteristics. OR Process of grouping things into categories.

Clast : Clast - A grain, fragment, or individual component of a sediment produced by the mechanical breakdown of a larger rock mass.

Clastic : Clastic - A rock made up of fragments (clasts) of pre-existing rocks, such as sandstones that are made up of fragments derived from igneous rocks such as granite.

Clastic Sedimentary Rock : Sedimentary rocks that are formed by the lithification of weathered rock debris that has been physically transported and deposited.

Clastic Wedge : Clastic Wedge - Clastic sediments in a marine basin that are derived from a nearby land mass and form a wedge-shaped deposit of variable size.

Clay : Soil particle < 0.002 mm in diameter. OR Either 1. Mineral material < 2mm. 2. A class of texture. 3. Silicate clay materials. OR Soil particle smaller than 0.002mm or 2µm, with high specific area mainly influencing soil colloidal properties (see also colloid) as well as stability of soil structure: high stability in both wet and dry conditions; also a soil texture class.

Clay coating/film : Coatings of oriented clay on the surfaces of pedes and mineral grains and lining pores, also called clay skins, clay flows, illuviation cutans, or argillans.

Clay Coating; : See coating.

Clay film. : A coating of oriented clay on the surface of a sand grain, pebble, soil aggregate, or ped. Clay films also line pores or root channels and bridge sand grains. Frequency classification is based on the percent of the ped faces and/or pores that contain films: very few – <5%; few – 5-25%; common – 25-50%; many – 50-90%; and continuous – 90-100%. Thickness classification is based on visibility of sand grains: thin – very fine sand grains stand out; moderately thick – very fine sand grains impart microrelief to film; thick – fine sand grains enveloped by clay and films visible without magnification. Synonyms: clay skin, clay coat, argillan, illuviation cutan. OR A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels.

Clay film : A thin coating of oriented clay on the surface of a soil aggregate or

lining pores or root channels. Synonyms: clay coating, clay skin.

Clay loam : Soil texture class. See also soil texture.

Clay Mineral : Crystalline or amorphous mineral material, <2mm in diameter.

Clay minerals : Clay-sized hydrous aluminium silicates having a large interlayer space that can hold significant amounts of water and other substances; they have large a surface area allowing swelling and shrinking; examples are montmorillonite or smectite and kaolinite.

Clay Pan : A middle or lower horizon containing significantly more clay than the horizon above. It is usually very dense and has a sharp upper boundary. Clay pans generally impede drainage, are usually plastic and sticky when wet and hard when dry.

Clay soils : Soils with clay particles and small air pores. Water retention is high creating poor drainage conditions

Claypan : A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clear boundary : Boundary 20 – 50 mm wide.

Clearcut harvest : (Forestry) a harvest and regeneration technique removing all the trees (regardless of size) on an area. Clearcutting is commonly used with shade-intolerant species such as douglas fir or lodgepole pine, which require full sunlight to reproduce and grow well. Clearcutting produces an even-aged stand of trees.

Cleavage : The tendency of some minerals or rocks to break along planes of weakness. This weakness occurs because of the nature of the bonds between mineral grains. OR The ability of a mineral or rock to split along predetermined planes.

Cleistothecium : Closed ascocarp of fungi in the phylum Ascomycota.

Cliff : A tall steep rock face.

CLIMAP Project : Multiuniversity research project that reconstructed the Earth's climate for the last million years by examining proxy data from ocean sediment cores.

Climate : General pattern of weather conditions for a region over a long period time (at least 30 years).

Climatic Optimum : Warmest period during the Holocene epoch. This period is dated from about 5,000 to 3,000 BC. During this time average global temperatures were 1 to 2° Celsius warmer than they are today.

Climatology : Scientific study of the Earth's climate over long time spans (greater than several days). May also involve the investigation of climate's influence on the biotic and the abiotic environment.

Climax : Most advanced successional community of plants capable of development under, and in dynamic equilibrium with, the prevailing environment.

Climax Community : Plant community that no longer undergoes changes in species composition due to succession.

Climax Vegetation : A fully developed plant community that is in equilibrium with its environment.

Climograph : Two dimensional graph that plots a location's air temperature and precipitation on times scales that range from a 24 hour period to a year.

Clinker : Clinker - A local term used for remains of coal that have burned and the surrounding rock that has been transformed during the burning of the coal.

Clinoptilolite : Clinoptilolite - A zeolite or hydrous silicate mineral that usually forms as an alteration product of volcanic rocks.

Clod : A mass of soil produced by disturbance.

Clone : (i) Population of cells all descended from a single cell. (ii) Number of copies of a DNA fragment to be replicated by a phage or plasmid.

Clone Cloning vector : (i) Population of cells all descended from a single cell. (ii) Number of copies of a DNA fragment to be replicated by a phage or plasmid.

Cloning vector : DNA molecule that is able to bring about the replication of foreign DNA fragments.

Closed System : Is a system that transfers energy, but not matter, across its boundary to the surrounding environment. Our planet is often viewed as a closed system.

Closed Talik : Is a form of localized unfrozen ground (talik) in an area of permafrost. It is completely enclosed by permafrost in all directions.

Closed-sedgeland : Vegetation structure dominated by sedges with a canopy cover of 70 - 100% of the ground area.

Cloud : A collection of tiny particles of liquid or solid water occurring above the Earth's surface. Clouds are classified accord to their height of occurrence and shape. The major types of clouds include: Cirrus, Cirrocumulus, Cirrostratus, Altocumulus, Altostratus, Nimbostratus, Stratocumulus, Stratus, Cumulus, and Cumulonimbus.

Coagulants : Chemicals which cause very fine particles to clump (floc) together into larger particles. This makes it easier to separate the solids from the water by

settling, skimming, draining, or filtering.

Coagulants : Chemicals which cause very fine particles to clump (floc) together into larger particles. This makes it easier to separate the solids from the water by settling, skimming, draining, or filtering.

Coagulase : An enzyme that induces blood clotting; it is characteristically produced by pathogenic staphylococci.

Coagulation : Destabilization of colloid particles by addition of a reactive chemical, called a coagulant. This happens through neutralization of the charges.

Coal : Sedimentary rock composed of the compacted, lithified and altered remains of plants. Coal is a solid, combustible mixture of organic compounds, hydrocarbons, with 30 % to 98 % carbon by weight, mixed with various amounts of water and small amounts of sulfur and nitrogen compounds. It is formed in several stages as the remains of plants are subjected to heat and pressure over millions of years.

Coal Smut : Coal Smut - An earthy coal layer at or near the earth's surface. Often contains minerals such as marcasite.

Coalescence : Process where two or more falling raindrops join together into a single larger drop because of a midair collision.

Coarse fragments. : If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. : A soil with USDA Soil textures of loamy fine sand or coarser (loamy sand or sand).

Coastal Dune : Sand dune that forms in coastal areas. The sand for its formation is supplied from a beach.

Coastal Upwelling : An ocean process that occurs most notably on the western coasts of continents when cold nutrient rich bottom water flows to the surface along the continental coastlines. Upwelling is strong in California and Chile where it is closely linked to the fishing industry. Coastal upwelling is greatly reduced during El Niño events.

Coastal Wetland : Wetland habitat found along a coastline and is covered with ocean salt water for all or part of the year. Examples of this type of habitat include tidal marshes, bays, lagoons, tidal flats, and mangrove swamps.

Coastal Zone : Relatively nutrient-rich, shallow part of the ocean that extends from the high-tide mark on land to the edge of the continental shelf.

Coastline : The line that separates a land surface from an ocean or sea.

Coating : A layer of a substance completely or partly covering a surface. Coatings are composed of a variety of substances separately or in combination. They include clay coatings (clay skins), calcite coatings, whole soil coatings, etc. Coatings may become incorporated into the matrix or be fragmented

Coating : Layer of a substance completely or partly covering a surface of soil material; coatings can comprise clay, calcite, gypsum, iron, organic material, salt, etc.

Cobble : Cobble - A rock fragment from 2.5 to 10 inches in diameter, somewhat rounded by abrasion during transport.

Cobblestone (or cobble) : A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Coccolith : Coccolith - A general term applied to various microscopic calcium-rich structures or button-like plates having various shapes and averaging about 3 microns in diameter, constituting the outer skeletal remains of a coccolithophore. Coccoliths are found in chalk and in deep-sea oozes of the temperate and tropical oceans and were probably not common before the Jurassic.

Coccus : Spherical bacterial cells.

Codling moth : Small moth that is problem in fruits and vegetables.

Codon : A sequence of three nucleotides in mrna that directs the incorporation of an amino acid during protein synthesis or signals the start or stop of translation.

Coefficient of Determination : Statistic that measures the proportion of the variation in the dependent variable that is associated with the statistical regression of an independent variable. Can be calculated by taking the square of the correlation coefficient.

Coefficient of Linear Extensibility : The ratio of the difference between the moist and dry lengths of a clod to its dry length, $(L_m - L_d)/L_d$ when L_m is the moist length at (1/3 atmospheres) and L_d is the air-dry length. The measure correlates with the volume change of a soil upon wetting and drying.

Coenocytic : Fungal hypha without crosswalls (septa), so that the nuclei present in the cytoplasm are freefloating and mobile.

Coenzyme : Low-molecular-weight chemical which participates in an enzymatic reaction by accepting and donating electrons or functional groups.

Coevolution : The coordinated evolution of two or more species that interact and exert selective pressures on each other that can cause each species to undergo associated adaptations. Also see evolution and natural selection.

Cofactor : The nonprotein component of an enzyme; it is required for catalytic

activity.

Coffee rock : A compacted, cemented or indurated layer within the profile that is comprised of humus and iron oxides. OR A type of brownish sand rock or soil pan formed where iron oxides and organic matter, which have leached through the soil profile, are precipitated at or above a fluctuating watertable.

Coherent : Means that two-thirds or more of the soil material, whether composed of peds or not, will remain united at the given moisture stage unless force is applied.

Cohesion : Force holding a solid or liquid together, owing to attraction between like molecules.

Col : Saddle like depression found between two mountain peaks. Formed when two opposing cirque glaciers back erode an arête.

Cold Desert : Desert found in the high latitudes and at high altitudes where precipitation is low. Surface air temperatures are generally cold in these dry environments.

Cold Front : A transition zone in the atmosphere where an advancing cold air mass displaces a warm air mass.

Cold Glacier : Glacier in which the ice found from the its surface to base has a temperature as cold as -30° Celsius throughout the year. This is well below the pressure melting point. Pressure melting can cause the melting of ice at the base of these glaciers. One of the three types of glaciers: cold glacier; temperate glacier; and subpolar glacier.

COLE : An abbreviation of coefficient of linear extensibility.

Colicin : A plasmid-encoded protein that is produced by enteric bacteria and binds to specific receptors on the cell envelope of sensitive target bacteria, where it may cause lysis or attack specific intracellular sites such as ribosomes.

Coliform : Gramnegative, nonsporeforming facultative rod that ferments lactose with gas formation with 48 hours at 35°C. Often an indicator organism for fecal contamination of water supplies. Escherichia coli and Enterobacter are important members.

Coliform Bacteria : Many strains of coliform bacteria are naturally present in our environment. Fecal coliform bacteria are present in the feces of humans and other warm-blooded animals but are rare or absent in unpolluted waters. Fecal coliform bacteria should not be found in sources of drinking water. Their presence in water serves as a reliable indication of contamination from human sewage or animal droppings. Although coliform bacteria themselves are not pathogenic, they occur with intestinal pathogens that are dangerous to human health.

Coliform Organisms : Microorganisms found in the intestinal tract of humans and animals. Their presence in water indicates fecal pollution and potentially adverse contamination by pathogens.

Collector sewers : Pipes to collect and carry wastewater from individual sources to an interceptor sewer that will carry it to a treatment facility.

Colloid fraction : Organic and inorganic matter with very small particle size and a correspondingly large surface area per unit of mass.

Colloid. : Organic and inorganic particles of very small size, clay-sized particles, with large surface areas per unit of mass.

Colloids : Very small, finely divided solids (particles that do not dissolve) that remain dispersed in a liquid for a long time due to their small size and electrical charge.

Colluvial : Pertaining to material or processes associated with transportation and/or deposition by mass movement (direct gravitational action) and local, unconcentrated runoff on slopes and/or at the base of slopes.

Colluvium : Soil materials with or without rock fragments that accumulate at the base of steep slopes by gravitational action. OR Unconsolidated, unsorted colluvial material. OR Any loose mass of soil or rock fragments that moves downslope largely by the force of gravity. Usually it is thicker at the base of the slope. OR Unconsolidated soil and rock material moved largely by gravity (ie, mass movement), deposited on a lower slope and/or at the base of a slope.

Colluvium-filled swale. : The prefailure topography of the source area of a debris flow.

Colonization : Establishment of a community of microorganisms at a specific site or ecosystem. OR Movement of individuals or propagules of a species to a new territory. OR Establishment of a community of microorganisms at a specific site or ecosystem.

Colony : Clone of bacterial cells on a solid medium that is visible to the naked eye.

Colony forming units (CFU) : The number of microorganisms that can form colonies when cultured using spread plates or pour plates, an indication of the number of viable microorganisms in a sample.

Colourless sulfur bacteria : A diverse group of nonphotosynthetic proteobacteria that can oxidize reduced sulfur compounds such as hydrogen sulfide. Many are lithotrophs and derive energy from sulfur oxidation. Some are unicellular, whereas others are filamentous gliding bacteria.

Columnar : A type of soil structure where the soil peds (or chunks) are in the

shape of a column with a rounded top.

Columnar structure : Soil particles are arranged around a vertical axis with flat faced peds. The tops of the columns have clearly defined domes. Columnar structure is often associated with subsoil sodicity.

Combinatorial biology : Introduction of genes from one microorganism into another microorganism to synthesize a new product or a modified product, especially in relation to antibiotic synthesis.

Combine : (Crop science) a self-propelled or tractor-drawn machine which cuts, threshes, and cleans the standing crop which moving across the field. It is adapted to harvesting all the small grains, soybeans, grain sorghums, peanuts, beans, etc. In some areas, the crop is cut and placed in windrows by a swather (windrower), and a combine with a pickup attachment gathers the grain and threshes it at a later date.

Combined available chlorine : The concentration of chlorine which is combined with ammonia (NH₃) as chloramine or as other chloro derivatives, yet is still available to oxidize organic matter.

Combined sewer : A sewer designed to carry both sanitary wastewaters and storm or surface-water runoff.

Comet : A large mass of ice and dust that has an orbit around a star.

Cometabolism : Transformation of a substrate by a microorganism without deriving energy, carbon, or nutrients from the substrate. The organism can transform the substrate into intermediate degradation products but fails to multiply at its expense.

Comminuters : Organisms that shred organic material into smaller pieces.

Comminution : Reduction in the size of organic materials as a result of feeding by soil organisms; shredding is one form of comminution.

Common vehicle transmission : The transmission of a pathogen to a host by means of an inanimate medium or vehicle.

Commonsource epidemic : An epidemic that is characterized by a sharp rise to a peak and then a rapid, but not as pronounced, decline in the number of individuals infected; it usually involves a single contaminated source from which individuals are infected.

Community : All organisms that occupy a common habitat and interact with one another.

Community Boundary : Spatial edge of a unique community.

Compaction : An increase in bulk density and soil strength and a decrease in soil porosity by the application of mechanical forces to the soil. Wheel traffic, the

action of tillage implements, and similar physical forces crush soil aggregates and push soil particles closer together, especially under wet soil conditions. Compacted soils or soil layers restrict root growth, water movement, and air exchange.

Compaction (of soil) : Compaction of soil is a lack of air or oxygen. Particles of soil are pressed together so tightly that there is insufficient air space. The obvious way this may occur is when a great weight is present, i.e., during construction when large trucks are daily rolled over the land. However, chemical overuse and poor irrigation are more common causes. In healthy soil, natural processes provide aeration, notably the presence of earthworms burrowing their way through the soil.

Comparative pedology. : The comparison of soils, particularly through examination of features known to evolve through time.

Compass : Navigation instrument that uses the Earth's magnetic field to determine direction.

Compensatory growth : Accelerated population growth in response to grazing or predation.

Competent : In a genetic sense, the ability to take up DNA. OR Rivalry between two or more species for a limiting factor in the environment that usually results in reduced growth of participating organisms. OR Ability of flowing water to transport large particles

Competitive Exclusion : Situation where no two competitively interacting species can occupy exactly the same fundamental niche indefinitely because of resource limitations. The outcome of this process is the local extinction the species that is a poorer competitor.

Competitive exclusion principle : Two competing organisms overlap in resource use, which leads to the exclusion of one of the organisms.

Complement system : A group of plasma proteins that plays a major role in an animal's defensive immune response. complementary- In reference to base pairing, the ability of two polynucleotide sequences to form a double-stranded helix by hydrogen bonding between bases in the two sequences.

Complementary : In reference to base pairing, the ability of two polynucleotide sequences to form a doublestranded helix by hydrogen bonding between bases in the two sequences.

Complementary DNA (cdna) : A DNA copy of an RNA molecule (e.g., a DNA copy of an mrna).

Complete fertilizer. : A fertilizer that supplies nitrogen, phosphorus, and potassium.

Complex medium : Medium whose precise chemical composition is unknown.

Also called undefined medium.

Complex slope. : Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex viruses : Viruses with capsids having a complex symmetry that is neither icosahedral nor helical.

Complex, soil : A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Composite Structure : Any combination of different types of pedon units.

Composite Volcano : Volcano created from alternate layers of flows and exploded rock. Their height ranges from 100 to 3,500 meters tall. The chemistry of the magma of these volcanoes is quite variable ranging from basalt to granite.

Composites : Plants of the compositae family (Asteraceae). Common examples of these flowering plants are thistles, dandelion, and sunflowers.

Compost : Plant and animal residues that are arranged into piles and allowed to decompose, sometimes soil or mineral fertilizers may be added. The stabilized product of composting which is beneficial to plant growth; it has undergone an initial, rapid stage of decomposition and is in the process of humification.

Compost tea : Water in which finished compost has been steeped to cultivate a liquid fertilizer for plants.

Composting : The biodegradation, usually aerobic and thermophilic, that involves a heterogeneous organic substrate in the solid state; evolves by passing through a thermophilic stage with a temporary release of phytotoxins; results in the production of carbon dioxide, water, minerals and stabilized organic matter.

Composting, Municipal : Solid waste management method whereby the organic component of the solid waste stream is biologically decomposed under controlled conditions; an aerobic process in which waste organic materials are ground or shredded and then decomposed to humus in windrow piles or in mechanical digesters, drums, or similar enclosures; results in volume and odor reduction, waste stabilization, destruction of pathogens, larvae and weed seeds; the final product is sufficiently stable for storage and land application without adverse environmental effects.

Compound : A compound is the atoms of different elements joined together.

Compound Structure : Large peds such as prisms and columns that are themselves composed of smaller incomplete peds.

Concatemer : A long DNA molecule consisting of several genomes linked together in a row.

Concavo-convex : Concave (waning) lower slope; convex (waxing) upper slope.

Conchoidal fracturing : A mass of soil which has obvious concave fracturing (ball and socket appearance). This is associated with severe compaction and remoulding (disturbed in a moist to wet condition.). It is best seen in a soil pit exposure when material is removed with a mattock or pick and has the appearance of fractured bluestone.

Conchoidal fracturing is most likely to occur just beneath the surface of clay soils (Vertosols) and if the soil has been compacted (e.g. Vehicular traffic) whilst in a moist to wet condition (i.e. Wetter than the plastic limit) for prolonged periods.

Concrete Grout : Concrete Grout - A mixture of one sack (94 pounds) of Portland cement, an equal amount by volume of sand and gravel or crushed stone, and not more than 7 gallons of clean water.

Concrete Space : Actual geographic space in the real world. Geographers approximate this space when they try to represent it in a model or map. This approximation is referred to as abstract space.

Concretion : Small, hard local concentrations of material such as calcite, gypsum, iron oxide, or aluminum oxide. Usually spherical or subspherical but may be irregular in shape.

Concretions or nodules(c) : This symbol indicates a significant accumulation of concretions or nodules. Cementation is required. The cementing agent commonly is iron, aluminum, manganese, or titanium. It cannot be silica, dolomite, calcite, or more soluble salts.

Concretions. : Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

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Condensate : Moisture in the air that is pulled through a compost pile.

Condensation : The change in state of matter from vapor to liquid that occurs with cooling. Usually used in meteorology when discussing the formation of liquid water from vapor. This process releases latent heat energy to the environment.
OR The change of state from a gas to a liquid.

Condensation Nuclei : Microscopic particle of dust, smoke or salt that allows for condensation of water vapor to water droplets in the atmosphere. Nucleus for the formation of a rain drop. Condensation normally occurs on these particles when relative humidity becomes 100 %. Some condensation nuclei, like salt, are hygroscopic and water can condense on them at relative humidities lower than 100 %.

Conditional mutations : Mutations that are expressed only under certain environmental conditions.

Conduction : Conduction consists of energy transfer directly from atom to atom and represents the flow of energy along a temperature gradient.

Conductivity : A measure of the soluble salts in the soil; used as an overall indicator of the level of macro- and micronutrients in the soil. OR Measure of the ability of water to conduct electrical current. It is directly related to the total dissolved substances in the water.

Cone of Depression : Cone shaped depression occurring horizontally across a water table. Causes by excessive removal of groundwater by a surface well.

Confined Aquifer (or Artesian) : Confined Aquifer (or Artesian) - An aquifer overlain by a low-permeability layer or layers, in which pressure head will force water to rise above the aquifer.

Confined Groundwater : Groundwater trapped between two impervious layers of rock.

Confining Layer : Confining Layer - A body of impermeable or distinctly less permeable material that lies above and/or below one or more water-bearing zones.

Congeliturbate : Soil material disturbed by frost action.

Conglomerate : Conglomerate - A coarse-grained sedimentary rock composed of rounded clasts larger than 2 millimeters in the narrower diameter, usually included in a matrix of sand, silt, or any of the natural cementing materials. OR A sedimentary rock composed mainly of rounded boulders. OR Coarse grained sedimentary rock composed of rounded rock fragments cemented in a mixture of clay and silt.

Conidiospore : An asexual, thin-walled spore borne on hyphae and not contained within a sporangium; it may be produced singly or in chains. OR Aerial hypha bearing conidia.

Conidium (plural, conidia) : Nonmotile, asexual spore resulting from mitotic nuclear division and formed from the ends or sides of a hypha; produced in abundant numbers by the asexual phase of soil fungi in the phyla Ascomycota and Basidiomycota.

Coniferous Forest : A forest consisting of predominantly cone-bearing trees with

needle shaped leaves: usually evergreen but some are deciduous, for example the larch forests (*Larix dehurica*) of central Siberia. Their greatest extent is in the wide belt across northern Canada and northern Eurasia. Coniferous forests produce soft wood which has a large number of industrial applications including paper making.

Coniferous Vegetation : Cone-bearing vegetation of middle and high latitudes that are mostly evergreen and that have needle-shaped or scale like leaves. Compare with deciduous vegetation.

Conjugation : In prokaryotes, transfer of genetic information from a donor cell to a recipient cell by cell-to-cell contact. OR Complementary mating types that participate in a form of protozoan sexual reproduction called conjugation.

Conjugative plasmid : Selftransmissible plasmid; a plasmid that encodes all the functions needed for its own intercellular transmission by conjugation.

Conodonts : Conodonts - Extinct animals of unknown affinities, characterized only by microscopic, brown, transparent to translucent tooth-like elements.

Conservation Biology : Multidisciplinary science that deals with the conservation of genes, species, communities, and ecosystems that make up Earth's biodiversity. It generally investigates human effects on biodiversity and tries to develop practical approaches to preserving biodiversity and ecological integrity.

Conservation tillage : Any tillage and planting system that maintains at least 30% of the soil surface covered by residue after planting for the purpose of reducing soil erosion by water.

Conservative : Conservative - A contaminant that moves with the same velocity as water.

Consistence : Consistence is measured by the resistance of a ped to deformation between the thumb and forefinger. According to Australian Soil and Land Survey Field Handbook (Mc Donald et al. (1990) consistence can be measured on a scale of 1 (small force required) to 7 (rigid force required). This varies depending on the soil water content. Consistence relates to the texture and structure of a soil and is a measure of its workability and stability e.g. Friable soils are easier to work than hard soils.

Loose : No force required, separate particles such as loose sand.

Very weak : Very small force.

Weak : Small but significant force.

Firm : Moderate or firm force.

Very firm : Strong force but within the power of the thumb and forefinger.

Strong : Beyond power of thumb and forefinger but crushes underfoot on hard flat surface with small force e.g. A shovel.

Very strong : Crushes underfoot on hard flat surface with full body weight applied slowly.

Rigid : Cannot be crushed underfoot by full body weight applied slowly.

Consistence : The resistance of the soil to deformation or rupture as determined by the degree of cohesion or adhesion of the soil particles to each other. OR Comprises the attributes of the soil material that are expressed by the degree and kind of cohesion and adhesion or by the resistance to deformation or rupture.

Consistency : 1. the resistance of a material to deformation or rupture. 2. The degree of cohesion or adhesion of the soil mass. Used for describing consistency of soil materials at various soil moistures and degrees of cementation.

Consolidated : A term that usually refers to compacted or cemented rocks.

Consortium : Two or more members of a natural assemblage in which each organism benefits from the other. The group may collectively carryout some process that no single member can accomplish on its own.

Consortium : A two- (or more) membered bacterial culture (or natural assemblage) in which each organism benefits from the other.

Constitutive enzyme : Enzyme always synthesized by the cell regardless of environmental conditions.

Consumer : An organism that receives the nutrients (food) required for maintenance, growth, and reproduction from the consumption of tissues of producers and/or other consumers. Also called a heterotroph. Several different kinds of consumers have been recognized including: carnivores, omnivores, scavengers, herbivores, detritivores, secondary consumers, and tertiary consumers.

Contact : Contact - A specific point in a specific sequence of stratified rock that separates rocks of differing lithologies (for example, limestone/shale) or differing ages (Permian/Pleistocene).

Contact Metamorphism : Is the small scale metamorphic alteration of rock due to localized heating. It is usually cause by an igneous intrusion like a sill or a dyke.

Contact stabilization : Contact stabilization is a modification of the conventional activated sludge process. In contact stabilization, two aeration tanks are used. One tank is for separate reaeration of the return sludge for at least four hours before it is permitted to flow into the other aeration tank to be mixed with the primary effluent requiring treatment.

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Contaminant : Foreign material lending impurity to a primary material; physical contaminants of compost include glass and plastic, chemical contaminants include heavy metals and toxic organic compounds.

Contaminant : See pollutant.

Continental Arctic Air Mass (A) : Air mass that forms over extensive landmass areas of the high latitudes. In the Northern Hemisphere, these system form only in winter over Greenland, northern Canada, northern Siberia, and the Arctic Basin. Continental Arctic air masses are very cold and extremely dry. These air masses are also very stable.

Continental Claystones : Continental Claystones - A sedimentary rock consisting mostly of clay-sized particles that formed on a continent, above sea level.

Continental Crust : Granitic portion of the Earth's crust that makes up the continents. Thickness of the continental crust varies between 20 to 75 kilometers. See sial layer.

Continental Divide : The elevated area that occurs on a continent that divides continental scale drainage basins.

Continental Drift : Theory that suggests that the Earth's crust is composed of several continental plates that have the ability to move. First proposed by A. Snider in 1858 and developed by F.B. Taylor (1908) and Alfred Wegener (1915).

Continental Effect : The effect that continental surfaces have on the climate of locations or regions. This effect results in a greater range in surface air temperature at both daily and annual scales. Also see maritime effect.

Continental Glacier : Largest type of glacier with a surface coverage in the order of 5 million square kilometers.

Continental Ice Sheet : See continental glacier.

Continental Margin : The area between a continent's shoreline and the beginning of the ocean floor. It includes the continental shelf, continental rise, and continental slope.

Continental Plate : A rigid, independent segment of the lithosphere composed of mainly granite that floats on the viscous plastic asthenosphere and moves over the surface of the Earth. The Earth's continental plates are an average 125 kilometers thick and were formed more than 3 billion years ago. Also see oceanic plate.

Continental Polar Air Mass (cP) : Air mass that forms over extensive landmass areas of middle to high latitudes. In North America, these system form over northern Canada. Continental Polar air masses are cold and very dry in the winter and cool and dry in the summer. These air masses are also atmospherically stable in both seasons.

Continental Rise : Thick layers of sediment found between the continental slope the ocean floor.

Continental Rocks : Continental Rocks - Rocks derived from sediments deposited on land rather than a sea floor.

Continental Shelf : Shallow submerged margin of the continents that lies between the edge of the shoreline and the continental slope. This nearly level area of the continental crust has surface layers composed of sediment or sedimentary rock.

Continental Shelf Break : Boundary zone between the continental shelf and slope.

Continental Shield : See shield.

Continental Slope : Steeply sloping portion of continental crust found between the continental shelf and continental rise.

Continental Tropical Air Mass (cT) : Air mass that forms over extensive landmasses areas of the low latitudes. In North America, these system form over southwestern United States and northern Mexico. Continental Tropical air masses are warm and dry in the winter and hot and dry in the summer. These air masses are also generally unstable in the winter and stable in the summer.

Continuous gradient tunnelling : A geomorphic situation where tunnel flow debouches through a free face such as provided by a gully wall (Boucher 1990).

Continuous Permafrost : Form of permafrost that exists across a landscape as an unbroken layer.

Continuously Anaerobic (very poorly drained) : A horizon that is saturated with water throughout the year, it is blue, olive or gray.

Contour : An imaginary line on the surface of the earth connecting points of the same elevation. A line drawn on a map connecting points of the same elevation.

Contour (Line) : Line on a topographic map that connects all points with the same elevation.

Contour farming : (Crop science) field operations such as plowing, planting, cultivating, and harvesting on the contour, or at right angles to the natural slope to reduce soil erosion, protect soil fertility, and use water more efficiently.

Contour Interval : Difference in elevation between two successive contour lines. The interval at which contours are drawn on a map depends on the amount of the relief depicted and the scale of the map.

Contour Stripcropping : Growing crops in strips that follow the contour. Strip of grass or close-growing crops are alternated with strip of clean-tilled crops or summer fallow.

Contour . : An imaginary line on the land or a line on a map connecting points of equal elevation on the surface of the land.

Control section : The part of the soil on which soil classification is based. The thickness varies among different kinds of soils, but for many it is that part of the soil profile between the surface to 60 inches.

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Controlled drainage : The use of surface and subsurface drainage and control structures to control the water table depth in a field.

Conulariid : Conulariid - Any member of the extinct phylum Conulariida, characterized by a four-sided, pyramid-shaped outer covering.

Convection : Convection involves the transfer of heat energy by means of vertical mass motions through a medium.

Convection Current : The movement of a gas or a fluid in chaotic vertical mass motions because of heating.

Convective Lifting : The vertical lifting of parcels of air through convective heating of the atmosphere. This process can initiate adiabatic processes inside the air parcel.

Convective Precipitation : Is the formation of precipitation due to surface heating of the air at the ground surface. If enough heating occurs, the mass of air becomes warmer and lighter than the air in the surrounding environment, and just like a hot air balloon it begins to rise, expand and cool. When sufficient cooling has taken place saturation occurs forming precipitation. This process is active in the interior of continents and near the equator forming cumulus clouds and possible later thunderstorms. Rain is usually the precipitation type that is formed, and in most cases this moisture is delivered in large amounts over short periods of time in extremely localized areas.

Conventional treatment : The preliminary treatment, sedimentation, flotation, trickling filter, rotating biological contactor, activated sludge and chlorination of wastewater.

Convergence : Horizontal inflow of wind into an area. Once at the area, the wind then travels vertically.

Convergence Precipitation : The formation of precipitation due to the convergence

of two air masses. In most cases, the two air masses have different climatological characteristics. One is usually warm and moist, while the other is cold and dry. The leading edge of the latter air mass acts as an inclined wall or front causing the moist warm air to be lifted. Of course the lifting causes the warm moist air mass to cool due to expansion resulting in saturation. This precipitation type is common at the mid-latitudes where cyclones form along the polar front. Also called frontal precipitation.

Convergent Lifting : The vertical lifting of parcels of air through the convergence of opposing air masses in the atmosphere. This process can initiate adiabatic processes inside the air parcel.

Conversion : Changing from one substance to another. As food matter is changed to cell growth or to carbon dioxide.

Conveyance loss : Water loss in pipes and channels by leakage or evaporation. Water coming to San Diego from the Colorado River travels over 200 miles in open trenches and, at times, over unlined trenches so water loss also occurs through the ground.

Coordinated Universal Time (UTC) : Current official world time reference for civil and scientific purposes. Coordinated Universal Time is measured from six standard atomic clocks at the International Bureau of Weights and Measures (BIPM) in Paris, France. Implemented in 1964.

Copepod : Copepod - Any minute, aquatic crustacean belonging to the subclass Copepoda, characterized by compound eyes and the lack of a carapace.

Coprogenous earth (sedimentary peat) : Fecal material deposited in water by aquatic organisms. Also known as sedimentary peat. OR Fecal material deposited in water by aquatic organisms.

Coprolite : Coprolite - Fossilized excrement of vertebrates, a good source of information about the food sources of extinct animals.

Coquina : Coquina - A sedimentary rock composed of shell fragments that have been size-sorted by currents and transported to the site of deposition.

Coral : Simple marine animals that live symbiotically with algae. In the symbiotic relationship, the algae provides the coral with nutrients, while the coral provide the algae with a structure to live in. Coral animals secrete calcium carbonate to produce a hard external skeleton.

Coral Bleaching : Situation where coral lose their colorful symbiotic algae. Thought to be caused by unusually warm water, changes in salinity of ocean seawater, or excessive exposure to ultraviolet radiation.

Coral Reef : Ridge of limestone found generally below the ocean surface. This marine feature is produced by numerous colonies of tiny coral animals, called polyps, that create calcium carbonate structures around themselves for protection.

When the corals die, their vacant exterior skeletons form layers that cause the reef to grow. Coral reefs are found in the coastal zones of warm tropical and subtropical oceans.

Cord : (Forestry) a stack of wood that has a gross volume of 128 cubic feet. A standard cord measures 4 feet x 4 feet x 8 feet.

Core : The core is a layer rich in iron and nickel found in the interior of the Earth. It is composed of two sub-layers: the inner core and outer core. The core is about 7,000 kilometers in diameter.

Coriolis Force : An apparent force due to the Earth's rotation. Causes moving objects to be deflected to the right in the Northern Hemisphere and to the left in the Southern hemisphere. Coriolis force does not exist on the equator. This force is responsible for the direction of flow in meteorological phenomena like mid-latitude cyclones, hurricanes, and anticyclones.

Correlation Coefficient : Statistic that measures the degree of linear association between two variables. Its values vary from between -1 and 1. Perfect positive (the dependent variable increases with an increase in the independent variable) linear association has a correlation coefficient of 1. Perfect negative (the dependent variable decreases with an increase in the independent variable) linear association has a correlation coefficient of -1. Absolutely no association between variables has a value of zero.

Corrosive : High risk of corrosion to uncoated steel or deterioration of concrete.

Corrosivity : Ability of water to dissolve or break down certain substances, particularly metals.

Cosmid : A plasmid vector with lambda phage cos sites that can be packaged in a phage capsid; it is useful for cloning large DNA fragments.

Cotton bollworm : Cotton pest.

Cotton strip assay : Measures the amount of biological activity as determined by the degree of degradation of a standardized strip of cotton buried in the soil.

Coulee : (1) Steep-sided flow of volcanic lava that has solidified.

(2) Abandoned glacial meltwater channel.

(3) Term used in the United States to describe a steep-sided stream valley.

Countercurrent regeneration : A type of regeneration in which the flow through a water conditioner is reversed during the cleaning process for greater effectiveness and efficiency

Counter-Radiation : Redirection of the Earth's longwave radiation back to the surface because of the greenhouse effect.

Covalent : Nonionic chemical bond formed by a sharing of electrons between two atoms.

Cove : A small, narrow sheltered bay or recess in an estuary, often inside a larger embayment (modified from Jackson, 1997). Compare - Estuary. OR(Wildlife science) vegetation or other natural shelter serving to conceal wildlife from predators.

Cover Crop : A crop grown primarily to protect soil against wind water erosion, add organic matter and nitrogen, catch and recycle nutrients, improve soil structure, and provide weed control.

Cowal : A swamp, small lake, small swampy depression or an old stream bed often associated with stagnant and alluvial plains.

Crater : Circular depression in the ground surface created by volcanic activity or asteroid impact.

Craton : Stable foundation core of the Earth's various plates of continental crust. Composed of the shield and platform.

Creek : A stream that is smaller than a river and larger than a brook..

Creep : Slow movement of masses of soil down slopes that are usually steep. The process takes place in response to gravity facilitated by saturation with water. OR More or less imperceptible but continuous movement of soil down a slope.

Creep (soils) : slow mass movement of soil and soil material down relatively steep slopes, primarily under the influence of gravity but facilitated by saturation with water and by alternate freezing and thawing.

Crenulated : Crenulated - Pertaining to small, rounded projections forming a distinct edge.

Cretaceous : Cretaceous - The last period of the Mesozoic era (after the Jurassic and before the Tertiary period of the Cenozoic era), between 135 and 65 million years ago; also, the corresponding system of rocks.

Cretaceous : Geologic period that occurred roughly 65 to 144 million years ago. During this period, the first flowering plant species appear and dinosaurs are at their greatest diversity. Dinosaurs die out at the end of this period.

Crevasse : (1) Opening on a levee that allows for the drainage of water from the floodplain to the stream channel.

(2) Fracture on the brittle surface of a glacier.

Crevasse Splay : Crevasse Splay - A wide break or crack in the bank of a river or canal. OR Sediment fan deposited on a floodplain from a rupture in the levee of a river.

Crinoid : Crinoid - A usually stalked echinoderm characterized by a crown

attached to a somewhat flexible stem.

Crista : Inner membrane in a mitochondrion, site of respiration.

Critical Entrainment Velocity : Velocity required to entrain a particular sized particle into the moving medium of air or water.

Crop rotation . : A planned sequence of crop production in a regularly occurring succession on land. Contrast with monoculture of a continuous crop or with random sequence of cropping.

Crops : Crops are plants grown for human or animal consumption and use. Crops used directly for human consumption are those eaten by humans with only superficial washing in water. Crops may be processed for human consumption by many means, most of which reduce the likelihood of contact with or ingestion of pathogens. Food chain crops are those crops ultimately used for food by humans and other animals.

Cross-bedded : Cross-bedded - Pertaining to individual beds in a stratified rock sequence that are at angles to the main plane of stratification.

Crossbedding : Cross-stratification in which the cross-beds are more than 1 cm in thickness. OR (Animal science) the mating of animals of different breeds. For example, breeding a hereford cow with an angus bull.

Crossfeeding : (i) Specific type of syntrophy where two populations cooperate to metabolize a compound. (ii) One organism consuming products excreted by another organism.

Crotovina : An animal burrow which has been filled with material from another horizon.

Croute Calcaire : A synonym for caliche.

Crown : Crown - The upper part of a faceted gem.

Crown Angle : Crown Angle - In faceted gems, the angle of the faceted crown of the stone measured with respect to the horizontal.

CRT : Cell residence time - the amount of time in days that an average "bug" remains in the process. Also termed "sludge age".

Crumb : A soft, porous, more or less rounded soil aggregate 1 - 5 mm in diameter.

Crumb structure : Rounded peds less than 12 mm in diameter which are unstable and tend to crumble into smaller units. This type of structure is associated with surface horizons.

Crust : A surface layer of soils that becomes harder than the underlying horizon. OR Earth's outer most layer of solid rock. Between 7 to 70 kilometers thick. Two types of crust exist: oceanic crust and continental crust.

Crusty : Soils with a massive or weakly structured surface crusty horizon (3 cm or less thick). It is often lower in clay content than the underlying non-self mulching structured clay. This term is used as a Great Group definition for Vertosols in the Australian Soil Classification (Isbell 1996).

Cryosol Soil : Soil order (type) of the Canadian System of Soil Classification. This soil is common to high latitude tundra environments. The main identifying feature of this soil is a layer of permafrost within one meter of the soil surface.

Cryostatic Pressure : Pressure exerted on a substance by ice at rest.

Cryotic : Something that is frozen.

Cryptins : Peptides produced by Paneth cells in the intestines. Cryptins are toxic for some bacteria, although their mode of action is not known.

Cryptococcosis : An infection caused by the basidiomycete, *Cryptococcus neoformans*, which may involve the skin, lungs, brain, or meninges

Cryptocrystalline : Cryptocrystalline - Composed of tiny crystals that require magnification to be seen.

Cryptogams : Collective term which includes mosses, algae, lichen and liverworts.

Cryptosporidiosis : Infection with protozoa of the genus *Cryptosporidium*. The most common symptoms are prolonged diarrhea, weight loss, fever, and abdominal pain.

Crystalline : Crystalline - A rock that consists wholly of crystals or crystal fragments.

Crystallizable fragment : The stem of the Y portion of an antibody molecule. Cells such as macrophages bind to the Fc region, and it also is involved in complement activation

CTD : (Conductivity, Temperature, Depth) Common name referring to a scientific instrument that records ocean salinity, temperature, and depth. This instrument can also record a host of other parameters such as nutrient levels and chlorophyll concentrations.

Ctpot. : Easily remembered acronym for climate, topography, parent material, organisms, and time; the five factors of soil formation.

Cull : (Animal science) to select inferior animals from the herd for potential sale.

Cultivar : A horticultural variety or strain that originated and has persisted under human cultivation.

Cultivator : (Crop science) a machine used to till the upper portion of the soil, primarily used to destroy weeds or form a moisture retaining mulch.

Culture : Population of microorganisms cultivated in an artificial growth medium. A pure culture is grown from a single cell; a mixed culture consists of two or

more microbial species or strains growing together.

Cumulic. : A soil horizon that has undergone aggradation coincident with its active development.

Cumulonimbus Cloud : A well developed vertical cloud that often has top shaped like an anvil. These clouds are very dense with condensed and deposited water. Weather associated with this cloud includes: strong winds; hail; lightning; tornadoes; thunder; and heavy rain. When this weather occurs these clouds are then thunderstorms. Can extend in altitude from a few hundred meters above the surface to more than 12,000 meters.

Cumulus Cloud : Puffy clouds with relatively flat bases. Cumulus clouds form when moist warm air bubbles vertically escape from the Earth's surface. Found in an altitude range from 300 to 2,000 meters.

Curing : Late stage of composting, after much of the readily metabolized material has been decomposed, which provides additional stabilization and allows further decomposition of cellulose and lignin.

Curing Time : Curing Time - Minimum time required for particular types of cementing or grouting materials to harden.

Cuspate Foreland : Is a triangular accumulation of sand and/or gravel located along the coastline. This feature is formed by the joining of two spits.

Cutan. : (See Clay Film.)

Cutans : Coatings or deposits of material on the surface of peds, stones, etc. A common type is the clay cutan caused by translocation and deposition of clay particles on ped surfaces. OR Coatings on ped surfaces, which may include clay skins or coatings of sesquioxide, manganese, ferromanganese, organic matter or carbonate.

Cutoff : Cutoff - The new and relatively short channel formed when a stream cuts through a narrow strip of land called a neck, and thereby shortens the length of its channel.

Cyanobacteria : Filamentous or single-celled bacteria that fix carbon and nitrogen (formerly called blue-green algae). Only the filamentous species can be seen without a microscope. Cyanobacterial crusts with low biomass are generally the color of the soil and those with high biomass and diversity are dark (brown to black), OR Bacteria that have the ability to photosynthesize.

Cyanobacterium : Prokaryotic, oxygenic phototrophic bacterium containing chlorophyll a and phycobilins, formerly the "bluegreen algae."

Cyanophage :

Cyanophycin : Nonprotein nitrogen storage polymer in cyanobacteria. OR Virus

that infects cyanobacteria.

Cycle : Cycle - A series of normally recurring events that returns to a specific starting point and is repeated in more or less regular intervals.

Cyclic photophosphorylation : Formation of ATP when light energy is used to move electrons cyclically through an electron transport chain during photosynthesis.

Cyclic photophosphorylation : Formation of ATP when light energy is used to move electrons cyclically through an electron transport chain during photosynthesis.

Cyclic Sedimentation : Cyclic Sedimentation - A term used for deposition of sediments that show a repetitive sequence of conditions.

Cyclogenesis : Process of cyclone formation, maturation, and death.

Cyclone : Area of low pressure in the atmosphere that displays circular inward movement of air. In the Northern Hemisphere circulation is counterclockwise, while Southern Hemisphere cyclones have clockwise wind patterns.

Cyclospora cayetanensis : *Cyclospora cayetanensis* is an acid-fast, coccidian-like, parasitic protozoa with the size of 8-10 micrometer in diameter. *Cyclospora cayetanensis* was recently recognized as a new (intestinal) protozoan pathogen of human (1993, species name was proposed in 1994) and was identified as the cause of the prolonged diarrhoea of travelers as well as immunocompetent and immunocompromised patients.

Cyclothem : Cyclothem - Repetitive cycles or sequences of deposition of sedimentary rocks, characterized by late Paleozoic sediments in the North American midcontinent, but observed elsewhere.

Cyst : Resting stage formed by some bacteria, nematodes, and protozoa in which the whole cell is surrounded by a protective layer; not the same as endospore.

Cytochrome : Iron-containing porphyrin ring (e.g., heme) complexed with proteins which act as electron carriers in an electron transport chain.

Cytokine : A general term for nonantibody proteins, released by a cell in response to inducing stimuli, which are mediators that influence other cells. Are produced by lymphocytes, monocytes, macrophages, and other cells.

Cytoplasm : All of the protoplasm in a cell except for what is contained in the nucleus. OR Cellular contents inside the cell membrane, excluding the nucleus.

Cytoplasmic membrane : Selectively permeable membrane surrounding the cell's cytoplasm.

Cytosome : Cell opening through which protozoa ingest food (mouth) or secrete wastes (anus).

D

D horizon : Any soil material below the solum that is unlike the solum and C Horizon and is not a buried soil (mcdonald et al, 1990). OR Layers below the solum which are not C horizon and are not related to the solum or pedologic organisation.

D/I unit : Deionizing unit, frequently used to maintain water quality in aquariums. Advantages: does not waste water like the R/O unit, is designed to be hooked up to either a faucet or household piping system, the anion & cation resins can be regenerated (with another expensive unit) indefinitely, and these systems allow a larger water flow (up to 2,000 gallons a day), than an R/O system, but cost dramatically more too.

DAF : Dissolved air flotation - one of many designs for waste treatment

Damping Off : Over watering seedlings promotes the growth of mildew that causes seedlings to keel over with shriveled stems. The most common disease of greenhouse seedlings, it is aggravated by extreme swings in temperature like warm days and cold nights. The best prevention is to water in mid-morning and to allow the soil surface to dry out between waterings.

Day Length : Period of time for a location on the Earth when insolation from the sun is being received.

Daylight Savings Time : The setting of time so it is one hour ahead starting in the spring and one hour back beginning in the fall in the Northern Hemisphere. In Canada and the United States the dates for these events is the first Sunday in April (spring ahead) and the last Sunday in October (fall back).

DCR : Virginia Department of Conservation and Recreation. The state agency assigned to address non-point source pollution to Virginia waterways.

Debouch :

When runoff emerges from a confined space onto a larger area.

Debris basin - : *Sometimes called catch basin - a large excavated basin into which a debris flow runs or is directed, and where it quickly dissipates its energy and deposits its load. Abandoned gravel pits or rock quarries can often be incorporated.*

Debris Flow : A type of mass movement where there is a downslope flow of a saturated mass of soil, sediment, and rock debris. OR Incoherent or broken masses of rock, soil, and other debris that move downslope in a manner similar to a

viscous fluid.

Debris slope. : A constant slope with debris on it from the free face above.

Decalcification : Removal of calcium carbonate or calcium ions from the soil by leaching.

Decay : To rot, break down, or decompose

Deciduous Forest : A forest composed of trees that shed their leaves at some season of the year. In tropical areas the trees lose their leaves during the hot season in order to conserve moisture. Deciduous trees of the cool areas shed their leaves during the autumn to protect themselves against the cold and frost of winter. Deciduous forests produce valuable hardwood timber such as teak and mahogany from the tropics, oak and beech come from the cooler areas.

Deciduous tree : (Forestry) a tree that loses its leaves or needles during the fall and winter.

Deciduous Vegetation : Type of vegetation that sheds its leaves during winter or dry seasons. Compare with coniferous vegetation.

Declination : Location (latitude) on the Earth where the location of the sun on a particular day is directly overhead at solar noon. This location is somewhere between 23.5° North and 23.5° South depending on the time of the year.

Declining growth : A growth phase in which the availability of food begins to limit cell growth.

Decommissioned Wells : Decommissioned Wells - When used in relation to a water well, the act of filling, sealing, and plugging water well in accordance with rules and regulations of the Nebraska Department of Health.

Decompose, decomposition : Decay. Rot. The breaking down of organic materials into smaller particles until the original material is no longer recognizable

Decomposer : A type of detritivore. Decomposers play an important role in recycling organic matter back into inorganic nutrients in ecosystems. This recycling is done by decomposing complex organic matter and then converting the less complex organic products into inorganic compounds and atoms. Much of the recycled inorganic nutrients are then consumed by producers. Bacteria and fungi are the most common decomposers found in most ecosystems. Also see detritus feeders. OR Heterotrophic organism that breaks down organic compounds.

Decomposition : (1) To chemically or physically breakdown a mass of matter into smaller parts or chemical elements.

(2) Breakdown of organic matter into smaller parts or inorganic constituents by decomposing organisms. OR Chemical breakdown of a compound into simpler compounds, often accomplished by microbial metabolism.

Decomposition : The biochemical breakdown of organic matter into organic compounds and nutrients, and ultimately into its original components.

Deduction : Inference in which the conclusion about particulars follows necessarily from general theory. In a science like Physical Geography, deductive reasoning would involve stating a theory first and then trying to find facts that reject this idea.

Deep Percolation : Deep Percolation - Movement of water below the maximum effective plant zone.

Deficiency symptom. : A result, including slow plant growth, chlorosis or necrosis, caused by the lack of a plant essential element.

Deficiency. : The lack of an adequate amount of a plant nutrient.

Defined medium : Medium whose exact chemical composition is quantitatively known.

Deflation : Process where wind erosion creates blowout depressions or deflation hollows by removing and transporting sediment and soil.

Deflation Hollow : A surface depression or hollow commonly found in arid and semiarid regions caused by wind erosion. Also see the related blowout depression.

Deflocculate : To separate or disperse particles of clay dimensions from a flocculated condition.

De-foaming agents : Chemicals that are added to wastewater discharges to prevent the water from foaming when it is discharged into a receiving water body.

Deformation : Deformation - A general term for folding and faulting of rocks as a result of various Earth forces. OR Removal of trees from a habitat dominated by forest.

Degasification : The process of removing dissolved gasses from water, using vacuum or heat.

Degradation : Readjustment of the stream profile where the stream channel is lowered by the erosion of the stream bed. Usually associated with high discharges. OR Process whereby a compound is usually transformed into simpler compounds. OR A modification of the earth's surface by erosion.

Dehalorespiration : The utilization of haloorganic compounds by anaerobes as terminal electron acceptors.

Deionization : Process that serves to remove all ionized substances from a solution. Most commonly is the exchange process where cations and anions are removed independently of each other.

Delta : Large deposit of alluvial sediment located at the mouth of a stream where it enters a body of standing water. OR A roughly triangular area of the mouth of a river composed of river transported sediment.

Delta-front landsliding : Underwater landsliding along coastal and delta regions due to rapid sedimentation of loosely consolidated clay, which is low in strength and high in pore-water pressures.

Demineralization : Processes to remove minerals from water, usually the term is restricted to ion exchange processes.

Denaturation : Process where double-stranded DNA unwinds and dissociates into two single strands. The reverse of DNA-DNA hybridization. OR Process where doublestranded DNA unwinds and dissociates into two single strands. The reverse of DNADNA hybridization.

Dendrites : Dendrites - Tiny, tree- or bush-like inclusions usually composed of manganese or iron oxides; a post-banding inclusion in some agates.

Dendritic : Term used to describe the stream channel pattern that is completely random. Resembles the branching pattern of blood vessels or tree branches.

Denitrification : Conversion of nitrates into gaseous nitrogen and nitrous oxide. OR The process by which nitrate-nitrogen is converted to nitrogen gas by soil microorganisms when soil oxygen is low or absent.

Dense layer : A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Dense Non-aqueous Phase Liquid : Dense Non-aqueous Phase Liquid - A contaminant that is denser than water and exists as an isolated "plug."

Densipan : Earthy pan which is very fine sandy (0.02 - 0.05 mm). Fragments, both wet and dry, slake in water. Densipans are less stable on exposure than overlying or underlying horizons.

Density (of Matter) : Refers to the quantity of mass per unit volume. For gases, density involves the number of atoms and molecules per unit volume.

Denudation : .

Denudation : (1) The erosion or wearing down of a landmass.

(2) Removal of the vegetative cover from an area.

OR Sculpturing of the surface of the land by weathering and erosion; leveling mountains and hills to flat or gently undulating plains

Deoxyribonucleic Acid (DNA) : Form of nucleic acid that is organized into a double-helix molecule. DNA is used by most organisms to chemically code their

genetics and to direct the development and functioning of cells. This direction requires RNA which represents a copy of a portion of DNA. Found in the nucleus of cells. OR Polymer of nucleotides connected via a phosphate-deoxyribose sugar backbone; the genetic material of the cell.

Dependent Variable : Variable in a statistical test whose observation's values are thought to be controlled through cause and effect by another independent variable modeled in the test.

Deposit : Material placed in a new position by the activity of humans or natural processes such as wind, water ice or gravity.

Deposition : (1) The change in state of matter from gas to solid that occurs with cooling. Usually used in meteorology when discussing the formation of ice from water vapor. This process releases latent heat energy to the environment.

(2) Laying down of sediment transported by wind, water, or ice.

Deposition : The settling out of a soil particle or aggregate of particles from the water column.

Deposition Nuclei : Six-sided microscopic particle that allows for deposition of water as ice crystals in the atmosphere. Nucleus for the formation of snowflakes. Deposition normally occurs on these particles when relative humidity becomes 100 %.

Depositional Landform : Is a landform formed from the deposition of weathered and eroded surface materials. On occasion, these deposits can be compressed, altered by pressure, heat and chemical processes to become sedimentary rocks. This includes landforms with some of the following geomorphic features: beaches, deltas, floodplains, and glacial moraines.

Depression : (1) Concave hollow found on the Earth's surface. ·

(2) Term used to describe a cyclone or an atmospheric low pressure system.

OR Any relatively sunken part of the Earth's surface, especially a low-lying area surrounded by higher ground.

Depth to rock : Bedrock is too near the surface for the specified use.

DEQ : Virginia Department of Environmental Quality. The state agency assigned to administer the Federal and state environmental laws.

Deranged Drainage : Drainage pattern that is highly irregular. Areas that have experienced continental glaciation may have this type of drainage pattern.

Derepressible enzyme : Enzyme that is produced in the absence of a specific inhibitory compound acting at the transcriptional level.

Dermal Ossicles : Dermal Ossicles - Scales of sharks and rays.

Dermosolic : This is a term used as a Great Group distinction to describe Hydrosols in the Australian Soil Classification (Isbell, 1996) indicating that they have a structured B2 horizon. Apart from saturation of the greater part of the profile for prolonged periods (2-3 months) in most years, these soils would otherwise have been classified as Dermosols.

Dermosols : Soil Order of the Australian Soil Classification (Isbell, 1996). Soils that have structured B2 Horizons more developed than weak throughout the major part of the horizon. They also lack strong texture contrast between the A and B horizons. OR ASC Soil Order classification—Other soils with b₂ horizons that have structure more developed than weak throughout the major part of the horizon.

Desalination : The removal of salt from seawater or brackish water to produce drinking water, or conversely, removing water from salt water.

Desert : (1) Biome that has plants and animals adapted to survive severe drought conditions. In this habitat, evaporation exceeds precipitation and the average amount of precipitation is less than 25 centimeters a year.

(2) Area that receives low precipitation. Also see cold desert and warm desert.

Desert Crust : A hard surface layer in desert regions containing calcium carbonate, gypsum, or other cementing materials.

Desert loams : GSG classification—Soils which have moderate texture contrast with thin, loamy A horizons clearly separated from structural clay B horizons, brown to red colour, and alkaline reaction—commonly strongly so in the deeper subsoil. Surface soil ph ranges from alkaline to neutral.

Desert Pavement : A layer of gravel or stones remaining on the surface of the ground in deserts after the removal of fine material by wind. SEE DEFLATION AND HAMADA. OR A veneer of coarse particles left on the ground after the erosion of finer particles by wind.

Desert Varnish : A glossy sheen or coating on gravel or stones in arid regions.

Desertification : Conversion of marginal rangeland or cropland to a more desert like land type. Desertification can be caused by overgrazing, soil erosion, prolonged drought, or climate change.

Designated Beneficial Use : Desirable uses that water quality should support (e.g., drinking water, recreation, aquatic life). Each designated use has a unique set of water quality requirements that must be met for the use to be realized.

Designated use : A beneficial use type established by a state for each water resource and specified in water quality standards, whether or not it is being attained.

Detachment : The process of a soil particle, nutrient, or pesticide breaking free

from its position in the soil. OR One of three distinct processes involved in erosion. This process involves the disengagement of a particle from its surroundings.

Detention Basin : Reservoir designed to slow the rate of flow in an open drainage facility.

Determinate/Indeterminate : Determinates flower once or twice a growing period, usually early in the season, and yield mature harvests all at one time. Indeterminate plants flower and fruit continuously throughout the growing season.

Detrital Rock : Sedimentary rock that is composed of particles transported to their place of deposition by erosional processes. Examples of such rock include sandstone and shale.

Detritivore : Heterotrophic organism that feeds on detritus. Examples of such organisms include earthworms, termites, slugs, snails, bacteria, and fungi. Two types of detritivores are generally recognized: decomposers and detritus feeders. OR Organisms that eat detritus, that is, dead plants and animals.

Detritus : Dead plant and animal matter, usually consumed by bacteria, but some remains

Detritus : Detritus - A collective term for loose rock and mineral material that is worn off or removed directly by mechanical means, as by disintegration or abrasion.

Detritus : Shed tissues, dead body parts, and waste products of organisms. In most ecosystems, detritus accumulates at the soil surface and other types of surface sediments. Or Fragments of plant material.

Detritus : Dead plant and animal matter, usually consumed by bacteria, but some remains.

Detritus Feeder : A type of detritivore. Detritus feeders acquire the nutrients they need from partially decomposed organic matter found in shed animal tissues, plant litter, dead bodies of plants and animals, and animal waste products. Some examples of detritus feeders include various species of beetles, various species of ants, earthworms, and termites. Also see decomposer.

Detritus Food Chain : Model describing the conversion of organic energy in a community or ecosystem into inorganic elements and compounds through decomposition. The organisms involved in this conversion are called detritivores.

Deuterium : Isotope of hydrogen, with a nucleus containing one proton and one neutron, and an atomic mass number of 2.

Development of color or structure(w) : This symbol is used with B to indicate the development of color or structure, or both, with little or no apparent illuvial accumulation of material. It should not be used to indicate a transitional horizon.

Devitrification : Devitrification - The change in glassy rocks that results in crystallization of minerals.

Devonian : A period of geological time extending from 360 to 408 million years BP. OR Geologic period that occurred roughly 360 to 408 million years ago. During this period, the first amphibians and trees appear.

Dew : Condensation of water on the Earth's surface because of atmospheric cooling.

Dew Point : Dew point is the temperature at which water vapor saturates from an air mass into liquid or solid usually forming rain, snow, frost or dew. Dew point normally occurs when a mass of air has a relative humidity of 100 %. If the dew point is below freezing, it is referred to as the frost point.

Dewatering, dewatered biosolids : A process used to remove water from biosolids producing dewatered biosolids that contain equal to or greater than 20 percent dry solids.

Dhia : (Dairy science) dairy herd improvement association. A nationwide system of performance testing and records processing for dairy producers.

Diagenesis : Diagenesis - The physical, chemical, and biological changes a sediment undergoes after it is deposited.

Diagnostic horizon : see horizon

Diapiric : Diapiric - Pertaining to a mass of layered rock in which the core has broken through to the surface.

Diastrophic : Diastrophic - Adjective pertaining to all movements of the earth's crust, including formation of mountains and ocean basins.

Diatom : Alga with siliceous cell walls that persist as a skeleton after death. Any of the microscopic unicellular or colonial alga constituting the class Bacillariophyceae.

Diatomaceous earth : Geologic deposit of fine, grayish siliceous material composed chiefly or wholly of the remains of diatoms. It may occur as a powder or as a porous, rigid material.

Diatoms : Algae that possess a siliceous cell wall which remains preserved after the death of the organisms. They are abundant in both fresh and salt water and in a variety of soils.

Diatoms : Any number of microscopic algae whose cell walls consist of two box-like parts or valves and contain silica.

Diatreme : A small explosive volcanic intrusion comprised of varying amounts and types of pyroclastic debris and surrounding country rock.

Diazotroph : Organism that can use dinitrogen as its sole nitrogen source, i.e. Capable of N₂ fixation.

Diazotroph : Organism that can use dinitrogen as its sole nitrogen source, i.e. Capable of N₂ fixation.

Differential medium : Cultural medium with an indicator, such as a dye, which allows various chemical reactions or microbial genera to be distinguished during growth. OR Cultural medium with an indicator, such as a dye, which allows various chemical reactions to be distinguished during growth.

Differential weathering : When weathering across a rock face or exposure occurs at different rates; mainly due to variations in the composition and resistance of the rock. This results in an uneven surface with the more resistant material protruding.

Diffuse boundary : Boundary >100 mm wide.

Diffused Air Aeration : A diffused air activated sludge plant takes air, compresses it, and then discharges the air below the water surface of the aerator through some type of air diffusion device.

Diffused Solar Radiation : Solar radiation received by the Earth's atmosphere or surface that has been modified by atmospheric scattering.

Diffuser : A component of the ozone contacting system in an ozone generator that allows diffusion of an ozone containing gas.

Diffusion : Diffusion - Process where heat or chemicals are transported in response to differences in chemical concentration or temperature. Movement is from high concentration (or temperature) to low concentration (or temperature). This process could involve liquids, gases and solids.

Diffusion : (1) Molecular mixing of one substance into another substance.

(2) Redirection or refraction of solar insolation in many directions. Process cause the beam of traveling radiation to become less intense.

OR The slow movement of an ion in water mostly by its own kinetic motion.

Diffusion (nutrient) : Movement of nutrients in soil that results from a concentration gradient.

Digester : A closed tank for wastewater treatment, in which bacterial action is induced to break down organic matter.

Digital elevation model (DEM) : A digital elevation model is a digital file consisting of terrain elevations for ground positions at regularly-spaced horizontal intervals.

Dikaryon : Two nuclei present in the same hyphal compartment; they constitute a homokaryon when both nuclei are genetically the same or a heterokaryon when

each nucleus is genetically different from the other.

Dike : Dike - A tabular (book-shaped) igneous intrusion that cuts across the bedding of older rock.

Diluting water : Distilled water that has been stabilized, buffered, and aerated. It is often applied in the BOD tests.

Dilution plate count method : Method for estimating the viable numbers of microorganisms in a sample. The sample is diluted serially and then transferred to agar plates to permit growth and quantification of colonyforming units.

Dilution plate count method : Method for estimating the viable numbers of microorganisms in a sample. The sample is diluted serially and then transferred to agar plates to permit growth and quantification of colony-forming units.

Dinitrogen fixation : Conversion of molecular dinitrogen (N₂) to ammonia and subsequently to organic combinations or to forms useful in biological processes.

Dinoflagellates : Any of an order (Dinoflagellata) of chiefly marine, planktonic, usually solitary phytoflagellates (which have many characteristics in common with algae) These organisms are important in marine food chains, and cause red tides. OR Unicellular biflagellate algae with thick cellulose plates.

Diorite : A coarse grained igneous rock of intrusive origin that is darker and chemically more mafic than granite.

Dip : One of the directional properties of a geologic structure such as a fold or a fault. Dip is the inclination angle of the formation as measured at right angles to strike.

Diploid : In eukaryotes, an organism or cell with two chromosome complements, one derived from each haploid gamete. OR Cell that contains two sets of chromosomes. Also see haploid.

Direct count : Method of estimating the total number of microorganisms in a given mass of soil by direct microscopic examination.

Direct run-off : Water that flows from the ground surface directly into streams, rivers, and lakes.

Direct Solar Radiation : Solar radiation received by the Earth's atmosphere or surface which has not been modified by atmospheric scattering.

Disaggregate : Disaggregate - To separate a rock sample into its component parts, either chemically or mechanically.

Disarticulated : Disarticulated - Related to body parts amputated or separated at the joints.

Discharge : Discharge - The flow of surface water in a stream or canal or the

outflow of groundwater from a well, ditch or spring. OR See stream discharge.

Discontinuous Permafrost : Form of permafrost that contains numerous scattered pockets of unfrozen ground.

Disinfection : The decontamination of fluids and surfaces. To disinfect a fluid or surface a variety of techniques are used, such as ozone disinfection. Often disinfection means eliminating the present microorganisms with a biocide. OR Agent that kills microorganisms.

Disk : (Crop science) an tractor-drawn implement composed of circular plates arranged at an angle with the soil. Used to prepare the soil for seeding.

Dispersal : An organism leaving its place or birth or activity for another location.

Dispersible soils : Soils that are structurally unstable and disperse in water into basic particles i.e. Sand, silt and clay. Dispersible soils tend to be highly erodible and present problems for successfully managing earth works (See Dispersion).

Dispersion : Dispersion is an indicator of sodic soils as it occurs when excessive sodium is present. When water is added, the sodium attaches to the clay and forces the clay particles apart. This results in a cloud of clay forming around the aggregate. The fine clay particles that have dispersed, clog up the small pores in the soil and degrade soil structure as well as restricting root growth and water movement. Dispersive soils usually have a high Exchangeable Sodium Percentage (ESP). See Aggregate Slaking and Clay Dispersion.

Disposal : Method of final disposition that does not provide any beneficial use. Disposal includes landfilling and incineration. Sludge-only lagoons where sludge remains for more than two years are also defined as disposal by regulation.

Dissimilatory nitrate reduction : see denitrification.

Dissimilatory nitrate reduction to ammonium (DNRA)- : Use of nitrate by organisms as an alternate electron acceptor in the absence of oxygen resulting in the reduction of nitrate to ammonium.

Dissociation : Chemical process where a compound or molecule breaks up into simpler constituents.

Dissolution : Soils, among other compounds, start dissolving into smaller units when placed in contact with water.

Dissolve : The process during which solid particles mix molecule by molecule with a liquid and appear to become part of the liquid.

Dissolved Load : Portion of the stream load that is in solution in the flowing water.

Dissolved oxygen : The amount of oxygen present in the water column. More than 5 parts oxygen per million parts water is considered healthy; below 3 parts

oxygen per million is generally stressful to aquatic organisms.

Dissolved Oxygen (DO) : Dissolved Oxygen is important to the health of aquatic ecosystems. All aquatic animals need oxygen to survive. Natural waters with consistently high dissolved oxygen levels are most likely healthy and stable environments, and are capable of supporting a diversity of aquatic organisms. Natural and human-induced changes to the aquatic environment can affect the availability of dissolved oxygen. OR Oxygen dissolved in water and readily available to fish and other aquatic organisms.

Dissolved solids : Chemical substances either organic or inorganic that are dissolved in a waste stream and constitute the residue when a sample is evaporated to dryness.

Distal : Material that is deposited farthest from the source.

Distance Ratio : Method for measuring the gradient of a slope. Simply involves dividing the vertical change in distance (rise) by horizontal change in distance (run) or rise/run. The measurement is usually presented as a percentage or relative to some unit distance traveled in the horizontal.

Distillation : Distillation - A two-stage water treatment method: 1) the liquid is boiled, producing water vapor; 2) the water vapor is condensed, leaving most contaminants behind. Distillation can be used to remove inorganic chemicals, some non-volatile organic chemicals, and bacteria.

Distributary : A smaller branching stream channel that flows away from a main stream channel. Common on deltas. Opposite of tributary.

Distribution box : Serves to distribute the flow from the septic tank evenly to the absorption field or seepage pits. It is important that each trench or pit receive an equal amount of flow. This prevents overloading of one part of the system.

Distributional Limit : Spatial boundary that defines the edge of a species geographical range.

Distributor : The rotating mechanism that distributes the wastewater evenly over the surface of a trickling filter or other process unit.

Disturbance : (1) Partial or complete alteration of a community or an ecosystem by a biotic or abiotic factor.

(2) Cyclonic low pressure system.

Disturbance : An event or its change in intensity or frequency which alters the structure or functional status of an ecosystem. Examples of disturbances that can affect soil include drought, fire, harvest, tillage, compaction, overgrazing, or addition of pesticides.

Ditch rider : (Crop science) manages water for an irrigation district. This person

is responsible for delivering water through ditches to farmers for irrigation.

diurnal cycle : A daily cycle, a basic repetition period of 24 hrs. All processes that are dominated by the sun are diurnal. Tides, in contrast, repeat cycle twice daily.

Diurnal Tide : Tides that have one high and one low water per tidal period.

Divergence : Horizontal outflow of wind from an area. In a surface divergence, outflow originates from the upper atmosphere.

Divergent Evolution : Creation of two or more unique species from one ancestral species through the differential evolution of isolated populations.

Diversion (or diversion terrace) : A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Diversity : Biological diversity can refer to the number of species in an area, the number of types of species (e.g. microbial functional groups, or plant structural types), the degree of genetic variability within a species, or the distribution of species within an area. OR It means the same thing as a large variety. How many different kinds of microorganisms are present in a sample.

Divide : The topographic ridge that separates drainage basins.

DNA fingerprinting : Molecular genetic techniques to assess possible differences among DNA in a samples.

DNA library : Collection of cloned DNA fragments which in total contain genes from the entire genome of an organism; also called a gene library.

DNAPL : See NAPL

DO : Dissolved Oxygen - a measure of the oxygen dissolved in water expressed in milligrams per liter.

Doldrums : Area of low atmospheric pressure and calm westerly winds located at the equator. Similar to Intertropical Convergence Zone.

Doline or Dolina : A closed depression in a karst region often rounded or elliptical in shape, forms by the solution and subsidence of the limestone near the surface. Sometimes at the bottom is a sink hole into which surface water flows and disappears underground.

Dolipore septum : Specialized crosswall separating compartments of a hypha of fungi in the phylum Basidiomycota; consisting of a central pore covered with perforated membranes on both sides (called a parenthosome).

Dolipore septum : Specialized crosswall separating compartments of a hypha of fungi in the phylum Basidiomycota; consisting of a central pore covered with perforated membranes on both sides (called a parenthosome).

Dolomite : (1) Sedimentary rock formed from $\text{CaMg}(\text{CO}_3)_2$.

(2) Mineral with the chemical formula $\text{CaMg}(\text{CO}_3)_2$.

OR A carbonate sedimentary rock consisting chiefly (more than 50% by weight) of the mineral dolomite.

Domain : Highest level of biological classification, superseding kingdoms. The three domains of biological organisms are the Bacteria, the Archaea, and the Eukarya. OR A bundle of clay particles that is only visible in crossed polarized light.

Domal : Geological structures that have been uplifted into a dome like shape.

Domestic wastewater : Wastewater from restrooms and sanitary conveniences of residences, cities, mobile home parks, subdivisions, restaurants, rest homes, resorts, motels, factories, stores and other commercial businesses. It also includes industrial contributions when domestic and industrial wastewater are combined in a city sewer system.

Domestic wastewater sludge : Sludge generated from the treatment of domestic wastewater.

Domestic Well : Domestic Well - A water well providing water to any supply system furnishing water for human consumption and other than a public water supply system, or for watering of livestock, poultry, farm and domestic animals used in operating a farm, and for irrigation not exceeding two acres.

Dormant / dormancy : A biological process in which a plant ceases most growth activities and simply maintains existing tissue.

Doublet : Doublet - A gem made up of two layers cemented together, either a thin layer of desirable material supported by more durable material, or a thin layer of desirable material capped with a protective layer of clear quartz.

Doubling time : Time needed for a population to double in number or biomass.

DOUR : Dissolved Oxygen Uptake Ratio, reported as mg DO/L/hour, a test that is used to measure how much oxygen is being consumed by the microbes in a wastewater treatment plant, to assure that the biomass is receiving sufficient dissolved oxygen.

Downdraft : Downward movement of air in the atmosphere.

Downwelling Current : Ocean current that travels downward into the ocean because of the convergence of opposing horizontal currents or because of an accumulation of seawater.

Dowsing (water witching) : Using a forked stick or wire to locate underground water.

Drainage : Drainage - Process of transporting surface water over a land area to a

river, lake or ocean (surface drainage), or removal of water from a soil using buried pipelines that are regularly spaced and perforated (subsurface drainage).

Drainage : Loss of water from soils, either by percolation through the soil or by surface flow across the soil. Adequate drainage is necessary for good soil aeration, but soils that drain too well have low soil water content and may dry too quickly for good crop growth without irrigation.

Drainage area : An area of land that drains to one point; watershed.

Drainage Basin : Land surface region drained by a length of stream channel.

Drainage Class : Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets.

Drainage class (natural) . : Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Drainage Density : Is the measure of the length of stream channel per unit area of drainage basin. Mathematically its is expressed as:

Drainage Density (Dd) = Stream Length / Basin Area

Drainage ditch : A ditch that is constructed in a field in order to allow agricultural fields to drain more quickly.

Drainage Divide : Topographic border between adjacent drainage basins or watersheds.

Drainage Network : System of interconnected stream channels found in a drainage basin.

Drainage Pattern : Geometric pattern that a stream's channels take in the landscape. These patterns are controlled by factors such as slope, climate, vegetation, and bedrock resistance to erosion.

Drainage Wind : A wind common to mountainous regions that involves heavy cold air flowing along the ground from high to low elevations because of gravity. Also see katabatic wind.

Drainageway : A general term for a course of channel which water moves in draining an area.

Drawdown : Drawdown - The vertical drop of the water level in a well during groundwater pumping; the difference between a static water level and a subsequent, lowered level (pumping level).

Dredge spoil bank : A subaerial mound or ridge that permanently stands above the water composed of dredge spoils; randomly mixed sediments deposited during dredging and dumping. Compare - Dredged Channel, Dredge-Deposit Shoal, Filled Land. (Schoeneberger and Wysocki, 2005)

Dredge spoils : Unconsolidated, randomly mixed sediments composed of rock, soil, and/or shell materials extracted and deposited during dredging and dumping activities. Dredge spoils lie unconformably upon natural, undisturbed soil or regolith and can form anthropogenic landforms (e.g. Dredge Spoil Bank). Compare - Dredged Channel, Dredge-Deposit Shoal. (Schoeneberger and Wysocki, 2005)

Dredged channel : A roughly linear, deep water area formed by a dredging operation for navigation purposes (after Wells et al., 1994; dredged hole). Compare - Dredge-Deposit Shoal.

Dredge-deposit shoal : A subaqueous area, substantially shallower than the surrounding area that resulted from the deposition of materials from dredging and dumping (modified from Demas 1998). Compare - Dredged Channel, Shoal.

Dress, well dressed : Dress, well dressed - The condition of a grinding wheel that has been smoothed and sharpened.

Drift : A generic term for superficial deposits including till (boulderclay), outwash gravel and sand, alluvium, solifluction deposits and loess. OR Any material deposited by a glacier.

Drift : A general term applied to all mineral material (clay, sand, silt, boulders) transported by a glacier and deposited directly by or from the ice, or by running water emanating from the glacier. Generally applies to Pleistocene glacial deposits.

Drill : (Crop science) a farm implement for planting seeds which forms a small furrow, deposits the seed in dribbles, covers the seed, and packs soil over it. It can also deposit fertilizer, lime, or other amendments into the soil, alone or with the seed.

Drilled Well : Drilled Well - A well that is constructed with a rotary drilling machine that incorporates the use of circulating drilling fluid or compressed air to remove drill cuttings from the well hole.

Drip irrigation : (Crop science) a method used to place irrigation water near plants' roots through pipes or tubes. This reduces water evaporation and runoff, but may not be cost effective for all crops.

Drought : Climatic condition where water loss due to evapotranspiration is greater than water inputs through precipitation.

Drum Composting System : Enclosed cylindrical vessel which slowly rotates for a set period of time to break up and decompose material.

Drumlin : A small hill, composed of glacial drift with hog back outline, oval plan, and long axis oriented in the direction of ice movement. Drumlins usually occur in groups, forming what is known as basket of eggs topography.

Drumlin : A hill shaped deposit of till. The shape of these features resembles an elongated teaspoon lying bowl down. The tapered end of the drumlin points to the direction of glacial retreat. Drumlins come in assorted sizes. Lengths can range from 100 to 5,000 meters and heights can be as great as 200 meters.

Dry Adiabatic Lapse Rate (DALR) : The rate of decline in the temperature of a rising parcel of air before it has reached saturation. This rate of temperature decline is 9.8° Celsius per 1000 meters because of adiabatic cooling.

Dry bulb temperature : The actual air temperature. See wet bulb temperature below.

Dry cow : (Dairy science) a cow that is not lactating.

Dry Deposition : The transport of gases and minute liquid and solid particles from the atmosphere to the ground surface without the aid of precipitation or fog. Compare with wet deposition.

Dry Line : A boundary that separates dry and moist air in the warm sector of a mid-latitude cyclone wave. Found ahead of the cold front.

Dry period : (Dairy science) a rest period between lactations when a cow is not lactating, normally 60 days in duration.

Dry permafrost(ff) : This symbol indicates a horizon or layer that is continually colder than 0 °C and does not contain enough ice to be cemented by ice. This suffix is not used for horizons or layers that have a temperature warmer than 0 °C at some time of the year.

Dry sand, dry sanding : Dry sand, dry sanding - Sanding without a coolant.

Dry Weight Basis : Calculated on the basis of having been dried at 105 degrees Celsius until reaching a constant mass (i.e. essentially 100 percent solids).

Dry-Bulb Thermometer : Thermometer on a psychrometer used to determine current air temperature. This measurement and the reading from a wet-bulb thermometer are then used for the determination of relative humidity or dew point from a psychrometric table.

Dry Farming : A method of farming in arid and semi-arid areas without using irrigation, the land being treated so as to conserve moisture. The technique consists of cultivating a given area in alternate years allowing moisture to be stored in the fallow year. Moisture losses are reduced by producing a mulch and removing weeds. In Siberia, where melting snow provides much of the moisture for spring crops, the soil is ploughed in the autumn providing furrows in which snow can

collect, preventing it from being blown away and evaporated by strong winds. Usually alternate narrow strips are cultivated in an attempt to reduce erosion in the fallow year. Dry farming methods are employed in the drier regions of India, USSR, Canada and Austria.

Dunes, Sand Dunes: Ridges or small hills of sand which have been piled up by wind action on sea coasts, in deserts, and elsewhere. Barkhans are isolated dunes with characteristic crescentic forms.

Dynamic Pile System : compost piles receive forced aeration and are not turned. See Also: aerated static pile.

Dryland farming : (Crop science) farming on non-irrigated land. Success is based on rainfall, moisture-conserving tillage, and drought-resistant crops.

Dug Well : Dug Well - A hand-dug well sometimes lined with brick or stone but in many locations unlined.

Dune : (1) Stream bed deposit found streams whose channel is composed mainly of sand and silt. Dunes are about 10 or more centimeters in height and are spaced a meter or more apart and are common in streams with high velocities.

(2) Terrestrial deposit of sand that resembles a mound or ridge that was formed from aeolian processes. Also see sand dune.

Dune field : An assemblage of moving and/or stabilized dunes, together with sand plains, interdune areas, and the ponds, lakes, or swamps. OR An extensive region covered by numerous sand dunes.

Dune slack : A damp depression or trough between dunes in a dune field or dune ridges on a shore, caused by intersecting the capillary fringe of the local water table; a moist type of interdune. (modified from Jackson, 1997)

Dune, eolian : A low mound, ridge, bank, or hill of loose, windblown, granular material (generally sand), either bare or covered by vegetation, that is capable of movement from place to place but always maintaining its characteristic shape.

Duplex profile form : A Primary Profile Form of the Northcote Factual Key (1979) classification. It describes a soil where there is a sharp texture contrast between the A and B horizons. A duplex soil is often characterised by a sandy or loamy surface horizon with a sharp to clear boundary to a clay subsoil. Duplex soils are given the notation "D"

Duripan : Duripans are hard, subsurface horizons. They are cemented by silica or other materials such as iron oxides or calcium carbonate to the extent that fragments of the air-dry material will not slake after prolonged soaking in water or in Hydrochloric acid. They have a very firm or extremely firm consistence when moist and are always brittle, even after prolonged wetting (mcdonald et al, 1990).

Dust Dome : Dome of air that surrounds a city created from the urban heat island effect that traps pollutants like particulate matter.

Dyke : Thin vertical veins of igneous rock that form when magma enters and cools in fractures found within the crust. Also see intrusive igneous rock.

Dynamic Equilibrium : A dynamic equilibrium occurs when a system displays unpeated average states through time.

Dynamic Metamorphism : Form of metamorphism that causes only the structural alteration of rock through pressure. The minerals in the altered rocks do not change chemically. The extreme pressures associated with mountain building can cause this type of metamorphism.

Dynamic soil properties : Soil properties that change over the human time scale in response to anthropogenic (management, land use) and non-anthropogenic (natural disturbances and cycles) factors. Many are important for characterizing soil functions and ecological processes and for predicting soil behavior on human time scales. (Compare to use-dependent soil properties.)

Dyne : A unit of force that creates an acceleration on a mass of 1 gram equal to 1 centimeter per second. 105 dynes equals one newton.

Dysaerobic : Dysaerobic - Deficient in oxygen.

Dystrophic : See base status.

E

E horizon : A soil horizon between the A horizon and B horizon. Maximum eluviation has occurred in the E horizon, removing organic matter, iron oxides, clay, and other materials and causing the E horizon to be lighter colored than the A or B horizons. Formerly, the A₂ horizon.

$E^* = \sigma T^4$

where E^* is the amount of radiation emitted by the body in Watts per square meter,

σ is a constant equal to 0.000000567,

and T is the temperature of the body in Kelvins.

Early soil : A well-drained soil that warms quickly in the spring for early planting of crops.

Earth Albedo : Is the reflectivity of the Earth's atmosphere and surface combined. Measurements indicate that the average Earth albedo is approximately 30 %.

Earth Revolution : Refers to the orbit of the Earth around the sun. This celestial motion takes 365 1/4 days to complete one cycle. Further, the Earth's orbit around the sun is not circular, but elliptical.

Earth Rotation : Refers to the spinning of the Earth on its polar axis.

Earth Sciences Tradition : Academic tradition in modern Geography that investigates natural phenomena from a spatial perspective.

Earthflow : A rapid type of downslope mass movement that involves soil and other loose sediments. Usually triggered by water saturation from rainfall. OR A category of mass movement involving earth materials flowing downslope like a viscous fluid. Displacement varies from extremely slow to extremely rapid.

Earthquake : Is a sudden motion or trembling in the Earth. The motion is caused by the quick release of slowly accumulated energy in the form of seismic waves. Most earthquakes are produced along faults, tectonic plate boundaries, or along the mid-oceanic ridges.

Earthquake Focus : Point of stress release in an earthquake.

Earths : A Great Soil Group (Stace et al., 1968) description defining a variable group of soils which are porous and sandy textured. They usually have an acidic

trend (i.e. The pH decreases with depth), weak profile differentiation, diffuse horizon boundaries, an increase in clay content with depth and no A2 Horizon.

Earthworm : Soil-dwelling worm with a segmented body structure. Through their activities, earthworms can stimulate microbial activity, mix soils and aid in the formation of soil structure, and translocate plant material from the surface to lower soil strata.

Earthworm castings : Manure, i.e., excretion, of earthworms. Earthworm castings are high in nutrients for plants and microorganisms

Earthy (or porous) (E) : The soil material is coherent and characterised by the presence of pores with few if any peds. Soil particles are coated with oxides and/or clay particles are clumped around the pores

Earthy fabric : The soil material is cohesive and contains pores but few, if any, peds;

Earthy sands : GSG classification—A predominantly sandy soil with an earthy fabric and little texture differentiation from topsoil to subsoil.

Easterly Wave : Atmospheric disturbance in the tropical trade winds. Occasionally these systems intensify into hurricanes.

Easting : First measurement of a grid reference used to specify the location of a point on a rectangular coordinate system. The distance measured eastward from the origin of a rectangular coordinate system.

Ebb Tide : Time during the tidal period when the tide is falling. Compare with flood tide.

EC (electrical conductivity) : measured in Siemens/meter. EC_e = value from a saturated soil paste extract.

Eccentricity : Geometric shape of the Earth's orbit. This shape varies from being elliptical to almost circular.

Echinoderm : Echinoderm - Any member of the phylum Echinodermata, a group of exclusively marine animals that have a water-vascular system, which circulates water and assists them in both feeding and locomotion. Examples of echinoderms include sea urchins, star fish, brittle stars, sea cucumbers, heart urchins, sand dollars, cystoids, blastoids, and crinoids.

Echinoid : Echinoid - Any echinozoan belonging to the class Echinoidea, characterized by a modified spherical shape, interlocking calcareous plates, and movable appendages; a sea urchin.

E-coli : *Escherichia coli* - one of the non-pathogenic coliform organisms used to indicate the presence of pathogenic bacteria in water.

Ecological Diversity : See ecosystem diversity.

Ecological Niche : Is all of the physical, chemical and biological conditions required by a species for survival, growth and reproduction. Two further abstractions of this concept are the fundamental niche and the realized niche.

Ecology : Science which studies the interrelations among organisms and between organisms and their environment. OR The study of interrelationships between individual organisms, and between organisms and their environments.

Ecoregion : An area of relatively homogeneous environmental conditions, usually defined by elevation, geology, and soil type. Examples include mountains, piedmont, coastal plain, sandhills and slate belt.

Ecosphere : See biosphere.

Ecosystem : Community of organisms and the environment in which they live. OR A group of organisms interacting among themselves and with their environment.

Ecosystem : A community of animals and plants and the physical environment in which they live. OR Groupings of various organisms interacting with each other and their environment.

Ecosystem Diversity : The variety of unique biological communities found on the Earth. A component of biodiversity. Also see genetic diversity and species diversity.

Ecotone : Boundary zone between two unique community types.

Ectomycorrhiza (EM) : Mycorrhizal type in which the fungal mycelia extend inward, between root cortical cells, to form a network (Hartig net) and outward into the surrounding soil. Usually the fungal hyphae also form a mantle on the surface of the root.

Ectomycorrhizal fungi : A type of mycorrhizal fungi that grows between root cells and forms a sheath around roots, but does not actually invade cells. They are important to many woody plants.

Edaphic : (i) Of or pertaining to the soil. (ii) Resulting from or influenced by factors inherent in the soil or other substrate, rather than by climatic factors.

Edaphic : (1) Of or pertaining to the soil. (2) Influenced by soil factors. OR Referring to soil factors affecting plant growth.

Edaphology : The study of the relationships between soil and soil including the use of the land by humans.

Eddy : A localized chaotic movement of air or liquid in a generally uniform larger flow.

Eddy Diffusion : Mixing of the atmosphere by chaotic air currents.

Edge Wave : A wave of water that moves parallel to the shore. This wave is

usually a secondary wave of complex formation.

Efflorescence : The accumulation of dissolved substance (usually simple salts) at a surface due to evaporation.

Effluent : Effluent - The discharge of a contaminant or contaminants with water from animal production or industrial facilities or waste water treatment plant.

Effusive Eruption : Volcanic eruption where low-viscosity basaltic magma is released. This type of eruption is not explosive and tends to form shield volcanoes.

EGL : Energy grade line - a line that represents the elevation of energy head in feet of water flowing in a pipe, conduit, or channel.

E_h : Potential generated between an oxidation or reduction half-reaction and the H electrode in the standard state.

El Nino : Name given to the occasional development of warm ocean surface waters along the coast of Ecuador and Peru. When this warming occurs the tropical Pacific trade winds weaken and the usual upwelling of cold, nutrient rich deep ocean water off the coast of Ecuador and Peru is reduced. The El Nino normally occurs around Christmas and lasts usually for a few weeks to a few months. Sometimes an extremely warm event can develop that lasts for much longer time periods.

Elastic Deformation : Change in the shape of a material as the result of the force of compression or expansion. Upon release of the force, the material returns to its original shape. Also called plastic deformation.

Elastic Limit : Maximum level of elastic deformation of a material without rupture.

Elastic Rebound Theory : Theory that describes how earthquakes arise from the horizontal movement of adjacent tectonic plates along a linear strike-slip fault. This theory suggests that the two plates moving in opposite directions become locked for some period of time because of friction. However, the accumulating stress overcomes the friction and causes the plate to suddenly move over a short time period which generates an earthquake.

Elastic Wave : An energy wave that causes elastic deformation in a material without its structure and shape being deformed.

Electrical conductivity (EC) : Conduction of electricity through water or a solution of soil commonly used to estimate the soluble salt content in solution, e.g. soil solution. OR Energy produced from the force between two objects having the physical property of electrical charge

Electrolytic process : A process that causes the decomposition of a chemical compound by the use of electricity.

Electromagnetic Energy : Energy stored in electromagnetic waves or radiation.

Energy is released when the waves are absorbed by a surface. Any object with a temperature above absolute zero (-273° Celsius) emits this type of energy. The intensity of energy released is a function of the temperature of the radiating surface. The higher the temperature the greater the quantity of energy released.

Electromagnetic Radiation (Waves) : Emission of energy in the form of electromagnetic waves. All objects above the temperature of absolute zero (-273.15° Celsius) radiate energy to their surrounding environment. The amount of electromagnetic radiation emitted by a body is proportionally related to its temperature.

Electromagnetic Spectrum : See spectrum.

Electron : A sub-particle of an atom that contains a negative atomic charge.

Electron acceptor : Substance that accepts electrons during an oxidation-reduction reaction. An electron acceptor is an oxidant.

Electron acceptor : Substance that accepts electrons during an oxidation-reduction reaction. An electron acceptor is an oxidant.

Electron donor : Substance that donates electrons in an oxidation-reduction reaction. An electron donor is a reductant.

Electronic distance meter (EDM) : A device that emits ultrasonic waves that bounce off solid objects and return to the meter. The meter's microprocessor then converts the elapsed time into a distance measurement. Sound waves spread 1 foot wide for every 10 feet measured. There are various types available.

Electrontransport chain : Final sequence of reactions in biological oxidations composed of a series of oxidizing agents arranged in order of increasing strength and terminating in oxygen.

Electrontransport chain : Final sequence of reactions in biological oxidations composed of a series of oxidizing agents arranged in order of increasing strength and terminating in oxygen.

Electrontransport chain phosphorylation : See oxidative phosphorylation.

Electrophilic compounds : Chemicals that attack or are drawn to regions in other chemicals in which electrons are readily available; oxidizing agents act as electrophilic compounds.

Electrophilic compounds : Chemicals that attack or are drawn to regions in other chemicals in which electrons are readily available; oxidizing agents act as electrophilic compounds.

Electrophoresis : Separation of charged molecules, such as nucleic acids, in an electrical field.

Element : A molecule composed of one type of atom. Chemists have recognized

or created 112 different types of elements. See the following WWW link for the chemical description of these different elements. Two or more different elements form a compound.

ELISA : Enzyme-linked immunosorbent assay. An immunoassay that uses specific antibodies to detect antigens or antibodies in body fluids. The antibody-containing complexes are visualized through enzyme coupled to the antibody. Addition of substrate to the enzyme-antibody-antigen complex results in a colored product.

Eluvial Horizon : A horizon from which material has been removed either in solution or suspension.

Eluviation : The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial. OR Removal of soil material from a layer of soil as a suspension .

Eluviation : The removal or "exit" of materials from one horizon which are then "illuviated" into a horizon below.

EmbdenMeyerhof Parnas pathway (EmbdenMeyerhof pathway; EMP pathway; glycolytic pathway) : A biochemical pathway that degrades glucose to pyruvate; the sixcarbon stage converts glucose to fructose1,6bisphosphate, and the threecarbon stage produces ATP while changing glyceraldehyde3phosphate to pyruvate.

EmbdenMeyerhofParnas pathway (EmbdenMeyerhof pathway; EMP pathway) : A biochemical pathway that degrades glucose to pyruvate; the six-carbon stage converts glucose to fructose-1,6-bisphosphate, and the three-carbon stage produces ATP while changing glyceraldehyde-3-phosphate to pyruvate.

Emergent : Emergent - Above sea level or not under water.

Emergent properties : Properties of a whole system that are not apparent from examining properties of the components of the system.

Emigration : Migration of an organism out of an area for the purpose of changing its residence permanently. Compare with immigration.

Emissivity : The ratio of total radiative output from a body per unit time per unit area at a specific temperature and wavelength to that of a black body under the same environmental conditions.

Emulsion : A liquid mixture of two or more liquid substances not normally dissolved in one another, one liquid held in suspension in the other

Enclosed System : See: in-vessel.

Endangered Species : A species found in nature that has so few surviving individuals that the it could soon become extinct in all or most of its natural

range. Also see threatened species.

Endergonic reaction : Chemical reaction that proceeds with the consumption of energy.

Endergonic reaction : Chemical reaction that proceeds with the consumption of energy.

Endoacidic : Soils in which the major part of the profile deeper than 0.5 m is strongly acid. This term is used as a Subgroup distinction for Vertosols in the Australian Soil Classification (Isbell, 1996).

Endocalcareous : A term used to describe a soil in which the major part of the profile deeper than 0.5 m is calcareous. This term is used as a Subgroup definition for the Vertosol Order in the Australian Soil Classification (Isbell, 1996).

Endocarp : Endocarp - A fossilized fruit pit or stone.

Endoenzyme : Enzyme that operates along the internal portions of a polymer.

Endogenic : Refers to a system that is internal to the Earth.

Endogenous respiration : A reduced level of respiration (breathing) in which organisms break down compounds within their own cells to produce the oxygen they need.

Endogenous respiration : A reduced level of respiration (breathing) in which organisms break down compounds within their own cells to produce the oxygen they need.

Endohypersodic : These soils deeper than a 0.5 m depth, have an ESP of 15 or more. This term is used as a Subgroup definition for Calcarosols and Vertosols in the Australian Soil Classification (Isbell, 1996).

Endolithic : Rock dwelling.

Endomycorrhiza : Mycorrhizal association with intracellular penetration of the host root cortical cells by the fungus as well as outward extension into the surrounding soil.

Endomycorrhizal fungi : A type of mycorrhizal fungi that invades the cells of plant roots.

Endonuclease : Endoenzyme that cleaves phosphodiester bonds within a nucleic acid molecule.

Endophyte : Organism growing within a plant. The association may be symbiotic or parasitic.

Endospore : Differentiated cell formed within the cells of certain Grampositive bacteria and extremely resistant to heat and other harmful agents.

Endosymbiont : An organism that lives within the body of another organism in a symbiotic association.

Energy : Is defined as the capacity for doing work. Energy can exist the following forms: radiation; kinetic energy; potential energy; chemical energy; atomic energy; electromagnetic energy; electrical energy; and heat energy.

Energy Flux : The rate of energy flow from, into, or through a substance.

Enhanced rhizosphere degradation : Enhanced biodegradation of contaminants near plant roots where compounds exuded by the roots increase microbial biodegradation activity. Other plant processes such as water uptake by the plant roots can enhance biodegradation by drawing contaminants to the root zone.

Enrichment culture : Technique in which environmental (including nutritional) conditions are controlled to favor the development of a specific organism or group of organisms.

Enteric : Of intestinal origin, especially applied to wastes or bacteria.

Enteric bacteria : General term for a group of bacteria that inhabit the intestinal tract of humans and other animals. Among this group are pathogenic bacteria such as Salmonella and Shigella.

Enterovirus : Small virus that infects the gastrointestinal tract and can spread to other areas, especially the nervous system. Examples include coxsackie, hepatitis A, and polio.

Entisols : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. Soil of recent development with no or poorly developed soil horizons.

EntnerDoudoroff pathway (ED pathway) : A pathway that converts glucose to pyruvate and glyceraldehyde-3-phosphate by producing 6-phosphogluconate and then dehydrating it.

Entomology : The study of insects and their environments.

Entrainment : One of three distinct processes involved in erosion. More specifically, it is the process of particle lifting by an agent of erosion.

Entropy : Entropy is the measure of the disorder or randomness of energy and matter in a system.

Enumeration : The numbers of microbes present in a sample.

Environment : (1) Abiotic and biotic factors that influence the life of an organism.

(2) Abiotic and biotic factors that influence the function of some nonliving natural system.

Environmental geology : Environmental geology - The application of geologic

information to problems created by human habitation of the physical environment, particularly natural hazards, engineering problems and adverse effects on the quantity and quality of natural resources.

Environmental Gradient : Spatial gradient where abiotic and biotic factors vary.

Environmental impact statement (eis) : A document evaluating the probable consequences of a proposed project that might significantly alter the environment. Required by the national environmental policy act (1969) for any such project a u.s. Government agency plants to undertake, regulate, or fund. An eis is released in draft form (deis) to other agencies and the public for comment and review.

Environmental Lapse Rate (ELR) : The rate of air temperature increase or decrease with altitude. The average ELR in the troposphere is an air temperature decrease of 6.5° Celsius per 1000 meters rise in elevation.

Environmental resistance : All biotic and abiotic factors combining to limit explosion.

Environmental Science : Field of knowledge that studies of how humans and other species interact with one another and with the nonliving environment. It is both a physical and social science that integrates knowledge from a wide range of disciplines, including physics, chemistry, biology, geology, geography, economics, political science, sociology, psychology, and philosophy.

Environmental System : A system where life interacts with the various abiotic components found in the atmosphere, hydrosphere, and lithosphere.

Enzyme : Protein within or derived from a living organism that functions as a catalyst to promote specific reactions. OR Organic substances (proteins) produced by living organisms and act as catalysts to speed up chemical changes.

Enzymelinked immunosorbent assay (ELISA) : Immunoassay that uses specific antibodies to detect antigens or antibodies. The antibodycontaining complexes are visualized through an enzyme coupled to the antibody. Addition of substrate to the enzymeantibodyantigen complex results in a colored product.

Eocene : Eocene - 55 to about 35 million years ago, an epoch of the Tertiary Period. Also the rocks formed during this time.

Eolian : Eolian - Wind-blown deposits such as the modern Sand Hills or the loess bluffs near many large river valleys.

Eolian Landform : Is a landform formed from the erosion or deposition of weathered surface materials by wind. This includes landforms with some of the following geomorphic features: sand dunes, deflation hollows, and desert pavement. Alternative spelling aeolian landform.

Eolian soil material. : Earthy parent material accumulated through wind action;

commonly refers to sandy material in dunes or to loess in blankets on the surface.

Eolian. : Deposits laid down by the wind, landforms eroded by the wind, or structures such as ripple marks made by the wind.

Eon : Longest geologic time unit.

EPA : United States Environmental Protection Agency. The federal agency assigned to administer the federal Clean Water Act and other federal environmental laws.

Epeiric : Epeiric - Situated on a continental shelf or a continental interior.

Ephemeral stream : A stream that flows only sporadically, such as after storms.

Epiacidic : Soils in which the major part of the upper 0.5 m of the soil is strongly acid. This term is used as a Subgroup definition for Vertosols in the Australian Soil Classification (Isbell, 1996).

Epicalcareous : A soil in which the major part of the top 0.5 m of the profile is calcareous. It is used to describe Hydrosols and in the Australian Soil Classification (Isbell, 1996).

Epicenter : The point on the earth's surface directly above the focus of an earthquake. OR Surface location of an earthquake's focus.

Epidote : Epidote - A pistachio-green mineral that forms as an alteration product of some feldspars.

Epihypersodic : Soils with at least one subhorizon within the top 0.5 m of the profile having an ESP greater than 15. Used as a Subgroup definition for Calcarosols and Vertosols in the Australian Soil Classification (Isbell, 1996).

Epipedal : These soils have a pedal A Horizon, commonly blocky or polyhedral structure, with a moderate to strong grade and no surface crust. Used as a Great Group definition for Vertosols in the Australian Soil Classification (Isbell, 1996).

Epiphyte : Type of vegetation that gets its physical support from the branches of other plants. Commonly found in the tropical forests.

Episodic : These soils have an ESP of 6 or greater in the upper 0.1 m of the profile. This term is used as a Subgroup definition for Vertosols in the Australian Soil Classification (Isbell, 1996).

Episome : Plasmid that replicates by inserting itself into the bacterial chromosome.

Epitope : The region of an antigen to which the variable region of an antibody binds.

Epoch : Geologic time unit that is shorter than a period.

Equalizing basin : A holding basin in which variations in flow and composition of liquid are averaged. Such basins are used to provide a flow of reasonably

uniform volume and composition to a treatment unit. Also called a balancing reservoir.

Equator : Location on the Earth that has a latitude of 0°.

Equatorial Forest or Tropical Rain Forest : A dense, luxuriant, evergreen forest of hot, wet equatorial regions containing many trees of tremendous heights, largely covered with lianas and epiphytes. Individual species of trees are infrequent but they include such valuable tropical hardwoods such as mahogany, ebony and rubber. Typical equatorial forests occur in Zaire and Amazon basins in southeastern Asia.

Equilibrium : Equilibrium describes the average condition of a system, as measured through one of its elements or attributes, over a specific period of time.

Equinox : Two periods when the declination of the sun is at the equator. The autumnal equinox occurs on September 22 or 23. The vernal equinox occurs on March 21 or 22.

Era : Geologic time unit that is shorter than an eon but longer than a period.

Erg Desert : A region in a desert where sand is very abundant.

Ericoid mycorrhiza : Type of mycorrhiza found on plants in the Ericales. The hyphae in the root are able to penetrate cortical cells (endomycorrhizal habit); however, no arbuscules are formed. Major forms are ericoid, arbutoid, and monotropoid.

Erosion : The wearing away of the land surface by water, wind, ice, gravity or other natural or anthropogenic agents that abrade, detach and remove soil particles or rock material from one point on the earth's surface, for deposition elsewhere, including gravitational creep and so-called tillage erosion. OR The removal of weathered sediment or rocks by the forces of wind, water, and ice.

Erosion (accelerated). : Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion (geologic). : Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion Pavement : A layer of gravel or stones left on the surface of the ground after the removal of the fine particles by erosion.

Erosion pavement. : A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Erosional Landform : Is a landform formed from the removal of weathered and eroded surface materials by wind, water, glaciers, and gravity. This includes landforms with some of the following geomorphic features: river valleys, glacial valleys, and coastal cliffs.

Esker (geology) . : A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Essential element . : The elements C, H, O, P, K, N, S, Ca, Mg, K, B, Mn, Cu, Zn, Mo, Cl, Co, Si and F. These must be taken up and utilized in sufficient quantities for plants to complete their life cycles. OR A plant nutrient. One of 17 elements required for plants to complete their life cycles. Carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, zinc, copper, manganese, molybdenum, nickel, boron, chlorine. No other element fully substitutes for an essential element, and all plants require the essential element. Having a beneficial effect on plant growth or development is not a characteristic of essentiality.

Establishment : Subsequent growth and/or reproduction of a colonized species in a new territory.

Estimator : An estimator is any value calculated from the sample data For example, the sample mean is an estimator of the population mean.

Estrus (heat) : (Animal science) the recurrent, restricted period of sexual receptivity in livestock. Non-pregnant cows and heifers usually come in heat 18 to 21 days following their previous estrus.

Estuaries : Bodies of water which are located at the lower end of a river and are subject to tidal fluctuations.

Estuarine Deposits : Estuarine Deposits - Sediments laid down in an estuary by streams; may include conglomerates, sands, gravels, and siltstones or silty shales, as well as organic debris. OR Fine-grained sediments (sand, silt, and clay) of marine and fluvial origin often containing decomposed organic matter, laid down in the brackish waters of an estuary; characteristically finer sediments than deltaic deposits. Compare - Lacustrine Deposit, Lagoonal Deposit, Marine Deposit, Overbank Deposit. (modified from Jackson, 1997)

Estuarine subaqueous soils : Soils that form in sediment found in shallow-subtidal environments in protected estuarine coves, bays, inlets, and lagoons. Excluded from the definition of these soils are any areas "permanently covered by water too deep (typically greater than 2.5 m) for the growth of rooted plants.

Estuary : Estuary - A water passage, such as the mouth of a river, where the tide meets the current of a stream. OR a) A seaward end or the widened funnel-shaped tidal mouth of a river valley where fresh water comes into contact with seawater and where tidal effects are evident (e.g., a tidal river, or a partially

enclosed coastal body of water where the tide meets the current of a stream). b) A portion of an ocean or an arm of the sea affected by fresh water. c) A drowned river mouth formed by the subsidence of land near the coast or by the drowning of the lower portion of a non-glacial valley due to the rise of sea level. Compare - Lagoon. (modified from Jackson, 1997).

Eubacteria : Old term for the Bacteria.

Eucaryotes : The kingdom that describes ALL organisms (plants, fungi, animals, fish, birds, etc.) that have an organized nucleus surrounded by a nuclear membrane. The other major kingdom is the Procaryotes (containing only the primitive bacteria and Archae)

Euchrozems : GSG classification – Red, strongly structured clay soils with a somewhat lower clay content near the surface. They resemble but are more alkaline than Krasnozems.

Euhedral : Euhedral - A mineral bounded by crystal faces or having crystal faces.

Eukarya : Phylogenetic domain containing all eukaryotic organisms.

Eukaryota : All the organisms with a eukaryote cell type. This group includes animals, plants, fungi, and protists.

Eukaryote : Organism having a unit membranebound nucleus and usually other organelles.

Eurypterid : Eurypterid - An extinct order of merostomes, characterized by a body tapered toward the abdomen and six pairs of appendages; one pair was flattened and served as paddles for swimming.

Eurythermal : Bodies of water which are located at the lower end of a river and are subject to tidal fluctuations.

Eustacy : Variations in sea-level that are related to changes in the volume of seawater in the oceans.

Eustatic : Eustatic - Pertaining to world-wide changes in sea level that affect all oceans simultaneously.

Eutrophic : Having high concentrations of nutrients optimal, or nearly so, for plant or animal growth. Can be applied to nutrient or soil solutions and bodies of water. OR Base status is greater than $15 \text{ cmol}(+) \text{ kg}^{-1}$ clay.

Eutrophic :

Eutrophic Lake : Lake that has an excessive supply of nutrients, mostly in the form of nitrates and phosphates. Also see mesotrophic lake and oligotrophic lake.

Eutrophication : Enrichment of natural waters with excess nutrients that leads to algae blooms and subsequent oxygen deficiency when the algae die and bacteria

degrade them.

Evaporation : Changing a liquid to a gas; for example, when water turns into steam or water vapor. OR The process of the passage of water from the liquid or solid states into vapor. When passing from a solid the change of state is called OR Changing a liquid to a gas; for example, when water turns into steam or water vapor.

Evaporation : The phase change of liquid water into water vapor. OR Water on the Earth's surface or in the soil absorbs heat from the sun to the point that it vaporizes or evaporates and becomes part of the atmosphere.

Evaporation Pan : Meteorological instrument that is used to measure evaporation rates.

Evaporation ponds : Areas where sewage sludge is dumped and dried.

Evaporite : Mineral formations formed from evaporating ground water discharge areas, predominantly gypseous in northern Victoria

Evapotranspiration (ET) : Evapotranspiration (ET) - The process by which water is transmitted as a vapor to the atmosphere as the result of evaporation from any surface and transpiration from plants.

Evergreen tree : (Forestry) a tree that retains some or most of its leaves, or needles, throughout the year.

Evergreen Vegetation : Vegetation that keeps a majority of their leaves or needles throughout the year. Also see deciduous vegetation and succulent vegetation.

Evidence of cryoturbation(jj) : Evidence of cryoturbation includes irregular and broken horizon boundaries, sorted rock fragments, and organic soil materials occurring as bodies and broken layers within and/or between mineral soil layers. The organic bodies and layers are most commonly at the contact between the active layer and the permafrost.

Evolution : Is a process by which species come to possess genetic adaptations to their environment. Its mechanism is natural selection. It also requires genetic mutations.

Ewe : (Animal science) a female sheep of any age.

Exceptional Value Waters : A stream or watershed which constitutes an outstanding national, state, regional or local resource, such as waters of national, state, or county parks or forests, or waters which are used as a source of unfiltered potable water supply, or waters of wildlife refuges or state game lands, or waters which have been characterized by the Fish Commission as "Wilderness Trout Streams," and other waters of substantial recreational or ecological significance.

Excessively Aerobic : A horizon which is usually too dry to support adequate

plant growth.

Excessively Drained : A soil that loses water very rapidly because of rapid percolation.

Exchange capacity : A measure of a nutrient-holding power of a soil or soil amendment, such as compost. Cation exchange capacity concerns positively charged ions. Anion exchange capacity refers to negatively charged ions.

Exchangeable calciummagnesium ratio (Exch. Camg) : A ratio of exchangeable Calcium vs. Exchangeable Magnesium in the soil. Soils with a low camg ratio i.e. < 0.1 are considered to be Magnesian in the Australian Soil Classification (Isbell, 1996). A very low camg ratio will in most cases indicate low exchangeable calcium levels (possible calcium deficiency for some plants)

Exchangeable Cation : A cation such as calcium that is adsorbed onto a surface, usually clay or humus and is capable of being easily replaced by another cation such as potassium. Exchangeable cations are readily available to plants.

Exchangeable sodium percentage (esp) : Is calculated as the proportion of the cation exchange capacity occupied by the sodium ions and is expressed as a percentage. In Australia, sodic soils are categorised as soils with an ESP of 6-14% and strongly sodic soils have an ESP of 15% or greater.

Exergonic reaction : Chemical reaction that proceeds with the liberation of energy.

Exfoliation : A weathering process during which thin layers of rock peel off from the surface. This is caused by the heating of the rock surface during the day and cooling at night leading to alternate expansion and contraction. This process is sometimes termed "onion skin weathering".

Exfoliation Dome : A physical weathering feature associated with granite that is the result of the erosion of overburden material and pressure-release. With the release of pressure, layers of rock break off in sheets or shells leaving a dome-like bedrock feature.

Exobiology : Branch of biology concerned with the effects of extraterrestrial environments on living organisms.

Exoenzyme : Enzyme that acts at the end of a polymer cleaving off monomers and dimers and sometimes larger chain fragments

Exogenic : Refers to a system that is external to the Earth.

Exosphere : The outermost zone in the Earth's atmosphere. This layer has an altitude greater than 480 kilometers and is primarily composed of hydrogen and helium gas.

Exotic species : A non-native plant or animal species introduced by humans, either deliberately or accidentally.

Exotic Stream : A stream that has a course that begins in a humid climate and end in an arid climate. Because of reductions in precipitation and and increases in evaporation, the discharge of these streams deceases downslope. Examples of such streams are the Nile and Colorado Rivers.

Expansive soils : Types of soil that shrink or swell as the moisture content decreases or increases. Structures built on these soils may experience shifting, cracking, and breaking damage as soils shrink and subside or expand.

Experiment : A controlled investigation designed to evaluate the outcomes of causal manipulations on some system of interest.

Exploitation : Form of competition where the indirect effects of the two or more species or individuals reduce the supply of the limiting resource or resources needed for survival.

Explosive Eruption : Volcanic eruption where high-viscosity granite-rich magma causes an explosion of ash and pyroclastic material. This type of eruption is common to composite and caldera volcanoes.

Exponential growth : Period of sustained growth of a microorganism in which the cell number constantly doubles within a fixed time period.

Exponential phase : Period during the growth cycle of a population in which growth increases at an exponential rate. As referred to as logarithmic phase.

Extinction : Disappearance of a species from all or part of their geographic range. Also see background extinction and mass extinction.

Extracellular : Outside the cell.

Extrusive Igneous Rock : Igneous rock that forms on the surface of the Earth. Also called volcanic igneous rock.

Exudate : Low molecular weight metabolites that leak from plant roots into soil. OR Root excretions which work symbiotically with microbes to form an ideal microbial environment.

Eye : Area in the center of a hurricane that is devoid of clouds.

F

F : Food - represents BOD in the F/M ratio. Expressed in pounds.

F/M : A ratio of the amount of food to the amount of organisms. Used to control an activated sludge process.

F1 Hybrid : Refers to the first generation of offspring plants produced by a cross of two genetically different parent varieties. F1 hybrids can have advantages, including the robust growth known as "hybrid vigor," homogeneity, and the fact that they are often bred to be disease resistant. Seed saved from F1 hybrids are unpredictable, however, and are sometimes sterile.

Fabric : Describes the appearance of the soil material (under a hand lens). Fabric differences are associated with the presence or absence of peds, the lustre of the ped surface and the presence, size and arrangement of pores in the soil mass (mcdonald et al, 1990).

Fabric covers : In composting, specially designed covers applied to windrows to manage moisture levels, protect from UV rays, while simultaneously permitting gaseous exchange.

Faceted Stone : Faceted Stone - A gem with a faceted crown above and a faceted pavillion below, separated by a narrow girdle.

Facets : Facets - Small, flat-cut surfaces on a gem, which produce a sparkling effect with transparent stones. OR The appearance or aspect of any rock; the sum total of its characteristics. (*stratigraphic facies* – The sum of the rock and fossil features of a sedimentary rock).

Facilitation : Modification of a system that makes subsequent modifications easier.

Facilitation Model of Succession : This model of succession suggests that the change in plant species dominance over time is caused by modifications in the abiotic environment that are imposed by the developing community. Thus the entry and growth of the later species depends on earlier species preparing the ground.

Facultative Aerobic Organisms : Organisms capable of growing under both aerobic and anaerobic conditions

Facultative anaerobe : A bacterium capable of growing under aerobic conditions or anaerobic conditions in the presence of an inorganic ion ie. SO₄, NO₃.

Facultative organism : Organism that can carry out both options of a mutually exclusive process (e.g., aerobic and anaerobic metabolism).

Facultative pond : The most common type of pond in current use. The upper portion (supernatant) is aerobic, while the bottom layer is anaerobic. Algae supply most of the oxygen to the supernatant.

Fahrenheit Scale : Scale for measuring temperature. In this scale, water boils at 212° and freezes at 32°.

Fall : Season between summer and winter. Astronomically it is the period from the autumnal equinox to the winter solstice in the Northern Hemisphere.

Fallow : Leaving the land uncropped for a period of time. This may be to accumulate moisture, improve structure or induce mineralization of a nutrient.

Fallow, fallow land : Land is considered fallow if it is kept free of growing plants during the growing season (March to October) using cultivation. The process is called "fallowing."

Fallow. : Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

False Origin : Location of the starting coordinates picked to the south and west of the true origin of a rectangular coordinate system. False origins are used to avoid negative coordinates.

Falsification : Falsification is a procedure used in science to test the validity of a hypothesis or theory. It involves stating some output from theory in specific and finding contrary cases among experiments or observations.

FAME : Fatty Acid Methyl Ester, a means of identifying bacteria by analysis of the fatty acids in their cells. This is often done as an initial screening until a company, such as Alken-Murray Corporation, is sure that a bacterial strain is one they wish to use commercially, and then 16S rRNA identification may be completed for a more definite identification and fingerprint of the strain, to keep competitors from copying that strain.

Family : One of the categories in soil classification intermediate between the great soil group and the soil series.

Fan : A low cone of alluvial materials. The central point lies at the mouth of a gully or ravine and the material is spread out onto the adjoining plain.

Farm manure. : The feces saved from farm animals and applied to land to provide plant nutrients.

Fast intake (in tables). : The rapid movement of water into the soil.

Fatty acid analysis : Examination of the fatty acid methyl esters (FAMES) in the soil using gas chromatography. Fatty acids are within the cell walls of soil organisms, so the types of fatty acids found in soil are an indicator of the structure and diversity of the soil community.

Fault : Fault - A fracture in rock in which there is some displacement of opposite blocks. Fault planes are often mineralized. OR A fracture in rock caused by stress.

Fault Plane : The plane that represents the fracture surface of a fault.

Fault Scarp : The section of the fault plane exposed in a fault. Also called an escarpment.

Fault-line scarp . : A scarp that has been produced by differential erosion along an old fault line.

Faultslide . : A landslide that shows physical evidence of its interaction with a fault.

Fauna : Fauna - All the animals occupying any area.

Faunal : Faunal - Pertaining to fauna, that is, animal life.

Faunal casts : Soil matter reworked by passing through the digestive tracts of soil animals.

Fecal coliform : Bacteria found in the intestinal tracts of warm-blooded animals. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated sewage and/or the presence of animal feces. These organisms may also indicate the presence of pathogens that are harmful to humans. OR Bacteria from the colons of warm-blooded animals which are released in fecal material.

Fecal Material : The various types of feces or excrement produced by soil fauna.

Fed (or fat) cattle : (Animal science) cattle that have been finished, usually in the feedlot, and are ready for slaughter.

Feedback inhibition : Inhibition by an end product of the biosynthetic pathway involved in its synthesis.

Feedback Loop : Process where the output of a system causes positive or negative changes to some measured component of the system.

Feeder cattle : (Animal science) cattle past the calf stage that have weight increased making them salable as feedlot replacements.

Feedlot : (Animal science) a confinement facility where cattle are fed to produce beef for the commercial trade. May be under a roof or outdoors.

Feedstock : Biologically decomposable organic material used for the production of compost; the materials to be decomposed through the composting process

Feldspar : A group of common aluminum silicate minerals that contains potassium, sodium, or calcium.

Felsic Magma : Magma that is relatively rich in silica, sodium, aluminum, and potassium. This type of magma solidifies to form rocks relatively rich in silica, sodium, aluminum, and potassium.

Felspar or feldspar : Aluminosilicates of potassium, sodium and calcium, and characterised by two cleavages at nearly right angles. They are among the most important constituents of igneous rock).

Fen : Flat and swampy land, usually low in altitude and similar to a bog or marsh. OR A habitat composed of woodland and swamp.

Fen Peat : Peat that is neutral to alkaline due to the presence of calcium carbonate.

Fermentation : Decomposition and breakdown of organic matter by anaerobic means.

Fermentation : A type of heterotrophic metabolism in which an organic compound rather than oxygen is the terminal electron (or hydrogen) acceptor. Less energy is generated from this incomplete form of glucose oxidation than is generated by respiration, but the process supports anaerobic growth.

Fern : A group of about 11,000 species of vascular seedless plants that belong to the division Pterophyta. About 75 percent of the various species of ferns are found in the tropics. Some ferns grow on the branches of trees as epiphytes.

Ferrel Cell : Three-dimensional atmospheric circulation cell located at roughly 30 to 60° North and South of the equator.

Ferric horizon : A soil horizon containing more than 20% ferruginous nodules or concretions (also known as ironstone or buckshot) that are uncemented. The term is used as a definition for numerous Soil Orders in the Australian Soil Classification (Isbell, 1996). OR One which contains more than 20% of ferruginous nodules or concretions which are mostly uncemented, and has a minimum thickness of 0.1m.

Ferricretes : Sedimentary rock created by the chemical precipitation of iron.

Ferromanganiferous : Consisting of iron and manganese.

Ferrosols : Soil Order of the Australian Soil Classification (Isbell, 1996). These soils lack strong texture contrast between the A and B horizons. The B₂ horizon has structure more developed than weak and a fine earth fraction which has a free iron oxide content greater than 5% (as opposed to a Dermosol). OR ASC Soil Order classification—Soils with B₂ horizons in which the major part has a free iron oxide content greater than 5% Fe in the fine earth fraction (<2 mm). Soils with a b₂ horizon in which at least 0.3 m has vertic properties are excluded.

Ferruginous cementation : The bonding of soil particles into a hard mass by

concentration of iron around a nucleus.

Fertigation : a term coined for application of fertilizers in irrigation waters, usually through sprinkler systems. See also Chemigation.

Fertility, soil. : The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fertilization : Application of mainly mineral compounds, in order to increase soil fertility. In some cases, (e.g. liming) the purpose of fertilization is also to improve specific soil properties (pH, stability of soil structure).

Fertilizer : Substance that adds inorganic or organic nutrients to soil for the purpose of increasing the growth of crops, trees, or other vegetation. OR Any organic or inorganic material of natural or synthetic origin (other than liming materials) added to a soil to supply one or more elements essential to plant growth.

Fertilizer grade. : The guaranteed minimum percentages of available nitrogen (N), phosphoric acid (P_2O_5), and potash (K_2O) in a commercial fertilizer. Also known as fertilizer analysis.

Fetch : The distance of open water in one direction across a body of water over which wind can blow.

Fibric : Fibrous organic material.

Fibric soil material (peat). : The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field (water) capacity : the amount of water remaining in a soil after the soil layer has been saturated and the free (drainable) water has been allowed to drain away (a day or two). Estimated at -33 kPa water potential.

Field bindweed : Perennial with very deep roots related to the morning glory. Located throughout the state. Has a showy trumpet flower. Takes over areas with low water use such as the edges of fields. A problem in central and northern orchards.

Field capacity : Content of water, on a mass or volume basis, remaining in a soil after being saturated with water and after free drainage is negligible.

Field capacity (field moisture capacity) : Content of water, on a mass or volume basis, remaining in a soil after being saturated with water and after free drainage is negligible. OR The water remaining in a soil after the complete draining of the soil's gravitational water.

Field corn : (Crop science) any variety of corn that is grown extensively in large

fields primarily for livestock feed, as contrasted with the horticultural varieties, such as sweet corn or popcorn. Most field corn is of the dent variety.

Filamentous : In the form of very long rods, many times longer than wide (for bacteria), in the form of long branching strands (for fungi).

Filamentous algae : Algae that forms filaments or mats that are attached to sediment, weeds, piers, etc.

Filamentous organisms : Organisms that grow in a thread or filamentous form. Common types are Thiobacillus, Actinomycetes, and Cyanobacteria (aka blue-green algae). This is a common cause of sludge bulking in the activated sludge process. Variously known as "pond scum", "blue-green algae", or "moss", when it appears in a pond/lake, and confused with algae because it looks a lot like algae. Cyanobacteria forms a symbiotic relationship with some varieties of algae, making the combination very difficult to combat in lakes and ponds. Filamentous organisms and Actinomycetes will naturally stick to solid surfaces. Common types of Cyanobacteria are: Oscillatoria, Anabaena, and Synechococcus. Other filament formers include: Spirogyra, Cladophora, Rhizoclonium, Mougeotia, Zygnema and Hydrodictyon. Nocardia is another filament former, which causes foaming and interferes with flocculation in a waste treatment plant.

Filled land : A subaerial soil area composed of a variety of fill materials (construction debris, dredged or pumped sediments, etc.) deposited and smoothed to provide building sites and associated uses (e.g. lawns, driveways, parking lots). These fill materials are typically 0.5 to 3 m thick and have been deposited unconformably over natural soils (Schoeneberger and Wysocki, 2005). Compare - Dredge Spoil Bank.

Filling Materials : Filling Materials - Well-plugging materials that are used to take up space in a well.

Filly : (Animal science) a female horse less than three years old.

Filter aid : A chemical (usually a polymer) added to water to help remove fine colloidal suspended solids.

Filter medium : The permeable material that separates solids from liquids passing through it.

Filter strip : Strip or area of vegetation often situated at the edge of a field or along a waterway that is used for removing sediment, organic matter, and other pollutants from stormwater runoff.

Filtrate : A liquid that has passed through the filter medium.

Filtration : Separation of a solid and a liquid by using a porous substance that only lets the liquid pass through.

Fimbria (plural, fimbriae) : Short filamentous structure on a bacterial cell; although

flagellalike in structure, generally present in many copies and not involved in motility. Plays a role in adherence to surfaces and in the formation of pellicles.

Fine earth. : The soil separates or sand, silt, and clay of soil.

Fine Material : Soil material in thin sections composed of particles less than 2mm which are difficult or impossible to resolve with the petrological microscope.

Fine texture : (i) A broad group of textures consisting of, or containing, large quantities of fine fractions, particularly silt and clay. Includes sandy clay, silty clay, and clay texture classes. (ii) When used in reference to family particle-size classes in U.S. and FAO soil taxonomy, is specifically defined as having 35 to 60 percent clay. See also soil texture. OR Containing >35 per cent clay.

Fine textured soil. : Sandy clay, silty clay, and clay.

Finishing : Post-processing; screening, grinding, or a combination of similar processes to remove plastics, glass, and metals remaining after composting.

Firebreak : (Forestry) an existing barrier, or one constructed before a fire occurs, from which all or most flammable materials have been removed.

Firn : N  v   on a glacier that survives the year's ablation season. With time much of the firn is transformed into glacial ice.

Firn Limit : The lower boundary of the zone of accumulation on a glacier where snow accumulates on an annual basis. Also called the Firn Line.

Firn Line : See firn limit.

First bottom. : The normal flood plain of a stream, subject to frequent or occasional flooding.

First Law of Thermodynamics : See Law of Conservation of Energy.

First-order drainage. : The most upstream, field-discernible concavity that conducts water and sediments to lower parts of a watershed.

Fish : Group of vertebrate animals that inhabit aquatic habitats.

Fissile : Fissile - The ability of some shales to break into large pieces that have well-defined, thin layers.

Fission : Type of cell division in which overall cell growth is followed by formation of a crosswall which typically divides the fully grown cell into two similar or identical cells.

Fission (Nuclear) : Process where the mass of an atomic nucleus is made smaller by the removal of subatomic particles. This process releases atomic energy in the form of heat and electromagnetic radiation.

Fission Track : Fission Track - A tube of radiation damaged in a mineral or glass,

caused by nuclear particles formed during spontaneous fission of trace quantities of uranium 238.

Fissionable Isotope : Isotope that can undergo nuclear fission when hit by a neutron at the right speed. Examples include uranium-235 and plutonium-239.

Fissure : Opening or crack in the Earth's crust.

Fitness : A measure of the health of a species in terms of physiology and future reproductive success.

Fixed Energy : A process, like photosynthesis, where organisms repackage inorganic energy into organic energy.

Fjord : A glacial valley or glacial trough found along the coast that is now filled with a mixture of fresh water and seawater.

Flagellate : Protozoan that moves by means of one to several flagella.

Flagellum : A long, thread-like organelle used by many microscopic organisms for locomotion and feeding.

Flagellum (plural, flagella) : Whiplike tubular structure attached to a microbial cell responsible for motility.

Flagstone : A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flash Flood : A rapid and short-lived increase in the amount of runoff water entering a stream resulting in a flood.

Flashboard riser control structure : A structure made of corrugated steel that, when installed in a drainage ditch, allows the water level in the ditch to be controlled by the addition or removal of wooden boards.

Fleece : (Animal science) the wool coat of a sheep.

Floating matter : Matter which passes through a 2000 micron sieve and separates by flotation for an hour.

Floc : Clumps of bacteria and particulate impurities or coagulants that have come together and formed a cluster. Found in aeration tanks and secondary clarifiers.

Floc condition : Refers to the general flocculent or aggregated appearance of the soil mass, especially when viewed under a hand lens of about $\times 10$.

Flocculation : Chemical processes where salt causes the aggregation of minute clay particles into larger masses that are too heavy to remain suspended water.

Flood : Inundation of a land surface that is not normally submerged by water from quick change in the level of a water body like a lake, stream, or ocean.

Flood Basalt : See plateau basalt.

Flood Control Channel : Open waterway that is designed to carry large amounts of rain water. These structures are often lined with concrete to help control flood waters.

Flood plain : The nearly level plain that borders a stream and is subject to inundation under floodstage conditions unless protected artificially.

Flood plain : A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially

Flood Tide : Time during the tidal period when the tide is rising. Compare with ebb tide.

Floodplain : Relatively flat area found alongside the stream channel that is prone to flooding and receives alluvium deposits from these inundation events.

Flood-tidal Delta : A largely subaqueous (sometimes intertidal), crudely fan-shaped deposit of sand-sized sediment formed on the landward side of a tidal inlet (modified from Boothroyd et al., 1985; Davis, 1994; Ritter et al., 1995). Flood tides transport sediment through the tidal inlet and into the lagoon over a flood ramp where currents slow and dissipate (Davis, 1994). Generally, flood-tidal deltas along microtidal coasts are multi-lobate and unaffected by ebbing currents (modified from Davis, 1994). Compare - Flood-Tidal Delta Slope.

Flood-tidal delta flat : The relatively flat, dominant component of the flood-tidal delta. At extreme low tide this landform may be exposed for a relatively short period (modified from Boothroyd et al., 1985).

Flood-tidal delta slope : An extension of the flood-tidal delta that slopes toward deeper water in a lagoon or estuary, composed of flood channels, inactive lobes (areas of the flood-tidal delta that are not actively accumulating sand as a result of flood tides), and parts of the terminal lobe of the flood-tidal delta (modified from Boothroyd et al., 1985).

Flora : Flora - All the plants occupying an area.

Flotation : A solids-liquid or liquid-liquid separation procedure, which is applied to particles of which the density is lower than that of the liquid they are in. there are three types: natural, aided and induced flotation.

Flow augmentation : The addition of water to meet flow needs.

Flow equalization system : A device or tank designed to hold back or store a portion of peak flows for release during low-flow periods.

Flowtill : A supraglacial till that is modified and transported by mass flow.

Fluid : Substance, gas or liquid, that has the property of flow.

Fluid Drag : Reduction in the flow velocity of a fluid by the frictional effects of a surface.

Fluorescent : Able to emit light of a certain wavelength when activated by light of a shorter wavelength.

Fluorescent antibody : Antiserum conjugated with a fluorescent dye, such as fluorescein or rhodamine.

Fluvent : Floodplain soils, characterized by buried horizons and irregularly decreasing amounts of organic matter with depth.

Fluvial : Involving running water. Usually pertaining to stream processes. OR A geomorphic process whereby sediments are transported and deposited by flowing river water.

Fluvial : Of or pertaining to rivers; produced by river action.

Fluviatile : Relates to fluvial.

FluvioGlacial : See glacial-fluvial deposits.

Fluvioglacial deposits : Material moved from the margins of glaciers and subsequently sorted and deposited by streams flowing from the melting ice.

Fluviomarine bottom : The nearly level or slightly undulating, relatively low-energy, depositional environment with relatively deep water (1.0 to >2.5 m) directly adjacent to an incoming stream and composed of interfingering and mixed fluvial and marine sediments (fluviomarine deposits).

Fluviomarine deposit : Stratified materials (clay, silt, sand, or gravel) formed by both marine and fluvial processes, resulting from sea level fluctuations and stream migration (i.e. materials originally deposited in a nearshore environment and subsequently reworked by fluvial processes as sea level fell, or visa versa as sea level rose. (Schoeneberger and Wysocki, 2005).

Fluviomarine terrace : A constructional coastal strip, sloping gently seaward and/or down valley, veneered by or completely composed of unconsolidated sediments (typically silt, sand, fine gravel). Sediments were deposited by both marine and fluvial processes. Compare - Terrace, Stream Terrace, Marine Terrace. (Schoeneberger and Wysocki, 2002).

Fluxes : Rate of emission, sorption, or deposition of a material from one pool to another. For example, the exchange of methane between the land and the atmosphere is a flux, while the production of methane within the soil is not.

Foal : (Animal science) a young horse of either sex, less than one year old.

Focus : See earthquake focus.

FOG : Fog exists if the atmospheric visibility near the Earth's surface is reduced to 1 kilometer or less. Fog can be composed of water droplets, ice crystals or smoke particles. Fogs composed primarily of water droplets are classified according to the process that causes the air to cool to saturation. Common types of this type

of fog include: radiation fog; upslope fog; advection fog; evaporation fog; ice fog; and frontal fog. OR Fats, Oils and Greases. A measure of the non-petroleum based fats in waste treatment.

Föhn Wind : European equivalent of chinook wind.

Fold : Wavelike layers in rock strata that are the result of compression. OR Fold - Curved or bent rock strata.

Folding : The deformation of rock layers because of compressive forces to form folds.

Foliar : Pertaining to leaves

Foliar Leaching : Process in which water from precipitation removes plant nutrients from the surface of leaves.

Foliation : Process where once randomly distributed platy minerals in a rock become reoriented, because of metamorphism, in a parallel manner.

Folist gleization : A process in saturated or nearly saturated soils which involves the reduction of iron, its segregation into mottles and concretions, or its removal by leaching from the gleyed horizon.

Food chain : Movement of nutrients from one life form to another as a result of the different feeding habits and dietary requirements of organisms in an ecosystem.

Food chain : Very simple pathway of nutrient flow. Ex. Carnivore > herbivore > plant . OR Movement of energy through the trophic levels of organisms. In most ecosystems, this process begins with photosynthetic autotrophs (plants) and ends with carnivores and detritivores.

Food web : Diagram of the interconnections of nutrient flow through a food chain. OR Diagram of the interconnections of nutrient flow through a food chain.

Food web, soil : The interconnected community of organisms living all or part of their lives in the soil.

Foot slope. : The inclined surface at the base of a hill.

Foot Wall : The bottommost surface of an inclined fault.

Footslope : The hillslope position that forms the inner, gently inclined surface at the base of a hillslope

For soil morphology : Associated with each drainage class please.

Excessively drained: water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained: water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious.

Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained: water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained: water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained: (not mapped in Massachusetts) water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained: water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained: water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Forage : (Animal science) herbaceous plants or plant parts fed to domestic animals.

Foraminifer : Foraminifer - Any protozoan belonging to the subclass Sarcodina, order Foraminifera, characterized by the presence of an external shell or one or many chambers composed of secreted calcite or of composite particles. Most foraminifers are marine but freshwater forms exist. Range: Cambrian to the

present.

Forb. : Any herbaceous plant not a grass or a sedge.

Forbs : (Animal science, wildlife science) green broadleaf weeds.

Force : Process that changes the state of rest or motion of a body.

Force of Acceleration : Force resulting in the speed of a moving body to increase.

Foreset Bed : Deltaic deposit of alluvial sediment that is angled 5 to 25° from horizontal. Most of the delta is made up of these deposits.

Foreshock : Small earth tremors that occur seconds to weeks before a significant earthquake event.

Forest : Ecosystem dominated by trees. Major forest biomes include tropical evergreen forest, tropical savanna, deciduous forest, and boreal forest. OR Vegetation community consisting of trees to 30 m tall generally with an understorey of smaller trees, shrubs, grasses and herbs. Open-forest has a 30 - 70% canopy cover, while closed-forest has a canopy cover of >70%. Tall forests are forests in which the upper stratum height exceeds 30 m.

Forested riparian buffer : Streamside forest that is used to control nonpoint source pollution and in particular, sediment and nutrients.

Forestry : The science, art, and practice of managing and protecting tree and forest resources for human benefit.

Formation : Formation - A body of rock identified by lithologic characteristics or stratigraphic position; it is mappable at the surface and traceable through the subsurface.

Forminifera : Microscopic organisms of the group protozoa that are found living mainly in marine environments. These organisms produce shells rich in calcium carbonate. Sedimentation and lithification of these shells produces the sedimentary rock chalk.

Fossil : Geologically preserved remains of an organism that lived in the past.

Fossil fissure. : A buried rectilinear chamber associated with extension due to ground movement. The chamber must be oriented along the strike of the shear and must have vertical and horizontal dimensions greater than its width. It must show no evidence of faunal activity and its walls may have silt or clay coatings indicative of frequent temporary saturation with ground water. May be mistaken for an animal burrow. Also known as a paleofissure.

Fossil Fuel : Carbon based remains of organic matter that has been geologically transformed into coal, oil and natural gas. Combustion of these substances releases large amounts of energy. Currently, humans are using fossil fuels to supply much of their energy needs.

Fossiliferous : Fossiliferous - Containing fossils

Fouling : The deposition of organic matter on the membrane surface, which causes inefficiencies, a significant energy factor in membrane desalination.

Fractionation : In this study, using different chemicals to remove chemically different forms of phosphorus.

Fracture : Breaks in rocks due to intense folding or faulting; can be caused by breaking oil-, gas-, or water-bearing strata by injecting a fluid under such pressure as to cause partings in the rock.

Fragipan : Brittle subsurface restricting soil horizon, usually loamy textured and weakly cemented. OR Fragipans are earthy pans that are usually loamy. They seem to be cemented, with hard to very hard consistence when dry and moderate to weak brittleness when moist. However, a dry fragment slakes or fractures when placed in water (mcdonald et al, 1990).

Fragipan character(x) : This symbol indicates a genetically developed layer that has a combination of firmness and brittleness and commonly a higher bulk density than the adjacent layers. Some part of the layer is physically root-restrictive.

Fragment : A small mass of soil produced by a disturbance.

Free energy : Intrinsic energy contained in a given substance that is available to do work, particularly with respect to chemical transformations; designated ? G.

Freely Drained : A soil that allows water to percolate freely.

Freeze-Thaw Action : Processes associated with daily and seasonal cycles of freezing and melting.

Freezing : The change in state of matter from liquid to solid that occurs with cooling. Usually used in meteorology when discussing the formation of ice from liquid water.

Freezing : The phase change of liquid water into ice.

Freezing Rain : A type of precipitation. Occurs when liquid rain hits a cold surface and then immediately freezes into ice. For this to occur, a surface temperature inversion is usually required. In such an inversion, the surface must have a temperature below freezing, while the temperature of the atmosphere where the precipitation forms is above freezing.

Freons : See chlorofluorocarbons.

Frequency of Storm : Anticipated number of years between storms of equal intensity and/or total rainfall volume. For example, a 25-year 24-hour storm is the volume of rainfall that could be expected to occur during a 24-hour period once every 25 years on average.

Fresh compost : Organic matter that has gone through the thermophilic stage of composting and achieved pathogen kill, but is only partially decomposed and has not yet stabilized.

Fresh Water : Water that is relatively free of salts.

Freshwater : All waters that would have a chloride ion content of less than 500 parts per million under natural conditions.

Freshwater classifications : (See also Classifications)

Class C: freshwaters protected for secondary recreation, fishing, and propagation and survival of aquatic life; all freshwaters are classified to protect these uses at a minimum.

Class B: freshwaters protected for primary recreation, which includes swimming on a frequent or organized basis, and all Class C uses.

Class WS-I: waters protected as water supplies which are essentially in natural and undeveloped watersheds.

Class WS-II: waters protected as water supplies which are generally in predominantly undeveloped watersheds.

Class WS-III: waters protected as water supplies which are generally in low to moderately developed watersheds.

Class-IV: waters protected as water supplies which are generally in moderately to highly developed watersheds.

Class-V: waters protected as water supplies which are generally upstream of and draining to Class-IV waters.

Friability . : Term for the ease with which soil crumbles. A friable soil is one that crumbles easily.

Friable : Easily crumbled. Healthy soil is friable, so if you hold up a handful of soil and wiggle your fingers the particles of soil should fall out of your hand. OR A term applied to soils that when either wet or dry crumble easily between the fingers.

Friction : Resistance between the contact surfaces of two bodies in motion.

Frictional Force : Force acting on wind near the Earth's surface due to frictional roughness. Causes the deceleration of wind.

Fringe-tidal marsh : Narrow salt marsh adjacent to a relatively higher energy environment.

Front : Transition zone between air masses with different weather characteristics.

Frontal Fog : Is a type of fog that is associated with weather fronts, particularly

warm fronts. This type of fog develops when frontal precipitation falling into the colder air ahead of the warm front causes the air to become saturated through evaporation.

Frontal Lifting : Lifting of a warmer or less dense air mass by a colder or more dense air mass at a frontal transitional zone.

Frontal Precipitation : See convergence precipitation.

Frost : Deposition of ice at the Earth's surface because of atmospheric cooling.

Frost action (in tables) . : Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Frost Creep : Slow mass movement of soil downslope that is initiated by freeze-thaw action. Occurs where the stresses on the slope material are too small to create a rapid failure.

Frost Point : Is the temperature at which water vapor saturates from an air mass into solid usually forming snow or frost. Frost point normally occurs when a mass of air has a relative humidity of 100 %.

Frost Wedging : A process of physical weathering in which water freezes in a crack and exerts force on the rock causing further rupture.

Frozen soil or water(f) : This symbol indicates that a horizon or layer contains permanent ice. The symbol is not used for seasonally frozen layers or for dry permafrost.

Fruiting body : Macroscopic reproductive structure produced by some fungi, such as mushrooms, and some bacteria, including myxobacteria. Fruiting bodies are distinctive in size, shape, and coloration for each species.

Fruiting body : Macroscopic reproductive structure produced by some fungi, such as mushrooms, and some bacteria, including myxobacteria. Fruiting bodies are distinctive in size, shape, and coloration for each species.

Frustule : Siliceous wall and protoplast of a diatom.

Fujita Tornado Intensity Scale : Tornado classification system developed by T. Theodore Fujita. This system six levels from F0 to F5. These levels are based on the estimated speed of the tornado's winds from proxy information like property damage.

Fulvic Acid : The mixture of organic substances remaining in solution upon acidification of a dilute alkali extract of soil. OR Yellow organic material that remains in solution after removal of humic acid by acidification.

Fumigation : The spreading of pesticide to kill unwanted creatures.

Function : A service, role, or task that meets objectives for sustaining life and

fulfilling humanity's needs and is performed by soil or an ecosystem. (Compare to soil function.)

Functional capacity : The quantified or estimated measure of physical and biophysical mechanisms or processes selected to represent the soil's ability to carry out the function.

Functional redundancy : The presence of several species that serve similar functions (e.g. nitrification).

Fundamental Niche : Describes the total range of environmental conditions that are suitable for a species existence without the effects of interspecific competition and predation from other species.

Fungal-dominated food web : A soil food web in which the ratio of fungal biomass to bacterial biomass is greater than one.

Fungi : Simple plants that lack chlorophyll and are composed of cellular filamentous growth known as hyphae. Many fungi, but their fruiting bodies, viz. Mushrooms and puffballs are quite large. In composting: saprophytic or parasitic multinucleate organisms with branching filaments called hyphae, forming a mass called a mycelium; fungi bring about cellulolysis and humification of the substrate during stabilization.

Fungicide : See "pesticide"

Fungistasis : Suppression of germination of fungal spores or other resting structures in natural soils as a result of competition for available nutrients, presence of inhibitory compounds, or both.

Fungivores : Organisms that eat fungi.

Fungivorous : See mycophagous.

Fungus : A group of simple organisms that lack a photosynthetic pigment

Fungus (plural, fungi) : Nonphototrophic, eukaryotic microorganisms that contain rigid cell walls.

Funnel Cloud : A tornado which is beginning its descent from the base of a cumulonimbus cloud. This severe weather event may or may not reach the ground surface.

Furrow slice . : The layer of soil that is moved by tillage, usually by plowing. A furrow slice commonly is 6 inches deep. An acre furrow slice is the weight of the soil turned by tillage and is set at 2 million pounds. The weight of acre furrow slice is used in calculations of fertilizer applications, liming, and other soil amendments.

Fusarium basal rot : Occurs in onions. Fungal disease that attacks bulbs and causes a watery rot.

Fusiform : Spindleshaped; tapered at both ends.

Fusion (Nuclear) : Process where the mass of an atomic nucleus is made larger by the addition of subatomic particles. This process releases atomic energy in the form of heat and electromagnetic radiation.

Fusulinid : Fusulinid - Any fossil protozoan belonging to the order Foraminifera, characterized by a hard, external shell. Their shells make up as much as 70 percent of some limestones.

Futures contract : (Agricultural economics) an agreement between two people one who sells and agrees to deliver, and one who buys and agrees to receive a certain kind, quality, and quantity of products to be delivered during a specified delivery month at a specified price.

G

Gabbro : An intrusive igneous rock that develops from mafic magma and whose mineral crystals are coarse. Mineralogically this rock is identical to basalt.

Gaia Hypothesis : The Gaia hypothesis states that the temperature and composition of the Earth's surface are actively controlled by life on the planet. It suggests that if changes in the gas composition, temperature or oxidation state of the Earth are induced by astronomical, biological, lithological, or other perturbations, life responds to these changes by growth and metabolism.

Gaining Stream (effluent stream) : Gaining Stream (effluent stream) - Stream or portion of a stream where flow increases because of drainage from groundwater.

Galaxy : An assemblage of millions to hundreds of billions of stars.

Gall-Peters Projection : Map projection system that reduces the area distortion found in Mercator projections.

Gametangium : Fungal structure that contains one or more gametes.

Gamete : In eukaryotes, the haploid cell analogous to sperm and egg, which results from meiosis.

Gamma Radiation : A type of ionizing, electromagnetic radiation that readily penetrates the body tissues of organisms. Has a wavelength less than 0.03 nanometers.

Gap : A spatial opening in a plant community. Can be caused by natural death or by some other abiotic or biotic disturbance.

Gas chromatography : Chromatographic technique in which the stationary phase is a solid or an immobile liquid and the mobile phase is gaseous. The gaseous samples are separated based on their differential adsorption to the stationary phase.

Gas vacuole : A subcellular organelle, found only in prokaryotes, which consists of clusters of hollow, cylindrical, gas-filled vesicles (gas vesicles).

Gasification : The conversion of soluble and suspended materials into gas during anaerobic decomposition. In clarifiers the resulting gas bubbles can become attached to the settled sludge and cause large clumps of sludge to rise and float on the water surface. In anaerobic sludge digesters, this gas is collected for fuel or disposed of using a waste gas burner.

Gastropod : A member of the Gastropoda class of molluscs which includes snails and slugs.

Gastropod : Gastropod - Any mollusk of the class Gastropoda, characterized by a univalve shell without chambers, a distinct head, eyes and tentacles, such as a snail. Some gastropoda lack shells, such as slugs.

Gel : Inert polymer, usually made of agarose or polyacrylamide, that separates macromolecules such as nucleic acids or proteins during electrophoresis.

Gel : Inert polymer, usually made of agarose or polyacrylamide, that separates macromolecules such as nucleic acids or proteins during electrophoresis.

Gelding : (Animal science) a castrated male horse.

Gelifluction : Form of mass movement in periglacial environment where a permafrost layer exists. It is characterized by the movement of soil material over the permafrost layer and the formation of lobe-shaped features. Also see solifluction.

Gelisols : Soils that have:

Permafrost within 100 cm of the soil surface; or

Gelic materials within 100 cm of the soil surface and permafrost within 200 cm of the soil surface.

Gelisols : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. This soil is common to high latitude tundra environments. The main identifying feature of this soil is a layer of permafrost within one meter of the soil surface.

Gene : Unit of heredity; a segment of DNA specifying a particular protein or polypeptide chain, a trna or an mrna.

Gene cloning : Isolation of a desired gene from one organism and its incorporation into a suitable vector for the production of large amounts of the gene.

Gene Frequency : Frequency of alleles at an individual or population level.

Gene Pool : Sum total of all the genes found in the individuals of the population of a particular species.

Gene probe : A strand of nucleic acid which can be labeled and hybridized to a complementary molecule from a mixture of other nucleic acids.

Gene probe : A strand of nucleic acid which can be labeled and hybridized to a complementary molecule from a mixture of other nucleic acids.

Gene(s) : Organic material that allows organisms to pass on the inheritance of adaptations or traits. In most organisms these adaptations are coded through the

organic molecule DNA. New adaptations appear by way of mutations.

Genera : A taxonomic category ranking below a family and above a species and generally consisting of a group of species exhibiting similar characteristics.

General Circulation Model (GCM) : Computer-based climate model that produces future forecast of weather and climate conditions for regions of the Earth or the complete planet. Uses complex mathematical equations and physical relationships to determine a variety of climate variables in a three-dimensional grid.

Generalist : A species that will eat or prey on a wide variety of food resources. (See specialist)

Generalist Species : Species that can survive and tolerate a broad range of environmental conditions.

Generation time : Time needed for a population to double in number or biomass.

Generation time : The time required for a given population to double in size. This time can be as short as 20 minutes or as long as a week.

Generator : Any publicly-or privately-owned sewage treatment plant that handles residential and domestic sewage.

Genesis, soil : The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Genetic Adaptation : Changes in the genetic makeup of organisms of a species due to mutations that allow the species to reproduce and gain a competitive advantage under changed environmental conditions.

Genetic code : Information for the synthesis of proteins contained in the nucleotide sequence of a DNA molecule (or in certain viruses, of an RNA molecule).

Genetic Diversity : Genetic variability found in a population of a species or all of the populations of a species. Also see biodiversity, ecosystem diversity, and species diversity.

Genetic engineering : In vitro techniques for the isolation, manipulation, recombination, and expression of DNA.

Genetic engineering; : Scientists isolate a strand of DNA responsible for specific desired talents, but other undesirable traits, such as being slow-growing, finicky, delicate or belonging to a pathogenic organism, make the source strain unsuitable for large-scale commercial growth to produce desired raw enzymes or end product. This isolated strand of desired DNA is often coupled with a gene for resistance to a specific antibiotic that is not native to a selected, safe, fast-growing, robust production strain so that exposing the genetically engineered cell to high levels of the antibiotic will kill off ALL clone offspring cells that did not incorporate

the desired plasmid.

The USEPA FIFRA regulations PROHIBIT the uncontrolled release of genetically engineered organisms into the environment, to reduce the risk of unstable, engineered strains passing antibiotic resistance, immunity to chlorine bleach, survival of autoclaving or radiation exposure, etc. to unrelated species in the environment, potentially reducing our ability to effectively treat extremely dangerous pathogenic organisms, via horizontal gene transfer to *Bacillus anthracis*, *Corynebacterium diphtheriae*, *Streptococcus pyogenes*, *Clostridium botulinum*, *Clostridium tetanai*, *Legionella pneumoniae* etc. , increasing the spread of Anthrax, Diphtheria, Flesh-eating disease, Rheumatic fever, Botulism and Tetanus, Legionnaire's Disease, the diseases caused by the species named above.

Genome : Complete set of genes present in an organism.

Genomics : The study of the molecular organization of genomes, their information content, and the gene products they encode.

Genotype : Precise genetic constitution of an organism.

Genus : A group in the classification of organisms. Classification level above the species group. It consists of similar species. Similar genera (plural form of genus) are grouped into a family.

Genus (plural, genera) : The first name of the scientific name (binomial); the taxon between family and species.

Geocoding : The conversion of features found on an analog map into a computer-digital form. In this process, the spatial location of the various features is referenced geographically to a coordinate system used in the computer's software system.

Geode : Geode - A hollow or partly hollow, hard, globular body, usually from 2.5 to 30 cm or more in diameter found in certain limestone beds and, rarely, in some shale beds, characterized by a thin and sometimes incomplete outermost layer of chalcedony, by a cavity that is partly filled with a lining of inward-projecting crystals deposited from solution on the cavity walls, and by evidence of growth by expansion in the cavities of fossils or along fracture surfaces of the shells.

Geodesic/geodetic measurements : The investigation of any scientific questions connected with the shape and dimensions of the earth. Agi

Geodesy : The science that measures the surface features of the Earth.

Geographic Cycle : Theory developed by William Morris Davis that models the formation of river-eroded landscapes. This theory suggests that landscapes go through three stages of development (youth, maturity, and old age) and argues that the rejuvenation of landscapes arises from tectonic uplift of the land.

Geographic information system (gis) : A computerized database system containing information on natural resources and other factors that can be analyzed and displayed in spatial or map format.

Geographic Information Systems (GIS) : Geographic Information Systems (GIS) - Powerful computerized systems for compiling, analyzing and recombining spatial data; related to automated map making.

Geographic Isolation : See spatial isolation.

Geographic Range : Spatial distribution of a species. The geographic ranges of species often fluctuate over time.

Geographical Coordinate System : System that uses the measures of latitude and longitude to locate points on the spherical surface of the Earth.

Geography : The study natural and human constructed phenomena relative to a spatial dimension.

Geoid : True shape of the Earth, which deviates from a perfect sphere because of a slight bulge at the equator.

Geologic hazard : A geologic condition, either natural or man-made, that poses a potential danger to life and property. Examples: earthquake, landslides, flooding, faulting, beach erosion, land subsidence, pollution, waste disposal, and foundation and footing failures. Agi

Geologic map : *A map on which is recorded the distribution, nature, and age relationships of rock units and the occurrence of structural features. Agi*

Geologic Time Scale : (1) Scale used to measure time relative to events of geological significance.

(2) Time scale that occurs over millions and billions of years.

Geological erosion : See Erosion

Geological Maps : Maps which show boundaries of countries, cities, and roads.

Geology : The field of knowledge that studies the origin, structure, chemical composition, and history of the Earth and other planets.

Geomorphic Threshold : The amount of slow accumulated change a landform can take before it suddenly moves into an accelerated rate of change that takes it to a new system state.

Geomorphology : The study of the origin of physical features of the Earth, as they are related to geological structure and denudation. OR Pertaining to the form of the surface features of the earth. Specifically, geomorphology is the analysis of landforms and their mode of origin. OR Science of landforms that studies the evolution of the Earth's surface and interprets landforms as records of geological

history.

Geomorphology - : *The science that treats the general configuration of the earth's surface; specifically, the study of the classification, description, nature, origin, and development of landforms and their relationships to underlying structures, and the history of geologic changes as recorded by these surface features. Agi*

Geophysical Methods : Geophysical Methods - Methods of analyzing the Earth that involve lowering an instrument into a borehole or well and recording at the surface some physical property of the rocks or using percussion at the surface and recording the percussive (seismic) wave that is reflected; examples include electric logs, radioactivity logs, and seismic logs.

Geophysical studies - : The science of the earth, by quantitative physical methods, with respect to its structure, composition, and development. It includes the sciences of dynamical geology and physical geography, and makes use of geodesy, geology, seismology, meteorology, oceanography, magnetism, and other earth sciences in collecting and interpreting earth data. Agi

Geostationary Orbit : Satellite that has an orbit that keeps it over the same point on the Earth at all times. This is accomplished by having the satellite travel in space at the same angular velocity as the Earth.

Geostrophic Wind : Horizontal wind in the upper atmosphere that moves parallel to isobars. Results from a balance between pressure gradient force and Coriolis force.

Geothermal : Geothermal - Related to the Earth's interior heat.

Geothermal Energy : Heat energy derived from the Earth's interior.

Geothite : Geothite - Orthorhombic, hydrated oxide of iron, $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$

Germination shield, : A distinct germinal wall formed by *Scutellopora* spp. Or The beginning of vegetative growth of a plant from a seed.

Giardia Lamblia : Protozoan in the feces of humans and animals that can cause severe gastrointestinal ailments. It is a common contaminant in surface water.

Gibb's free energy : See free energy.

Gibbsite : $\text{Al}(\text{OH})_3$. Mineral with a platy structure, that occurs in highly weathered soils and in laterite.

Gilgai : A distinctive microrelief of knolls and basins that develop on clay soils that exhibit a considerable amount of expansion and contraction in response to wetting and drying. OR Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols; clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Gilgai microrelief : Gilgai's are common where they are Grey Vertisol soils. The land surface is irregular with alternating mounds and depressions and is commonly referred to as 'crab hole' country.

Gilgai microrelief is formed due to clay horizons shrinking and swelling with alternate drying and wetting cycles (vertic properties). This forces 'blocks' of subsoil material gradually upwards to form mounds. The resultant soil on the mounds have properties which are more like Grey Vertisol subsoils (i.e lighter colour, more alkaline, presence of carbonate, higher salinity).

Gill Raker : Gill Raker - One of the bony parts on the inside of the brachial arches of fishes that help to prevent solid substances from being carried out through the brachial clefts.

Gilt : (Animal science) sexually mature female hog, prior to having her first litter.

Girdle : Girdle - A narrow band separating the crown and pavillion of a faceted gem.

Glacial (glaciation) : (1) Period of time during an ice age when glaciers advance because of colder temperatures.

(2) Involving glaciers and moving ice. Usually pertaining to processes associated with glaciers. Or A generic term applied to all glacial and glaciofluvial deposits.

Glacial Drift(geology). : Materials transported by glaciers and deposited directly from the ice or from the meltwater Or Unstratified deposits laid down directly beneath the ice or dropped from the surface as the ice melted..

Glacial fluvial deposits (geology). : Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glacial Ice : A very dense form frozen water that is much harder than snow, névé, or firn.

Glacial lacustrine deposits. : Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Glacial Lake : A natural impoundment of meltwater at the front of a glacier. OR A lake that derives much or all of its water from the melting of glacier ice, fed by meltwater, and lying outside the glaciers margin.

Glacial Milk : Term used to describe glacial meltwater which has a light colored or cloudy appearance because of clay-sized sediment held in suspension.

Glacial outwash : Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

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Glacial outwash (geology) . : Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial Pavement : Glacial Pavement - A polished, striated and relatively smooth rock surface produced by glacial abrasion.

Glacial Polish : The abrasion of bedrock surfaces by materials carried on the bottom of a glacier. This process leaves these surfaces smooth and shiny.

Glacial Retreat : The backwards movement of the snout of a glacier.

Glacial Sluiceway : Glacial Sluiceway - An overflow channel; a channel formed by ice-marginal, englacial (within the glacier), or subglacial stream.

Glacial Surge : A rapid forward movement of the snout of a glacier.

Glacial till(geology) . : Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and stones transported and deposited by glacial ice.

Glacial Trough : A deep U-shaped valley with steep valley walls that was formed from glacial erosion. At the base of many of these valleys are cirques.

Glacial Uplift : Upward movement of the Earth's crust following isostatic depression from the weight of the continental glaciers.

Glacial Valley : Valley that was influenced by the presence of glaciers. The cross-section of such valleys tends to be U-shaped because of glacial erosion. Similar to glacial trough.

Glaciation : The formation, movement, and recession of glaciers or ice sheet; geologic processes of glacial activity.

Glacier : A large mass of ice that moves slowly over the surface of the ground or down a valley. They originate in snowfields and terminate at lower elevations in a warmer environment where they melt.

Glaciers : Large masses of ice that form by the compaction and recrystallization of snow under freezing conditions; glaciers often move downslope or outward in all directions because of the stress of their own weight; they may be stagnant or retreating under warming conditions.

Glaciofluvial Deposits : Geomorphic feature whose origin is related to the processes associated with glacial meltwater. OR Material deposited by meltwaters coming from a glacier. These deposits are variously stratified and may form outwash plains, deltas, kames, eskers, and kame terraces. SEE GLACIAL DRIFT

AND TILL.

Glaciofluvial deposits : Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits : Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes by water originating mainly from the melting of glacial ice; many such deposits are bedded or laminated with varves.

Glaciolacustrine deposits : Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Glaze : Coating of ice that forms when rain falls on a surface with a temperature below freezing.

Gleization : A soil formation process that occurs in poorly drained environments. Results in the development of extensive soil organic layer over a layer of chemically reduced clay that takes on a blue color.

Gley : some layer of mineral soil developed under conditions of poor drainage (poor aeration), resulting in reduction of iron and other elements and in gray colors and mottles (blobs of variously colored soils). OR The grey or greenish-grey colouration found in soils. It is often produced under conditions of poor drainage, giving rise to chemical reduction of iron and other elements.

Gley soil : Soil formed under naturally wet or waterlogged conditions as evidenced by grey colours stemming from the reduction, under anaerobic conditions, of ferric iron to the ferrous state.

Gleyed : A soil condition resulting from gleization which is manifested by the presence of neutral gray, bluish or greenish colors through the soil matrix or in mottles (spots or streaks) among other colors.

Gleyed Podzolic Soils : GSG classification – Poorly drained acid soils with strongly differentiated profiles, including a bleached A₂ overlying greyish or yellowish B horizons.

Gleyed soil : Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and redoximorphic features.

Gleyed soil. : A soil having one or more neutral gray horizons as a result of water logging and lack of oxygen. The term “gleyed” also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent water logging. OR Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gleying : The reduction of iron in an anaerobic environment leading to the formation of gray or blue colors. OR Gleying is indicative of permanent or periodic intense reduction due to wetness and is characterised by greying, bluish or greenish color, generally of low chroma. Mottling may be prominent as well as rusty root channel mottling.

Gleysol Soil : Soil order (type) of the Canadian System of Soil Classification. This soil type is found in habitats that are frequently flooded or permanently waterlogged. Its soil horizons show the chemical signs of oxidation and reduction.

Global Positioning System (GPS) : System used to determine latitude, longitude, and elevation anywhere on or above the Earth's surface. This system involves the transmission of radio signals from a number of specialized satellites to a hand held receiving unit. The receiving unit uses triangulation to calculate altitude and spatial position on the Earth's surface.

Global Warming : Warming of the Earth's average global temperature because of an increase in the concentration of greenhouse gases. A greater concentration in greenhouse gases in the atmosphere is believed to result in an enhancement of the greenhouse effect.

Glomalin : An extracellular glycoprotein produced by arbuscular mycorrhizal fungi.

Glucose : Simple six-carbon sugar. The chemical formula for glucose is $C_6H_{12}O_6$.

Glycolysis : Reactions of the EmbdenMeyerhof (glycolytic) pathway in which glucose is oxidized to pyruvate. OR Enzyme that hydrolyzes a glucosidic linkage between two sugar molecules

Glycosidase : Enzyme that hydrolyzes a glucosidic linkage between two sugar molecules.

Glyoxylate cycle : A modification of the Krebs cycle, which occurs in some bacteria. Acetyl coenzyme A is generated directly from oxidation of fatty acids or other lipid compounds.

Gneiss : A metamorphosed coarse grained igneous rock. In this rock you get the recrystallization of quartz, feldspars, micas and amphiboles into bands.

GOES (Geostationary Operational Environmental Satellite) : Series of geostationary meteorological satellites launched by the United States starting in 1968. The main purpose behind these satellites was to use a variety of remote sensing devices for weather forecasting and environmental monitoring.

Gondwanaland : Gondwanaland - A Late Paleozoic continent of the Southern Hemisphere; also Gonwana.

Goniatite : Goniatite - An ammonoid characterized by a coiled shell and mildly undulating sutures.

Graben Fault : This fault is produced when tensional stresses result in the subsidence of a block of rock. On a large scale these features are known as Rift Valleys.

Gradational profile form : A Primary Profile Form of the Factual Key (Northcote, 1979). It describes a soil with a gradual increase in texture (i.e. Becomes more clayey) as the profile deepens. Gradational soils are given the notation "G". Boundaries are usually gradual or diffuse

Graded Stream : A stream that has a long profile that is in equilibrium with the general slope of the landscape. A graded profile is concave and smooth. Stream's maintain their grade through a balance between erosion, transportation, and deposition. Erosion removes material from bumps in the profile and deposition fills in dips.

Graded stripcropping. : Growing crops in strips that grade toward a protected waterway.

Gradient : The steepness of a slope as measured in degrees, percentage, or as a distance ratio (rise/run).

Gradient Wind : Horizontal wind in the upper atmosphere that moves parallel to curved isobars. Results from a balance between pressure gradient force, Coriolis force, and centripetal force.

Gradual boundary : Boundary 50 - 100 mm wide.

Grains per Gallon : Grains per Gallon - A unit of measurement often used to describe water hardness. One grain per gallon is approximately equal to 17 ppm of various cations.

Gram negative : Bacteria cells which lose the crystal violet during the decolorizing step and are then colored by the counterstain. Pseudomonas and Thiobacillus are examples of gram negative strains.

Gram positive : Bacterial cells which retain the crystal violet stain during a staining procedure. Most strains of bacilli are gram positive.

Gram stain : Differential stain that divides bacteria into two groups, Grampositive and Gramnegative, based on the ability to retain crystal violet when decolorized with an organic solvent such as ethanol. The cell wall of Grampositive bacteria consists chiefly of peptidoglycan and lacks the outer membrane of Gramnegative cells.

Granite : An igneous rock that contains quartz, feldspar and varying amounts of biotite and muscovite. OR A granular igneous rock composed chiefly of felspar (orthoclase) and quartz, usually with one or more other minerals, as mica, hornblende, etc.

Granitic Magma : Felsic magma that generates mainly granitic rocks.

Granodiorite : Plutonic rock consisting of potassium feldspar, quartz, plagioclase, biotite and hornblende. Granodiorite is an intermediate between quartz, monzonite and quartz diorite.

Granular Bentonite : Granular Bentonite - A naturally occurring clay that is crushed and sized for pouring and easy handling. Like processed bentonite, it swells when hydrated by fresh water and will form a plastic, especially impermeable mass.

Granular structure : Rounded peds that are porous, stable and less than 12 mm in diameter. Granular structure usually occurs in the surface horizons (mcdonald *et al*, 1990).

Graphic Scale : Way of expressing the scale of a map with a graphic.

Grass : Type of plant that has long slender leaves that extend from a short stem or the soil surface.

Grassed waterway . : A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Grasshoppers : Many varieties throughout the state. Problem on new mexico rangeland because the insects eat grass.

Grassland : Ecosystem whose dominant species are various types of grass. Found in regions where average precipitation is not great enough to support the growth of shrublands or forest.

Graupel : A type of precipitation that consists of a snow crystal and a raindrop frozen together. Also called snow pellets.

Gravel : Gravel - An unconsolidated, natural accumulation of typically rounded rock fragments greater than 1/12th inch in diameter.

Gravel : A term used to describe unconsolidated sediments composed of rock fragments. These rock fragments have a size that is greater than 2 millimeters. Or Rounded or angular fragments of rock up to 3 inches (2 mm to 7.6 cm) in diameter. An individual piece is a pebble. OR The amount (visual abundance estimate) of gravel-sized (>2 mm) materials that occur on the surface and in the A₁ horizon and include hard (when moist), coarse fragments and segregations of pedogenic origin.

Gravelly : Over 60% of surface cover consists of gravel (2 - 60 mm).

Gravelly soil material . : Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Gravel-packed Well : Gravel-packed Well - A well in which filter material is placed in the annular space to increase the effective diameter of the well and to prevent fine-grained materials from entering the well.

gravimetric : A weight-based measurement. In our case, soil moisture content is determined by a series of wet and dry weights.

Gravitational potential : the amount of work an infinitesimal amount of pure free water can do at the site of the soil solution as a result of the force of gravity.

Gravitational water : Portion of total soil water potential due to differences in elevation. Or The water that flows freely through soils in response to gravity..

Gravity : Is the process where any body of mass found in the universe attracts other bodies with a force proportional to the product of their masses and inversely proportional to the distance that separates them. First proposed by Sir Issac Newton in 1686.

Grazers : Organisms such as protozoa and nematodes that eat bacteria and fungi.

Grazing : See predation.

Grazing Food Chain : Model describing the trophic flow of organic energy in a community or ecosystem.

Great Circle : An imaginary circle drawn on the Earth's surface that has its center synchronize to the center of the planet. The equator is a great circle.

Great Soil Group : One of the Categories in soil classification. OR A soil classification system developed by Stace et al. (1968). It is based on the description of soil properties such as colour, texture, structure, drainage, lime, iron, organic matter and salt accumulation, as well as on theories of soil formation. The profile is assigned to a Great Soil Group classification based on its description. The system is limited in that central concepts are inadequately defined making confident identification of some described profiles difficult. This system is no longer in regular use in Australia but some of the terms are still used quite frequently (e.g. Krasnozems) to describe soils.

Green (sulfur) bacteria : Anoxygenic phototrophs containing chlorosomes and bacteriochlorophyll *c*, *c_s*, *d* or *e* and light harvesting chlorophyll

Green manure : (Crop science, gardening) a crop planted with the intention of turning it under for use as organic matter. OR A growing, immature crop that is incorporated into the soil to improve soil fertility.

Greenhouse Effect : The greenhouse effect causes the atmosphere to trap more heat energy at the Earth's surface and within the atmosphere by absorbing and re-emitting longwave energy. Of the longwave energy emitted back to space, 90 % is intercepted and absorbed by greenhouse gases. Without the greenhouse effect the Earth's average global temperature would be -18° Celsius, rather than

the present 15° Celsius. In the last few centuries, the activities of humans have directly or indirectly caused the concentration of the major greenhouse gases to increase. Scientists predict that this increase may enhance the greenhouse effect making the planet warmer. Some experts estimate that the Earth's average global temperature has already increased by 0.3 to 0.6° Celsius, since the beginning of this century, because of this enhancement.

Greenhouse Gases : Gases responsible for the greenhouse effect. These gases include: carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); chlorofluorocarbons (CFCs); and tropospheric ozone (O₃).

Greens : The term "greens" is used to denote organic materials high in nitrogen, more specifically, materials whose carbon to nitrogen ratio is lower than 30:1. (Materials high in carbon are referred to as "browns"). Achieving a carbon-to-nitrogen ratio of about 30:1 is one factor in creating favorable conditions for backyard pile composting.

Greenwich Mean Time (GMT) : Former standard world time as measured at Greenwich, England (location of the Prime Meridian). Replaced in 1928 with Universal Time (UT).

Grey water : Wastewater other than sewage, such as sink or washing machine drainage.

Grey, brown and red calcareous soils : A Great Soil Group classification, (Stace *et al.*, 1968). These soils are shallow, soft, powdery or weakly structured loams to light clays containing finely divided carbonates throughout the profile and showing very little horizon development. They tend to develop from highly calcareous rocks which underlie them, at depths up to 50 cm from the surface. Fragments of limestone may also be found in the profile. The surface texture may be a loam or a clay loam, with a weak platy or a fine blocky structure. Below this, the structure is massive or more clayey with a medium blocky structure of rough faced peds. The clay content tends to increase about one texture class throughout the profile.

Grey, brown and red clays : A Great Soil Group Classification, Stace *et al.*, (1968). This is a broad group of soils which have a moderate to very deep profile. These soils crack deeply on drying and have a high clay content throughout. Subsoil clays range from grey to brown or red in colour gradually becoming paler with increasing depth. In Victoria, these soils are typically alkaline throughout most of the profile and carbonates may also be present. OR GSG classification—These form a broad group of soils whose common properties are determined by their high clay contents. Typically, they are moderately deep to very deep soils with uniform colour and texture profiles, weak horizonation mostly related to structure differentiation and some carbonates and/or gypsum in their subsoils. They crack deeply on drying

Grey-brown and Red Calcareous Soils : GSG classification—Shallow, soft, powdery or weakly structured loams to light clays containing finely divided carbonates throughout the solum and showing little pedological differentiation. They are essentially sedentary soils formed from highly calcareous rocks which underlie them at various depths. Fragments of limestone are commonly present.

Grey-brown Podzolic Soils : GSG classification—Duplex soil with a clayey brownish blocky B horizon. A bleached A₂ horizon may be present.

Grid North : The direction north as measured on the Universal Transverse Mercator grid system.

Grid South : The direction south as measured on the Universal Transverse Mercator grid system.

Grit : The heavy material present in wastewater, such as sand coffee grounds, eggshells, gravel and cinders.

Groin : Groin - A long, narrow, man-made jetty, usually extending roughly perpendicular to the shoreline to protect the bank or shore from erosion.

Gross Primary Productivity : Total amount of chemical energy fixed by the processes of photosynthesis.

Gross Secondary Productivity : Total amount of chemical energy assimilated by consumer organisms.

Gross Sediment Transport : The total amount of sediment transported along a shoreline in a specific time period.

Ground Fog : See radiation fog.

Ground Frost : Frost that penetrates the soil surface in response to freezing temperatures.

Ground Ice : General term used to describe all bodies of ice in the ground surface of the permafrost layer. Also called anchor ice. Some forms of ground ice include: pore ice, needle ice, ice wedge, segregated ice, sand wedge, and ice lenses.

Ground litter : The covering over the soil in a forest made up of leaves, needles, twigs, branches, stems, and fruits from the surrounding trees.

Ground Moraine : A thick layer of till deposited by a melting glacier.

Ground water : That portion of the water below the surface of the ground at a pressure equal to, or greater than, that of the atmosphere. See also water table. OR Portion of the water below the surface of the ground at a pressure equal to or greater than atmospheric.

Ground water (geology). : Water filling all the unblocked pores of underlying material below the water table.

Ground. : The soil of the land.

Groundwater : The subsurface water within the zone of saturation. This water moves under the influence of gravity and is, in many instances, a source of well water for domestic and agricultural use.

Groundwater discharge : Ground water entering coastal waters, which has been contaminated by land-fill leachates, deep well injection of hazardous wastes and septic tanks.

Groundwater Flow : Underground topographic flow of groundwater because of gravity.

Groundwater Mining : Groundwater Mining - Removal of groundwater from an aquifer in excess of the rate of natural or artificial recharge. Continued groundwater mining reduces the groundwater supply until it is no longer an economical source of water.

Groundwater Recharge : Groundwater Recharge - Process where water enters the soil and eventually reaches the saturated zone.

Groundwater Recharge : The replenishment of groundwater with surface water.

GroundwaterTable : The upper limit of the groundwater.

Grout : Grout - A fluid mixture of cement and water (neat cement), cement and sand (sand cement), and cement, sand and coarse aggregate (concrete), bentonite seal or other material that is substantially equivalent, to form a permanent impervious, watertight bond in the annular space or between two or more strings of casing.

Growing season : The portion of the year when soil temperatures are above biologic zero 41°F (4°C).

Growing Season Definition : The 1987 USACOE Wetlands Delineation Manual (<http://www.wes.army.mil/el/wetlands/pdfs/wlman87.pdf>) - glossary, Appendix A defines growing season as the portion of the year when soil temperature (measured at 20 inches below the surface) is above biological zero (5C or 41F). This period "can be approximated by the number of frost-free days." Estimated starting and ending dates for growing season are based on 28F air temperature thresholds at a frequency of 5 years in 10.

Growth : In microbiology, an increase in both cell number and cellular constituents.

Growth factor : Organic compound necessary for growth because it is an essential cell component or precursor of such components and cannot be synthesized by the organism itself. Usually required in trace amounts.

Growth rate : The rate at which growth occurs, usually expressed as the generation time.

Growth rate constant : Slope of the log of the number of cells per unit volume plotted against time.

Growth yield coefficient : Quantity of biomass carbon formed per unit of substrate carbon consumed.

Gsg : Great Soil Groups of Australia (as defined by Stace *et al* 1968), described in terms of morphology, genesis and land use.

Gulf Stream : Warm ocean current that originates in and around the Caribbean and flows across the North Atlantic to northwest Europe.

Gully : A shallow steep-sided valley that may occur naturally or be formed by accelerated erosion. OR flow of water during and immediately following heavy rainfall; gullies are deep enough (usually >0.5 m) to interfere with, but not obliterated by, normal tillage operations.

Gully Erosion : A form of catastrophic erosion that forms gullies.

Gumbo : Gumbo - A local term for clay soil that becomes sticky, impervious, and plastic when wet.

Gun club lake watershed management organization : A public agency comprised of the respective governmental units of the cities of Eagan, Inver Grove Heights, and Mendota Heights. Because it comprises most of the Gun Club Lake watershed, the City of Eagan coordinates the activities of the organization. The general purpose of the organization is to regulate the natural water storage and retention of the Gun Club Lake watershed to: 1) protect, preserve, and use natural surface and ground water storage and retention systems; 2) minimize public capital expenditures needed to correct flooding and water quality problems; 3) identify and plan for means to effectively protect and improve surface and ground water quality; 4) establish more uniform local policies and official controls for surface and ground water management; 5) prevent erosion of soil into surface water systems; 6) promote ground water recharge; 7) protect and enhance fish and wildlife habitat and water recreational facilities; and 8) secure the other benefits associated with the proper management of surface and ground water.

Gust Front : A boundary found ahead of a thunderstorm that separates cold storm downdrafts from warm humid surface air. Winds in this phenomenon are strong and fast.

Gutter : Area formed by the curb and the street to prevent flooding by channeling runoff to storm drains.

Gymnosperm : Plant that bears naked seeds. Representatives of this group include the conifers.

Gypsic : These soils contain more than 20% visible gypsum with a minimum thickness of 0.1 m that is of apparent pedogenic origin. If the upper boundary of

the horizon occurs below the 1 m depth it is disregarded in the classification. It is used as a definition for a number of Orders in the Australian Soil Classification (Isbell, 1996).

Gypsic horizon : One which contains more than 20% of visible gypsum that is apparently of pedogenic origin and has a minimum thickness of 0.2 m.

Gypsum(calcium sulphate) : Gypsum - Monoclinic, hydrated calcium sulfate, $\text{CaSO}_4 \cdot \text{H}_2\text{O}$. OR Sedimentary rock created by the chemical precipitation of calcium, sulfur, and oxygen.

Gyre : Arrangement of surface ocean currents into a large macro-scale circular pattern of flow.

Gyttja : Peat consisting of fecal material, strongly decomposed plant remains, shells of diatoms, phytoliths, and fine material particles. Usually forms in standing water.

H

Habitat : Place where an organism lives. OR Location where a plant or animal lives.

Hadean : Geologic eon that occurred from 3800 to 4600 million years ago. The Earth's oldest rocks date to the end of this time period.

Hadley Cell : Three-dimensional atmospheric circulation cell located at roughly 0 to 30° North and South of the equator. The Hadley cell consists of rising air (intertropical convergence zone) at the equator and descending air (subtropical highs) at 30° North and South.

Hail : Hail is a solid form of precipitation that has a diameter greater than 5 millimeters. Occasionally, hailstones can be the size of golf balls or larger. Hailstones of this size can be quite destructive. The intense updrafts in mature thunderstorm clouds are a necessary requirement for hail formation.

Hair Hygrometer : Hygrometer that uses the expansion and contraction of hair to determine atmospheric humidity.

Half-life : Time required for one half of the nuclei in a radioisotope to emit its radiation. Half-lives for radioisotopes range from a few millionths of a second to several billion years.

Halite : Sedimentary rock created by the chemical precipitation of sodium and chlorine.

Halogen : Any of the five elements F, Cl, Br, I, and At that form part of group VII A of the periodic table.

Halomorphic Soil : A soil containing a significant proportion of soluble salts.

Halophile : Organism requiring or tolerating a saline environment

Halophilic or Halotolerant : Bacteria which thrive in a highly salt environment, up to 25% NaCl.

Halophyte : A plant capable of growing in salty soil; i.e. A salt tolerant plant.

Halophytic Vegetation : Vegetation that tolerates or requires saline conditions.

Halotolerant : An organism capable of growing in the presence of nacl but not requiring it.

Hamada : An accumulation of stones at the surface of deserts, formed by the

washing or blowing away of the finer material. OR A very flat desert area of exposed bedrock.

Hanging Valley : A secondary valley that enters a main valley at an elevation well above the main valley's floor. These features are result of past erosion caused by alpine glaciers. Hanging valleys are often the site of spectacular waterfalls.

Hanging Wall : The topmost surface of an inclined fault.

Hapl : minimum horizon development.

Haplic : A term used in the Australian Soil Classification (Isbell, 1996) which indicates that the major part of the upper 0.5 m of the soil profile is whole coloured. It is used as the lowest order Subgroup distinction for a number of Soil Orders. Note by lowest order, it is meant that the soil described matches none of the other Subgroup classes e.g. A Haplic, Epipedal, black Vertosol is not acidic, sodic, calcareous etc.

Haploid : In eukaryotes, an organism or cell containing one chromosome complement and the same number of chromosomes as the gametes. OR Cell that contains only one set of chromosomes. Also see diploid.

Hapten : A substance not inducing antibody formation but able to combine with a specific antibody.

Hard : A general term to indicate strength.

Hard water : Water that contains dissolved calcium and magnesium

HardeningOff : A process of helping plants that have been raised under cover to adapt to cooler outdoor conditions and direct sun. Gradually introducing greenhouse plants to outside conditions for one to two weeks before planting in the ground is one recipe for hardening-off.

Hardground : Hardground - A zone beneath the sea bottom, usually a few centimeters thick, the sediment of which is lithified to form a hard surface layer. The surface may be encrusted, discolored, hardened, bioturbated, bored, or solution-ridden, indicating a break in sedimentation or unconformity.

Hardness : The amount of dissolved calcium and magnesium in a water sample, typically measured in grains per gallon (gpg)

Hardpan : A horizon cemented with organic matter, silica, sesquioxides, or calcium carbonate. Hardness or rigidity is maintained when wet or dry and samples do not slake in water.

Hardpan. : A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance. OR A hardened or cemented soil horizon or layer.

Hardsetting : The condition of a soil where the surface is dry, hard and compacted

with no apparent pedal development. These soils are not disturbed or indented by pressure of the forefinger. These harder setting soils tend to result in high runoff.

Hardwood : (Forestry) a term describing broadleaf trees, usually deciduous, such as oaks, maples, cottonwood, ashes, and elms.

Hardy : A general term used to describe a plant's ability to endure cold, although it does not necessarily indicate a plant's tolerance to heat.

Hardy Annual : An annual plant that can withstand fairly severe frosts, and in mild climates can be sown in the fall for spring bloom or harvest.

Hardy biennial/perennial : A biennial or perennial that can survive even in cold climates during the winter and needs little additional protection. It is freeze tolerant.

Hawaiian High : See Pacific High.

Hazard : Phenomenon which can cause loss of life, injury, disease, economic loss, or environmental damage.

Headlands : A strip of land that juts seaward from the coastline. This feature normally bordered by a cliff.

Headwaters : Upper portion of stream's drainage system.

Headworks : The facilities where wastewater enters a wastewater treatment plant. The headworks may consist of bar screens, comminutors, a wet well and pumps.

Health Advisory Level (HAL) : Health Advisory Level (HAL) - A non-regulatory health-based chemical concentration in drinking water that results in no adverse health risks when a given amount of water is ingested over exposure periods ranging from one day to a lifetime.

Heat : Heat is defined as energy in the process of being transferred from one object to another because of the temperature difference between them. In the atmosphere, heat is commonly transferred by conduction, convection, advection, and radiation.

Heat Capacity : Is the ratio of the amount of heat energy absorbed by a substance compared to its corresponding temperature rise.

Heat Energy : A form of energy created by the combined internal motion of atoms in a substance.

Heat exchanger : A component that is utilized to remove heat from or add heat to a liquid. Aqua Genesis uses heat exchangers throughout its system to maximize efficiency.

Heat Island : The dome of relatively warm air which develops over the center of

urbanized areas.

Heath : Vegetation structure dominated by shrubs less than 2 m tall, having a foliage cover of 30 - 70% (open-heath) or 70 - 100% (closed-heath).

Heavy metals : Those metals which have densities $> 5.0 \text{ Mg m}^3$. These include the metallic elements Cu, Fe, Mn, Mo, Co, Zn, Cd, Hg, Ni, and Pb. Al and Se have densities < 5 but are also considered heavy metals. OR Trace elements regulated because of their potential for human, plant, or animal toxicity, including cadmium (Cd), copper (Cu), chromium (Cr), mercury (Hg), nickel (Ni), lead (Pb) and Zinc (Zn).

Heavy metals. : Metallic elements, some of which are plant nutrients, but commonly used to identify elements considered to be pollutants. These metals may have high densities, exceeding 5 g per cubic centimeter, and may include Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, and Zn and perhaps others, not considered to be metals, such as As.

Heavy Soil (Obsolete) : A soil that has a high content of clay and is difficult to cultivate. OR A soil that is difficult to till. A condition which refers to soil in which the particles are packed closely together. Clay soils are likely to be heavy soils. The opposite of heavy soil is light soil, which refers to soil composed of relatively large particles loosely packed together. Sandy soils are called light soils.

Heavy water : Water in which all the hydrogen atoms have been replaced by deuterium, the chemical formula is D₂O. It is harmless

Heifer : (Animal science) a young female bovine.

Heirloom : Time-tested, open-pollinated varieties of primarily European descent, that have been passed down for at least three generations. For many reasons, including flavor, vigor, local hardiness and dependability, these have become favorites. Often, heirloom seeds are the repository of unusual genes that can help to preserve genetic diversity.

Helical Flow : Movement of water within a stream that occurs as spiral flows.

Hematite : Hematite - A hexagonal (rhombohedral) oxide of iron, Fe₂O₃.

Hemic soil material (mucky peat) : Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Henry's Law : A way of calculating the solubility of a gas in a liquid, based on temperature and partial pressure, by means of constants.

Herb : A nonwoody angiosperm whose above ground vegetation dies off seasonally.

Herbicide : See "pesticide"

Herbicide : A substance used to destroy or inhibit the growth of vegetation. OR Agents used to inhibit plant growth or kill specific plant types

Herbivore : Heterotrophic organism that consumes plants for nutrition. Also known as a primary consumer. Also see detritivore, omnivore, scavenger, and carnivore.

Heredity : The transmission of behavioral, physiological and morphological characteristics from parent to offspring.

Hermaphroditic : Containing both male and female sex organs.

Heterocyst : Differentiated cyanobacterial cell that carries out dinitrogen fixation.

Heterofermentation : Any fermentation in which there is more than one major end-product. . Synonym of heterolactic fermentation

Heterogeneity : State of being dissimilar or diverse.

Heterogeneous : Complex and not easily described.

Heterokaryon : Hypha that contains at least two genetically dissimilar nuclei.

Heterolactic fermentation : A type of lactic acid fermentation in which sugars (e.g. Lactose, glucose) are fermented to a range of products.

Heteropolysaccharide : The class name for polysaccharides composed of two or more different kinds of monomeric units.

Heterosphere : The upper layer in a two part classification of the atmosphere based on the general homogeneity of chemical composition. In this layer, oxygen atoms and nitrogen molecules dominate and remain constant in their relative quantities. The heterosphere extends upward from a height of 80 to 100 kilometers depending on latitude. Below this layer is the homosphere.

Heterothallic : Hyphae that are incompatible with each other each requiring contact with another hypha of compatible mating type which, upon fusion, forms a dikaryon or a diploid.

Heterotroph : Organism capable of deriving carbon and energy for growth and cell synthesis from organic compounds; generally also obtain energy and reducing power equivalents from organic compounds. OR A microorganism which uses organic matter for energy and growth.

Heterotroph : Organism capable of deriving carbon and energy for growth and cell synthesis from organic compounds; generally also obtain energy and reducing power equivalents from organic compounds.

Heterotrophic nitrification : Biochemical oxidation of ammonium to nitrite and nitrate by heterotrophic microorganisms.

Heterotrophic Organisms : Those that derive their energy by decomposing organic

compounds, cf. AUTOTROPHIC.

Hexose monophosphate pathway : A metabolic pathway present in a wide range of prokaryotic and eukaryotic microorganisms as well as in plants and animals; it involves the oxidative decarboxylation of glucose 6-phosphate, via 6-phosphogluconate, to ribulose 5-phosphate, followed by a series of reversible, non-oxidative interconversions whereby hexose and triose phosphates are formed from pentose phosphates. Also called: HMP pathway, HMP shunt; oxidative pentose phosphate pathway, pentose phosphate pathway/cycle, phosphogluconate pathway; Warburg-Dickens pathway

High Plains (Ogallala) Aquifer : High Plains (Ogallala) Aquifer - A massive aquifer under the central and south-central Great Plains composed mostly of sand and gravel, sand, silt, clay and sandstone and siltstone. It reaches from South Dakota to Texas and is most extensive and at its greatest saturated thickness in Nebraska.

High Pressure : An area of atmospheric pressure within the Earth's atmosphere that is above average. If this system is on the Earth's surface and contains circular wind flow and enclosed isobars it is called an anticyclone.

High water mark : A distinct mark made on vegetation, buildings or rocks that shows the extent of water rise.

Highly decomposed organic material(a) : This symbol is used with O to indicate the most highly decomposed organic materials, which have a fiber content of less than 17 percent (by volume) after rubbing.

Highstand. : The highest elevation reached by the ocean during an interglacial period.

Histosol : A soil "order" in the taxonomic system that is composed of mucks and peats that have a high concentration of organic materials in the surface soil or overly rock. OR Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. This soil is composed more than 30 % organic matter as a result of saturated environmental conditions.

Histosols : Other soils that:

Do not have andic soil properties in 60 percent or more of the thickness between the soil surface and either a depth of 60 cm or a densic, lithic, or paralithic contact or duripan if shallower; and

Have organic soil materials that meet one or more of the following:

Overlie cindery, fragmental, or pumiceous materials and/or fill their interstices¹ and directly below these materials, have a densic, lithic, or paralithic contact; or

When added with the underlying cindery, fragmental, or pumiceous materials, total 40 cm or more between the soil surface and a depth of 50 cm; or

Constitute two-thirds or more of the total thickness of the soil to a densic, lithic, or paralithic contact and have no mineral horizons or have mineral horizons with a total thickness of 10 cm or less; or

Are saturated with water for 30 days or more per year in normal years (or are artificially drained), have an upper boundary within 40 cm of the soil surface, and have a total thickness of either:

60 cm or more if three-fourths or more of their volume consists of moss fibers or if their bulk density, moist, is less than 0.1 g/cm³; or

40 cm or more if they consist either of sapric or hemic materials, or of fibric materials with less than three-fourths (by volume) moss fibers and a bulk density, moist, of 0.1 g/cm³ or more.

Histosols :

Hobby farm : Type of land development, irrespective of allotment size but usually relatively small, involving some form of agricultural enterprise which is secondary to the owner's main line of business.

Holistic : Concerned with complete system.

Holocene : The Holocene epoch forms part of the late Quaternary period and extends from about 11 000 years ago to the present day. OR Present geological epoch which commenced 10 000 years ago.

Holocene Epoch : Period of time from about 10,000 years ago to today. During this period glaciers retreated because of a warmer global climate. Time of modern humans.

Holocene Period : The period extending from 10,000-0 years BP.

Holocene. : The most recent epoch of geologic time, extending from 10 ka to the present.

Holomictic : In these lakes there is a periodic (usually once a year in temperate zone lakes) mixing of the zones

Holomorph : Whole fungus consisting of all sexual and asexual stages in its life cycle.

Holothurian : Holothurian - Any cylindrical echinozoan, usually free-living, belonging to the class Holothuroidea, and characterized by the absence of an articulated test (external shell or other hard covering) and by the reduction of skeletal parts to microscopic sclerites; a sea cucumber.

Home range : (Wildlife science) the area within which the activities of an animal are confined. The boundaries may be marked, such as by scent marking, and also may be defended, depending on the species.

Homeostatic (Homeostasis) : A constant or non-changing state of equilibrium in a system despite changes in external conditions.

Homofermentation : Any fermentation in which there is only one major end-product. Synonym of homolactic fermentation.

Homogenization : (Dairy science) the process of physically reducing the particle size of fat in milk, thus enabling even distribution of fat throughout the milk.

Homokaryon : Fungal hypha in which all nuclei are genetically identical.

Homolactic fermentation : A type of lactic acid fermentation in which sugars (e.g. Glucose, lactose, etc) are converted entirely, or almost entirely, to lactic acid

Homosphere : The lower layer in a two part classification of the atmosphere based on the general homogeneity of chemical composition. In this layer, nitrogen, oxygen, argon, carbon dioxide, and the trace gases dominate and remain constant in their relative proportions. The homosphere extends from the Earth's surface to a height of 80 to 100 kilometers depending on latitude. Above this layer is the heterosphere.

Homothallic : Hyphae that are self-compatible in that sexual reproduction occurs in the same organism by meiosis and genetic recombination; fusion of hypha results in a dikaryon or diploid.

Honeycomb : Honeycomb - A honeycomb-like structure sometimes seen in soil and rock, caused by a type of chemical weathering in which the decomposition of individual mineral grains forms a series of small pits.

Horizon : Relatively uniform materials that extend laterally, continuously or discontinuously throughout the pedon unit; runs approximately parallel to the surface of the ground and differs from the related horizons in many chemical, physical and biological properties. OR

(1) A surface separating two beds in sedimentary rock.

(2) A layer within a soil showing unique pedogenic characteristics. Four major horizons are normally found in a soil profile: A, B, C, and O.

(3) Point at which the visible edge of the Earth's surface meets the sky. OR A layer within the soil profile with morphological characteristics and properties different from layers below and/or above it.

Horizon suffixes : These are lower case letters or numbers used as further descriptors to the main horizons. The suffixes describe the genetic processes operating in the soil. For example, humus in the A1 horizon is indicated by A1h

and calcium carbonate in the B2 horizon is indicated by b2k. The horizon suffixes are as follows See McDonald *et al.*, 1990 for more detail.

- B - buried soil horizon (used in mineral soils only).
- C - iron, aluminium or manganese concretions or nodule accumulation.
- D - densipan (very fine sandy earthy pan).
- E - conspicuously bleached horizon.
- F - faunal accumulations e.g. Worm casts, dominating A1 horizons.
- G - strong gleying.
- H - accumulation of amorphous organic matter where aluminium dominates over iron.
- J - sporadically bleached horizon.
- K - large accumulation of carbonates, commonly calcium carbonates.
- M - strong cementation.
- P - any disturbance by man e.g. Ploughing.
- Q - accumulation of secondary silica, qm is used for near continuous silica cementation.
- R - layers of weathered rock that can be dug with hand tools.
- S - an accumulation of sesquioxide organic matter where iron dominates over aluminium.
- T - accumulation of silicate clay.
- W - development of color and/or structure in the B Horizon with little or no accumulation of sesquioxide organic matter complexes.
- X - fragipan or earthy pan.
- Y - large accumulation of calcium sulphate (gypsum) in B Horizon.

Horizon, soil. : A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major soil horizons:

O horizon. – The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon. – The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

E horizon – This eluvial horizon is light in color, lying beneath the A horizon and above the B horizon. It is made up mostly of sand and silt, having lost

most of its clay and iron oxides through reduction, chelation, and translocation.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these.

C horizon.—The relatively unweathered material immediately beneath the solum. Included are sediment, saprolite, organic matter, and bedrock excavatable with a spade. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a number precedes the letter C.

Consolidated rock not excavatable with a spade. It may contain a few cracks filled with roots or clay or oxides. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Major horizons may be further distinguished by applying prefix Arabic numbers to designate differences in parent materials as they are encountered (e.g., 2B, 2BC, 3C) or by applying suffix numerals to designate minor changes (e.g., B1, B2).

Thereafter, these lower-case letters may be appended (e.g., 2B2tkb):

- a **Highly decomposed organic material**
This symbol is used with O to indicate the most highly decomposed organic materials, which have a fiber content of less than 17 percent (by volume) after rubbing.
- b **Buried genetic horizon**
This symbol is used in mineral soils to indicate identifiable buried horizons with major genetic features that were developed before burial. Genetic horizons may or may not have formed in the overlying material, which may be either like or unlike the assumed parent material of the buried soil. This symbol is not used in organic soils, nor is it used to separate an organic layer from a mineral layer.
- c **Concretions or nodules**
This symbol indicates a significant accumulation of concretions or nodules. Cementation is required. The cementing agent commonly is iron, aluminum, manganese, or titanium. It cannot be silica, dolomite, calcite, or more soluble salts.

- d Physical root restriction
This symbol indicates noncemented, root-restricting layers in naturally occurring or human-made sediments or materials. Examples are dense basal till, plowpans, and other mechanically compacted zones.
- e Organic material of intermediate decomposition
This symbol is used with O to indicate organic materials of intermediate decomposition. The fiber content of these materials is 17 to 40 percent (by volume) after rubbing.
- f Frozen soil or water
This symbol indicates that a horizon or layer contains permanent ice. The symbol is not used for seasonally frozen layers or for dry permafrost.
- ff Dry permafrost
This symbol indicates a horizon or layer that is continually colder than 0 °C and does not contain enough ice to be cemented by ice. This suffix is not used for horizons or layers that have a temperature warmer than 0 °C at some time of the year.
- g Strong gleying
This symbol indicates either that iron has been reduced and removed during soil formation or that saturation with stagnant water has preserved it in a reduced state. Most of the affected layers have chroma of 2 or less, and many have redox concentrations. The low chroma can represent either the color of reduced iron or the color of uncoated sand and silt particles from which iron has been removed. The symbol g is not used for materials of low chroma that have no history of wetness, such as some shales or E horizons. If g is used with B, pedogenic change in addition to gleying is implied. If no other pedogenic change besides gleying has taken place, the horizon is designated Cg.
- h Illuvial accumulation of organic matter
This symbol is used with B to indicate the accumulation of illuvial, amorphous, dispersible complexes of organic matter and sesquioxides if the sesquioxide component is dominated by aluminum but is present only in very small quantities. The organos sesquioxide material coats sand and silt particles. In some horizons these coatings have coalesced, filled pores, and cemented the horizon. The symbol h is also used in combination with s as "Bhs" if the amount of the sesquioxide component is significant but the color value and chroma, moist, of the horizon are 3 or less.
- i Slightly decomposed organic material
This symbol is used with O to indicate the least decomposed of the organic materials. The fiber content of these materials is 40 percent or

- more (by volume) after rubbing.
- j Accumulation of jarosite
Jarosite is a potassium or iron sulfate mineral that is commonly an alteration product of pyrite that has been exposed to an oxidizing environment. Jarosite has hue of 2.5Y or yellower and normally has chroma of 6 or more, although chromas as low as 3 or 4 have been reported.
- jj Evidence of cryoturbation
Evidence of cryoturbation includes irregular and broken horizon boundaries, sorted rock fragments, and organic soil materials occurring as bodies and broken layers within and/or between mineral soil layers. The organic bodies and layers are most commonly at the contact between the active layer and the permafrost.
- k Accumulation of carbonates
This symbol indicates an accumulation of alkaline earth carbonates, commonly calcium carbonate.
- l Undefined as of 2006.
If used, it could be confused with the Arabic number "1".
- m Cementation or induration
This symbol indicates continuous or nearly continuous cementation. It is used only for horizons that are more than 90 percent cemented, although they may be fractured. The cemented layer is physically root restrictive. The predominant cementing agent (or the two dominant cementing agents) may be indicated by adding defined letter suffixes, singly or in pairs. The horizon suffix km indicates cementation by carbonates; qm, cementation by silica; sm, cementation by iron; ym, cementation by gypsum; kqm, cementation by lime and silica; and zm, cementation by salts more soluble than gypsum.
- n Accumulation of sodium
This symbol indicates an accumulation of exchangeable sodium.
- o Residual accumulation of sesquioxides
This symbol indicates a residual accumulation of sesquioxides.
- p Tillage or other disturbance
This symbol indicates a disturbance of the surface layer by mechanical means, pasturing, or similar uses. A disturbed organic horizon is designated Op. A disturbed mineral horizon is designated Ap even though it is clearly a former E, B, or C horizon.
- q Accumulation of silica
This symbol indicates an accumulation of secondary silica.

- r** Weathered or soft bedrock
This symbol is used with C to indicate cemented layers (moderately cemented or less cemented). Examples are weathered igneous rock and partly consolidated sandstone, siltstone, or shale. The excavation difficulty is low to high.
- s** Illuvial accumulation of sesquioxides and organic matter
This symbol is used with B to indicate an accumulation of illuvial, amorphous, dispersible complexes of organic matter and sesquioxides if both the organic-matter and sesquioxide components are significant and if either the color value or chroma, moist, of the horizon is 4 or more. The symbol is also used in combination with h as "Bhs" if both the organic-matter and sesquioxide components are significant and if the color value and chroma, moist, are 3 or less.
- ss** Presence of slickensides
This symbol indicates the presence of slickensides. Slickensides result directly from the swelling of clay minerals and shear failure, commonly at angles of 20 to 60 degrees above horizontal. They are indicators that other vertic characteristics, such as wedge-shaped peds and surface cracks, may be present.
- t** Accumulation of silicate clay
This symbol indicates an accumulation of silicate clay that either has formed within a horizon and subsequently has been translocated within the horizon or has been moved into the horizon by illuviation, or both. At least some part of the horizon should show evidence of clay accumulation either as coatings on surfaces of peds or in pores, as lamellae, or as bridges between mineral grains.
- u** User defined
This symbol must be defined with each use. A Bu horizon, for example, might have an extraordinary accumulation of mangans (manganese oxide coatings). It has been used in the past as a symbol for "unweathered," but this appears redundant for C and R horizons. It was not included in the Internet Glossary of Soil Science Terms in 2006.
- v** Plinthite
This symbol indicates the presence of iron-rich, humus-poor, reddish material that is firm or very firm when moist and hardens irreversibly when exposed to the atmosphere and to repeated wetting and drying.

- w Development of color or structure
This symbol is used with B to indicate the development of color or structure, or both, with little or no apparent illuvial accumulation of material. It should not be used to indicate a transitional horizon.
- x Fragipan character
This symbol indicates a genetically developed layer that has a combination of firmness and brittleness and commonly a higher bulk density than the adjacent layers. Some part of the layer is physically root-restrictive.
- y Accumulation of gypsum
This symbol indicates an accumulation of gypsum.
- z Accumulation of salts more soluble than gypsum
This symbol indicates an accumulation of salts that are more soluble than gypsum.

Horizon, soil. : A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon. An organic layer of fresh and decaying plant residue.

A horizon. The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon. The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon. The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon. The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Horizons : Soil layers within the profile which are reasonably homogeneous in terms of morphological characteristics and properties (e.g. Colour, texture, and structure) to the layers above and below.

A soil profile usually has these basic layers

- A1 surface
- A2 subsurface
- B subsoil
- C substrate.

Horizons : O horizon: An organic layer of fresh or decaying plant residue.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

E horizon: The mineral horizon in which the main feature is the loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an O, A, or E horizon and above the C horizon. Usually displaying soil structure and/or accumulation of clay, sesquioxides, humus, or a combination of these.

C horizon: The mineral horizon or layer excluding indurated bedrock, that has been little affected by soil-forming processes.

R layer: Hard, consolidated bedrock beneath the soil.

Horizontal Gene Transfer : The process by which bacteria and Archaea transfer genes to other bacteria or Archaea, especially obvious when a sudden environmental change forces resident bacteria or Archaea to seek a faster method of evolution than will occur slowly due to mutations of native DNA. Methods used include:

Conjugation - One cell binds to another cell, often unrelated, opening a connection through which it can pass a strand of DNA, copied from its primary DNA, into a separate contained packet of DNA, called a plasmid, to the recipient cell, without risking spilling cell contents from either donor or recipient cell into the environment. Conjugation is often a two-way transfer that enhances survival of both participants. If bacteria develop antibiotic resistance due to improper application of antibiotics (incorrect selection of treatment antibiotic, insufficient dosage to kill ALL bacteria exposed to the antibiotic), escaping bacteria may choose to pass antibiotic resistance along in plasmids to other bacteria they encounter in their environment (whether they normally live in hospitals, sewage systems, lakes, ponds, rivers or turf that is grazed by livestock).

DNA scavenging - One cell samples DNA strands strewn about during cell wall breakdown following death of bacterial cells that were intolerant of primary environmental conditions (temperature, pH, salinity, available food

sources, antibiotics produced by native bacteria to keep them dominant, etc.), sometimes delivering beneficial enzyme pathways to the resident species. When horizontal gene transfer happens naturally in the environment, huge leaps in adaptation can occur, creating new species very distinct from parental strains. I

Hormogonia : Small motile fragments produced by fragmentation of filamentous cyanobacteria; used for asexual reproduction and dispersal.

Horn : Pyramidal peak that forms when several cirques erode a mountain from three or more sides.

Horn fly : Small black fly that is a blood-sucking pest of cattle.

Hornblende : Hornblende - A monoclinic, dark green to black silicate of calcium and magnesium.

Horst Fault : A fault that is produced when two reverse faults cause a block of rock to be push up.

Host : Organism that develops disease from a pathogen or is being feed on by a parasite.

Hot composting, hot pile : Optimum conditions for compost piles, including 30:1 Carbon-to-Nitrogen ratio, 1" or smaller particles of various sizes and textures, moisture, air, minimum windrow depth of 3 cubit feet, produce an environment that will encourage and create an environment for psychrophilic, mesophyllic, and thermophilic bacteria. As the thermophilic bacteria work, the compost pile will reach high temperatures.

Hot Spot : A volcanic area on the surface of the Earth created by a rising plume of magma.

House fly : A two-winged fly that can carry many diseases. Problem in the state's dairies.

House Sewer : The pipeline connecting the house and drain and the septic tank.

Hqw high quality waters : Waters with quality higher than state water quality standards.

HRT : Hours of Retention Time.

Hue : one of the three variables of color, the rainbow color of light reflected from each soil. OR The dominant spectral color and one of the three color variables.

Human Geography : Field of knowledge that studies human-made features and phenomena on the Earth from a spatial perspective. Subdiscipline of Geography.

Human time scale : That portion of the pedogenic time scale that covers periods of centuries, decades, or less.

Human-Land Tradition : Academic tradition in modern Geography that investigates human interactions with the environment.

Humic : Where organic matter and aluminium compounds dominate under either semiaquic or aquic conditions. Subsoil horizons that are humic are notated as a Bh Horizon. This term is used as a Great Group definition for the Podsol Order in the Australian Soil Classification (Isbell, 1996).

Humic acid : Darkcolored organic material extracted from soil by various reagents (e.g., dilute alkali) and that is precipitated by acid (ph 1 to 2).

Humic gleys : GSG classification—Soils that are acid to neutral, predominantly mineral soils with significant but widely varying organic matter contents intimately incorporated in the dark A horizons. These grade into subsoils marked by rusty and ochreous streaks and mottles on a pale grey matrix. Below this mottled horizon, the soil is typically grey to bluish-grey and permanently waterlogged, but the watertable fluctuates, periodically rising almost to the surface.

Humic substances : Series of relatively highmolecularweight, browntoblack substances formed by secondary synthesis reactions. The term is generic in a sense that it describes the colored material or its fractions obtained on the basis of solubility characteristics, such as humic acid or fulvic acid.

Humidification : The addition of water vapor to air. The Delta T system first humidifies air then dehumidifies it to produce effluent or product water.

Humidity : A general term used to describe the amount of water vapor found in the atmosphere.

Hummin : Usually applied to that part of the organic matter that remains after extraction with dilute alkali.

Humose : The relatively resistant, usually dark brown to black fraction of soil organic matter, peat or compost which forms as a result of biological decomposition of organic material.

Humose horizon : A humus rich surface or near surface horizon that is at least 20 cm thick and has an organic carbon content of more than 4% for sandy soils and greater than 6% for clayey soils. This term is used as a Subgroup distinction for a number of Soil Orders in the Australian Soil Classification (Isbell, 1996). OR This is a humus-rich surface or near-surface horizon that is 0.2m or more thick and has insufficient organic carbon to qualify as organic material.

Humosesquic : Soils with only a Bhs Horizon within Aeris or Semiaquic conditions. This term is used as a Great Group definition for the Podsol Order in the Australian Soil Classification (Isbell, 1996).

Humus : Total of the organic compounds in soil exclusive of undecayed plant and animal tissues, their "partial decomposition" products, and the soil biomass. The

term is often used synonymously with soil organic matter. OR Dark colored semi-soluble organic substance formed from decomposition of soil organic matter.

Humus podzols : GSG classification – These soils have a dark A₁ horizon of organic accumulation, a light grey or whitish A₂ horizon and a dark grey to black, dominantly humic B horizon overlying water-saturated and weakly mottled mineral soil.

Hurricane : An intense cyclonic storm consisting of an organized mass of thunderstorms that develops over the warm oceans of the tropics. To be classified as a hurricane, winds speeds in the storm must be greater than 118 kilometers per hour.

Hybridization : Natural formation or artificial construction of a duplex nucleic acid molecule by complementary base pairing between two nucleic acid strands derived from different sources.

Hydration : A form of chemical weathering that involves the rigid attachment of H⁺ and OH⁻ ions to the atoms and molecules of a mineral. OR The process whereby a substance takes up water.

Hydraulic : Of or pertaining to fluids in motion; conveying, or acting, by water; operated or moved by means of water, as hydraulic mining. Agi

Hydraulic conductivity (Ksat) : A quantitative measure of how easily water flows through soil. (Compare to infiltration and permeability.).

Hydraulic Gradient : Hydraulic Gradient - The change in energy along a flow line in an unconfined or confined aquifer.

Hydraulic Head : Hydraulic Head - Water-level elevation in a well, or elevation to which the water of a flowing artesian well will rise in a pipe extended high enough stop the flow.

Hydraulic loading : Hydraulic loading refers to the flows (MGD or m³/day) to a treatment plant or treatment process.

Hydric (soil) : a soil with periods of wetness that exhibits evidence of that wetness (mottles, gleying, redox conditions at times).

Hydrocarbon : Any chemical compound containing only carbon and hydrogen elements. Some simple examples of hydrocarbons are: methane (CH₄), ethylene (C₂H₄), ethane (C₂H₆), etc

Hydroelectric power : The use of water in the generation of electricity at plants where the turbine generators are driven by falling water.

Hydrogen bond : Chemical bond between a hydrogen atom of one molecule and two unshared electrons of another molecule.

Hydrogen sulfide gas : Hydrogen sulfide is a gas with a rotten egg odor. This gas is produced under anaerobic conditions. Hydrogen sulfide is particularly dangerous because it dulls your sense of smell so that you don't notice it after you have been around it for a while and because the odor is not noticeable in high concentrations. The gas is very poisonous to your respiratory system, explosive, flammable, and colorless.

Hydrogenoxidizing bacterium : Facultative lithotrophs that, in the absence of an oxidizable organic source, oxidize H_2 for energy and synthesize carbohydrates with carbon dioxide as their source of carbon.

Hydrogeology : The science of chemistry and movement of groundwater.

Hydrograph : Hydrograph - A graph which illustrates a specific hydrologic measurement, such as water level, discharge or velocity, over a period of time. OR A graph describing stream discharge over time.

Hydrologic Cycle : Disposal of precipitation from the time it reaches the soil surface until it re-enters the atmosphere by evapotranspiration to serve again as a source of precipitation.

Hydrologic Properties : Hydrologic Properties - The properties of rocks or soil that control the entrance of water and the capacity to transmit water.

Hydrologic soil groups : Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Hydrology : The scientific study of the properties, distribution and effects of water in the atmosphere, on the earth's surface and in soil and rocks. OR Field of physical geography that studies the hydrosphere.

Hydrolysis : In soils it is the process whereby hydrogen ions are exchanged for cations such as sodium, potassium, calcium and magnesium.

Hydromorphic Soil : Soils developed in the presence of excess water. OR Formed under conditions of poor drainage in marshes, swamps, seepage areas or flats.

Hydrophytic vegetation : Plants that can exist in water that at least periodically is subject to anaerobic conditions.

Hydrosols : Soil Order of the Australian Soil Classification (Isbell, 1996). These are soils where a greater part of the profile is saturated for at least several months per year. OR ASC classification—Soils that are saturated for at least 2-3 months in most years.

Hydrosphere : The hydrosphere describes the waters of the Earth. Water exists on the Earth in various stores, including the: atmosphere, oceans, lakes, rivers, glaciers, snowfields and groundwater. Water moves from one store to another by way of: evaporation, condensation, precipitation, deposition, runoff, infiltration, sublimation, transpiration, and groundwater flow.

Hydrostatic Pressure : Force caused by water under pressure.

Hydrous : Hydrous - Containing water as part of the chemical formula.

Hygrometer : An instrument for measuring atmospheric humidity.

Hygroscopic : Substances that have the ability to absorb water and therefore accelerate the condensation process.

Hygroscopic : Absorbing or attracting moisture from the air.

Hygroscopic Coefficient : Maximum limit of hygroscopic water around the surface of a soil particle.

Hygroscopic water : Water adsorbed by a dry soil from an atmosphere of high relative humidity.

Hymenium : Layer of hyphae which are fertile in producing asci (fungi in the phylum Ascomycota) or basidia (fungi in the phylum Basidiomycota) from the process of meiosis.

Hypercalcic : These soils have a Bk Horizon or a subsurface layer containing more than 20% soft, finely divided carbonate, less than 20% hard calcrete fragments and/or carbonate nodules, and/or carbonate coated gravel. The term is used as a definition for a number of Orders in the Australian Soil Classification (Isbell, 1996).

Hypercyclothem : Hypercyclothem - A term proposed by Weller (1958) for a great cyclic sequence consisting of four megacyclothems.

Hypernatric : The major part of the upper 0.2 m of the B2 Horizon has an ESP greater than 25. This term is used as a Great Group definition for the Sodosol Order in the Australian Soil Classification (Isbell, 1996).

Hyperparasite : Parasite that feeds on another parasite.

Hyperthermophile : A prokaryote having a growth temperature optimum of 80 °C or higher.

Hypertrophy : A non-tumorous enlargement of an organ or a tissue as a result of

an increase in the size rather than the number of constituent cells.

Hypha (plural, hyphae) : Long and often branched tubular filament that constitutes the vegetative body of many fungi and funguslike organisms. Bacteria of the order Actinomycetes also produce branched hyphae.

Hyphae : Thread like structures found on a fungus. OR Long chains of cells formed by fungi usually occurring between aggregates rather than within micropores. (Compare to mycelium.)

Hypocalcic : Soils where the carbonate in the B or B/C Horizon is evident only by using acid treatment, or is in the form of a few soft visible segregations with few if any hard nodules or concretions. This term is used as a definition for a number of soils in the Australian Soil Classification (Isbell, 1996).

Hypolimnion : Deep part of lake - low temperature and low oxygen concentrations because of low light penetration and consequent low photosynthetic activity

Hypothesis : A tentative assumption that is made for the purpose of empirical scientific testing. A hypothesis becomes a theory when repeated testing and evidence suggests the hypothesis has a strong chance of being correct.

Hypothesis Testing : Process where an alternative and a null hypothesis are statistically tested for the purpose of falsifying a hypothesis.

Hypoxic : Insufficient availability of oxygen in an environment to support aerobic respiration.

I

Ice : Frozen form of the water molecule. Ice has a specific gravity (0.9166) which is slightly less than water. This difference in specific gravity causes ice to float on water.

Ice Age : Period of time when glaciers dominate the landscape of the Earth. The last major Ice Age was during the Pleistocene epoch.

Ice Cap : Large dome-shaped glacier found covering a large expanse of land. Smaller than an ice sheet.

Ice Fall : An area of crevassed ice on a glacier. Caused when the base of the glacier flows over steep topography.

Ice Field : Large level area of glacial ice found covering a large expanse of land. Similar in size to an ice cap but does not have a dome-shape.

Ice Fog : A fog that is composed of small suspended ice crystals. Common in Arctic locations when temperatures are below -30° Celsius and a abundant supply of water vapor exists.

Ice Jam : The accumulation of ice at a specific location along a stream channel. Can cause the reduction of stream flow down stream of the obstruction and flooding upstream.

Ice Lense : Horizontal accumulation of permanently frozen ground ice.

Ice Pellets : A type of precipitation. Ice pellets or sleet are transparent or translucent spheres of frozen water that fall from clouds. Ice pellets have a diameter less than 5 millimeters. To form, this type of precipitation requires an environment where raindrops develop in an atmosphere where air temperature is above freezing. These raindrops then fall into a lower layer of air with freezing temperatures. In this lower layer of cold air, the raindrops freeze into small ice pellets. Like freezing rain, an air temperature inversion is required for development of ice pellets.

Ice Sheet : A dome-shaped glacier covering an area greater than 50,000 square kilometers. Greenland and Antarctica are considered ice sheets. During the glacial advances of the Pleistocene ice sheets covered large areas of North America, Europe, and Asia. Larger than an ice cap.

Ice Shelf : Large flat layer of ice that extends from the edge of the Antarctic ice cap into the Antarctic Ocean. Source of icebergs.

Ice Wedge : Wedge-shaped, ice body composed of vertically oriented ground ice that extends into the top of a permafrost layer. These features are approximately 2 to 3 meters wide at their top and extend into the soil about 8 to 10 meters. Form in cracks that develop in the soil during winter because of thermal contraction. In the spring, these cracks fill with liquid water from melting snow which subsequently re-freezes. The freezing process causes the water to expand in volume increasing the size and depth of the crack. The now large crack fills with more liquid water and again it freezes causing the crack to enlarge. This process continues for many cycles until the ice wedge reaches its maximum size.

Iceberg : A mass of ice found floating in the ocean or a lake. Often icebergs form when ice calves from land-based glaciers into the water body. Icebergs can be dangerous to shipping in high and mid-latitude regions of the ocean because 90 percent of their mass lies below the ocean surface.

Ideal Gas Law : This law describes the physical relationships that exist between pressure, temperature, volume, and density for gases. Two mathematical equations are commonly used to describe this law:

$$\text{Pressure} \times \text{Volume} = \text{Constant} \times \text{Temperature}$$

And

$$\text{Pressure} = \text{Density} \times \text{Constant} \times \text{Temperature}$$

Igneous Intrusives : Igneous Intrusives - Formed from molten rock and cross-cutting other Earth materials beneath the Earth's surface. OR formed by solidification, from a molten or partially molten state. Synonym: primary rock. Example: granite.

Illite : a hydrous aluminosilicate clay mineral with structurally mixed mica and smectite or vermiculite, similar to montmorillonite but containing potassium between the crystal layers. Also referred to as *hydrous mica* or *mica*.

Illuvation : The deposition, normally in a B horizon, of materials moved downward by eluviation.

Illuvial accumulation of organic matter(h) : This symbol is used with B to indicate the accumulation of illuvial, amorphous, dispersible complexes of organic matter and sesquioxides if the sesquioxide component is dominated by aluminum but is present only in very small quantities. The organo-sesquioxide material coats sand and silt particles. In some horizons these coatings have coalesced, filled pores, and cemented the horizon. The symbol h is also used in combination with s as "Bhs" if the amount of the sesquioxide component is significant but the color value and chroma, moist, of the horizon are 3 or less.

Illuvial accumulation of sesquioxides and organic matter(s) : This symbol is used with B to indicate an accumulation of illuvial, amorphous, dispersible

complexes of organic matter and sesquioxides if both the organic-matter and sesquioxide components are significant and if either the color value or chroma, moist, of the horizon is 4 or more. The symbol is also used in combination with h as "Bhs" if both the organic-matter and sesquioxide components are significant and if the color value and chroma, moist, are 3 or less.

Illuvial Horizon : A horizon that receives material in solution or suspension from some other part of the soil.

Illuvial horizon : a soil layer or horizon in which material carried from an overlying layer has been precipitated from solution or deposited from suspension. The layer of accumulation. Contrast to eluviation.

illuviation : Deposition of soil material removed from one horizon to another in the soil. OR The process of movement of material from one horizon and its deposition in another horizon of the same soil; usually from an upper horizon to a middle or lower horizon in the pedonit. Movement can also take place laterally.

Illuviation : The process of deposition (in-washing) of soil materials either from suspension or solution, usually from an upper horizon into a lower soil horizon but also from a lateral source (Allaby, 1991).

Illuviation : The movement of soil material from one horizon to another in the soil profile. Generally material is lost from an overlying horizon to an underlying one.

Immature Soil : Lacking a well developed pedonit.

Immigrant Species : Species that migrate into an ecosystem or that are deliberately or accidentally introduced into an ecosystem by humans. Some of these species are beneficial, whereas others can take over and eliminate many native species. Compare with indicator species, keystone species, and native species.

Immigration : Migration of an organism into an area for the purpose of changing its residence permanently. Compare with emigration.

Immiscibility : The inability of two or more solids or liquids to readily dissolve into one another.

Immobilisation of nutrients : The incorporation of nutrients into the microbial communication in soil. This creates a pool of nutrients in living cells within the soil matrix.

This is the opposite of mineralization, which is the process of converting the nutrients from organic to inorganic forms through the degradation of organic matter. The immobilised nutrients are therefore unavailable to plants until death and decay of the microbes, preventing their loss by leaching.

Immobilization : Conversion of an element from the inorganic to the organic form in microbial or plant biomass.

Immunity : The ability of a human or animal body to resist infection by microorganisms or their harmful products such as toxins.

Immunoblot (western blot) : Detection of proteins immobilized on a filter by complementary reaction with specific antibody.

Immunofluorescence : Technique to visualize specific antibodies and any attached homologous antigens by means of conjugating the antibodies to a fluorescent dye

Immunogen : Substance which is capable of eliciting immune response. An immunogen usually has a fairly high molecular weight (usually greater than 10,000), thus, a variety of macromolecules such as proteins, lipoprotein, polysaccharides, and some nucleic acids can act as immunogens.

Immunoglobulin : Antibody.

Impaired waters : Surface and ground waters that are negatively impacted by pollution resulting in decreased water quality.

Impeded Drainage : Restriction of the downward movement of water by gravity.

Imperfectly drained : A soil that shows a small amount of reduction of iron due to short periods of water-logging.

Impermeable : Not easily penetrated by water.

Impervious : Not easily penetrated by roots or water.

Impervious soil : A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Impervious Surface : Paved surface or other land cover that does not allow water to percolate into the ground.

Impervious surface : Exterior covering that does not allow rainwater or snowmelt to infiltrate into the soil but rather causes it to run off and enter the stormwater system via street drains. Rooftops, driveways, sidewalks, and streets are common impervious surfaces in cities.

Impurities : Particles or other objects that cause water to be unclear.

in situ : In (its original) place. Thus the difference between an in situ and a laboratory soil measurement is that the first is made with little or no disturbance in the original soil profile while the second requires considerable mechanical agitation and change of environment to remove a sample to location away from the place of origin. OR In Situ - Describes material found in its place of origin.

In vivo : In the body, in a living organism, as opposed to *in vitro*; when a study or an experiment is done in the living organism, it is done *in vivo*.

Inactive Status : Inactive Status - A water well in good repair, which the owner has properly maintained, and which meets the following standards: does not

impair the water quality of the groundwater encountered by the well; has a water-tight cover constructed to prevent unauthorized access or removal; is visibly marked and identified as a water well and the area around the well kept clean and clear of wastes and debris.

Inceptisols : Other soils that have either:

One or more of the following:

A cambic horizon with its upper boundary within 100 cm of the mineral soil surface and its lower boundary at a depth of 25 cm or more below the mineral soil surface; or

A calcic, petrocalcic, gypsic, petrogypsic, or placic horizon or a duripan with an upper boundary within a depth of 100 cm of the mineral soil surface; or

A fragipan or an oxic, sombric, or spodic horizon with an upper boundary within 200 cm of the mineral soil surface; or

A sulfuric horizon that has its upper boundary within 150 cm of the mineral soil surface; or

A cryic temperature regime and a cambic horizon; or

No sulfidic materials within 50 cm of the mineral soil surface; and both:

In one or more horizons between 20 and 50 cm below the mineral soil surface, either an n value of 0.7 or less or less than 8 percent clay in the fine-earth fraction; and

One or both of the following:

A salic horizon or a histic, mollic, plaggen, or umbric epipedon; or

In 50 percent or more of the layers between the mineral soil surface and a depth of 50 cm, an exchangeable sodium percentage of 15 or more (or a sodium adsorption ratio of 13 or more), which decreases with increasing depth below 50 cm, and also ground water within 100 cm of the mineral soil surface at some time during the year when the soil is not frozen in any part.

Inceptisols : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. These soils have horizons in the early stages of pedogenesis. Many of these soils are found on glacial drift deposits.

Incineration : The conversion of dewatered wastewater solids by combustion (burning) to ash, carbon dioxide, and water vapor.

Incorporation : Incorporation means mixing biosolids with the soil. Incorporation includes injection, moldboard plowing, roto-tilling, chisel or disk plowing and

tandem disk harrowing.

Increasers : Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Incubation Study : Study done in a laboratory setting under controlled temperature and moisture conditions.

Independent Variable : Variable in a statistical test that is thought to be controlling through cause and effect the value of observations in another dependent variable modeled in the test.

Index Contour : Contour line that is accentuated in thickness and is often labeled with the appropriate measure of elevation. Index contours occur every four or fifth contour interval and help the map user read elevations on a map.

Indicator of soil quality : A quantitative or qualitative measure used to estimate soil functional capacity. Indicators should be adequately sensitive to change, accurately reflect the processes or biophysical mechanisms relevant to the function of interest, and be cost effective and relatively easy and practical to measure. Soil quality indicators are often categorized into biological, chemical, and physical indicators.

Indicator Species : Species that can be used as a early indicator of environmental degradation to a community or an ecosystem. Compare with immigrant species, keystone species, and native species.

Indicators of soil quality, biological : Measures of living organisms or their activity used as indicators of soil quality. Measuring soil organisms can be done in three general ways: 1) counting soil organisms or measuring microbial biomass, 2) measuring their activity (e.g. soil basal respiration, cotton strip assay, or potentially mineralizable nitrogen), or 3) measuring diversity, such as diversity of functions (e.g., biologic plates) or diversity of chemical structure (e.g. cell components, fatty acids, or DNA). Each approach provides different information.

Indicators of soil quality, chemical : These include tests of organic matter, pH, electrical conductivity, heavy metals, cation exchange capacity, and others.

Indicators of soil quality, physical : Physical characteristics that vary with management include bulk density, aggregate stability, infiltration, hydraulic conductivity, and penetration resistance.

Indirect discharge : Introduction of pollutants from a non-domestic source into a publicly owned wastewater treatment system. Indirect dischargers can be commercial or industrial facilities whose wastes enter local sewers.

Induced systemic resistance (ISR) : The process of active resistance dependent on the host's physical or chemical barriers, activated by biotic or abiotic inducing

agents.

Inducible enzyme : Enzyme synthesized (induced) in response to the presence of an external substance (the inducer).

Induction : Inference of a generalized conclusion from particular instances. In a science like Physical Geography, inductive reasoning would involve the development of a theory to explain previously collected facts or observed phenomenon.

Indurated : Hardened soil particles (see Cemented).

Industrial Revolution : Major change in the economy and society of humans brought on by the use of machines and the efficient production of goods. This period in human history began in England in the late 18th century.

Industrial sludge : Any sludge that is not domestic wastewater sludge is industrial sludge. This includes wastewater sludge from manufacturing or processing of raw materials, intermediate products, final products or other activities that include pollutants from non-domestic wastewater sources.

Industrial Smog : Form of air pollution that develops in urban areas. This type of air pollution consists of a combination of sulfur dioxide, suspended droplets of sulfuric acid, and a variety of suspended solid particles. Also see photochemical smog.

Inerts : Non-biodegradable products contained in wastes (glass, plastics, etc.)

Infection : Growth of an organism within another living organism.

Infection thread : Cellulosic tube in a root hair through which rhizobia can travel to reach and infect root cells.

Inferential Statistics : Statistical test that makes generalizations about a population based of the numeric information obtained from a sample based on the laws of probability.

Infiltration : The process whereby water enters the soil through the surface. OR entry of water downward into the soil surface

Infiltration : The movement of water through the soil surface. Soils with a high infiltration capacity allow more rain to enter the soil than those with a low infiltration capacity. Runoff will occur when the rate of rainfall exceeds the soil's infiltration capacity. Surface soil structure and texture are important determinants of the infiltration capacity of a soil.

Infiltration Capacity : The ability of a soil to absorb surface water OR The maximum rate at which water can infiltrate into a soil under a given set of conditions..

Infiltration Rate : Rate of absorption and downward movement of water into the soil layer. OR The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Infiltration .: The downward movement of water into soil (percolation). OR The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Influent : The stream of water that enters any system or treatment unit.

Influent : The liquid - raw (untreated) or partially treated - flowing into a reservoir, basin, treatment process or treatment plant.

Infrared (IR) : The portion of the electromagnetic spectrum with wavelengths from about 0.75 μm to 1 mm.

Infrared Radiation : Form of electromagnetic radiation with a wavelength between 0.7 and 100 micrometers (μm). Also called longwave radiation.

Inhibition : Prevention of growth or function.

Inhibition Model of Succession : This model of succession suggests that the change in plant species dominance over time is caused by death and small scale disturbances and variations in plant species longevity and ability to disperse. Over time species turnover favors plant species with longer life spans.

Inlet : A short, narrow waterway connecting a bay, lagoon, or similar body of water. Compare - Tidal Inlet. (modified from Jackson, 1997).

Inner Core : Inner region of the Earth's core. It is thought to be solid iron and nickel with a density of about 13 grams per cubic centimeter. It also has a diameter of about 1220 kilometers.

Inoceramid : Inoceramid - Related to Inoceramus, a genus of large bivalve mollusks (suborder Mytilacea) especially characteristic of the Cretaceous. The downward entry of water into the soil.

Inoculants : Dominant microorganisms which may be added to a compost pile. Generally, these are not necessary as there are microorganisms living on all organic matter, so your pile already has these in it.

Inoculate : To treat with microorganisms for the purpose of creating a favorable response. For example, treatment of legume seeds with rhizobia to stimulate N_2 fixation. OR To introduce a seed culture into a system, such as with the addition of ALKEN CLEAR-FLO® cultures.

Inoculum : Material used to introduce a microorganism into a suitable situation for growth.

Inorganic : Substance in which carbon-to-carbon bonds are absent; mineral matter. OR Non-living thing. Usually refers to the physical and chemical components of an organism's environment. Some times called abiotic.

Inorganic waste : Waste material such as sand, salt, iron, calcium, and other mineral materials which are only slightly affected by the action of organisms. Inorganic wastes are chemical substances of mineral origin; whereas organic wastes are chemical substances usually of animal or plant origin.

Inosilicate : Subclass of the silicate class of minerals. Inosilicates have two distinct forms: single and double chain silicates.

Input : Addition of matter, energy, or information to a system. Also see output.

Insect : Relatively small and simple animals that have a rigid external skeleton, three body sections, three pairs of legs, and antennae. These organisms are the most abundant group of eukaryotes on the Earth.

Insecticide : See "pesticide"

Inselberg : A German term used to describe a steep-sided hill composed of rock that rises from a pediplain.

Inselberg (pl. inselberge) : A steep sided hill composed predominantly of hard rock and rising abruptly above a plain; found mainly in tropical and subtropical areas.

Insertion : Genetic mutation in which one or more nucleotides are added to DNA.

Insertion sequence (IS element) : Simplest type of transposable element. Has only genes involved in transposition.

Insolation : Direct or diffused shortwave solar radiation that is received in the Earth's atmosphere or at its surface.

Insolation Weathering : Form of physical weathering. Involves the physical breakdown of minerals and rock due to thermal expansion and contraction.

Insoluble : : Not capable of being dissolved. For instance, insoluble phosphorus is present in the solid phase in soils.

Instability : Atmospheric condition where a parcel of air is warmer than the surrounding air in the immediate environment. This condition causes the parcel to rise in the atmosphere. Also see unstable atmosphere.

Intake rate : The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	Very low
0.2 to 0.4	Low
0.4 to 0.75	Moderately low
0.75 to 1.25	Moderate
1.25 to 1.75	Moderately high
1.75 to 2.5	High
More than 2.5	Very high

Integrated pest management (IPM) : A systems approach that combines a wide array of crop production practices with careful monitoring of pests and their natural enemies. IPM practices include use of resistant varieties, timing of planting, cultivation, biological controls, and judicious use of pesticides to control pests. These IPM practices are used in greenhouses and on field crops. IPM systems anticipate and prevent pests from reaching economically damaging levels. OR Using the best features of chemical, biological, and cultural controls in an overall pest control program.

Integration : Process by which a DNA molecule becomes incorporated into another genome.

Intensity : = I/d^2

Where I is the intensity of the radiation at 1 unit distance and d is the distance traveled in those units.

Interaction (biological) : Mutual or reciprocal influence between two or more similar organisms or individuals of different species. Major biotic interactions are: competition, mutualism, predation, parasitism, amensalism, and commensalism.

Interception : Is the capture of precipitation by the plant canopy and its subsequent return to the atmosphere through evaporation or sublimation. The amount of precipitation intercepted by plants varies with leaf type, canopy architecture, wind speed, available radiation, temperature, and the humidity of the atmosphere.

Interface : The common boundary layer between two substances such as between water and a solid (metal) or between water and a gas (air) or between a liquid (water) and another liquid (oil).

Interference : Form of competition where an individual directly prevents the physical establishment of another individual in a portion of a habitat.

Interfluvium : The area between two adjacent streams flowing in the same direction. OR The land lying between streams.

Interglacial : Period of time during an ice age when glaciers retreated because of milder temperatures.

Interglacial Period : A relatively mild period occurring between two glacial periods.

Intergrade : A soil which contains the properties of two distinctive and genetically different soils.

Intermittent Stream : A stream that flows only for short periods over a year. Flow events are usually initiated by rainfall.

Intermittent stream : A watercourse that flows only at certain times of the year, conveying water from springs or surface sources; also, a watercourse that does not flow continuously when water losses from evaporation or seepage exceed available stream flow.

International Date Line : A line drawn almost parallel to the 180 degree longitude meridian that marks the location where each day officially begins. The location of the International Date Line was decided upon by international agreement.

Interspecies : Between two different species, such as tomato and weeds.

Interspecies hydrogen transfer : The process in which organic matter is degraded anaerobically by the interaction of several groups of microorganisms in which hydrogen production and hydrogen consumption are closely coupled among species.

Interspecific Interaction : An interaction between different species.

Interstadial Period : A slightly warmer phase during a glacial period.

Intertidal : (adjective) The coastal environment between mean low tide and mean high tide that alternates between subaerial and subaqueous depending on the tidal cycle. Compare - Subtidal.

Intertropical Convergence Zone (ITCZ) : Zone of low atmospheric pressure and ascending air located at or near the equator. Rising air currents are due to global wind convergence and convection from thermal heating. Location of the thermal equator.

Intracellular : Inside the cell.

Intraclast : Intraclast - A rock fragment that has been torn up and reworked in contemporaneously deposited sediment.

Intraspecies : Within same species; Elk vs. Elk

Intraspecific Interaction : An interaction occurring between the individuals that make up a single species.

Intrazonal Soils : One of the three orders of the zonal system of soil classification. They have well developed characteristics resulting from the dominant influence

of a local factor such as topography and parent material.

Intrusive Igneous Rock : A mass of igneous rock that forms when magma from the mantle migrates upward and cools and crystallizes near, but not at, the Earth's surface. Also called plutonic igneous rock. Also see dyke, sill, and batholith.

Invasive species : Non-native plants and animal species; plants and animal species that have been introduced to an area where they do not occur naturally.

Inventory : The systematic acquisition of resource information needed for planning and management.

Inverse Square Law : This law suggests that the amount of radiation passing through a specific area is inversely proportional to the square of the distance of that area from the energy source. Mathematically, the Inverse Square Law is described by the equation:

Inversely Proportional : Cause and effect relationship between two variables where a positive or negative change in the quantity of one causes a predictable opposite change in quantity in the other.

Inversion : See temperature inversion.

Invertebrate : Invertebrate - An animal without a notochord or spinal column.

Invertebrate : Animal that does not have a backbone. Also see vertebrate.

Ion : An atom, molecule or compound that carries either a positive (cation) or negative (anion) electrical charge. OR Electrically charged atom or group of atoms.

Ionization : The process of adding electrons to, or removing electrons from, atoms or molecules, thereby creating ions. High temperatures, electrical discharges, and nuclear radiation can cause ionization.

Ionizing Radiation : The emission of alpha or beta particles or gamma rays from radioisotopes. These emitted particles can dislodge one or more electrons from atoms they strike. The free electrons can form charged ions in living tissue that can react with and damage cells.

Ionosphere : A region in the atmosphere above 50 kilometers from the surface where relatively large concentrations of ions and free electrons exist. The ionosphere is important for human communications because it re-directs AM radio transmissions. This process extends the distance that radio transmissions can travel.

Ions : Atoms, groups of atoms, or compounds, that are electrically charged as a result of the loss of electrons (cations) or the gain of electrons (anions).

Ions : Atoms, groups of atoms, or compounds, that are electrically charged as a result of the loss of electrons (cations) or the gain of electrons (anions).

Irrigation . : Intentional watering of the soil. OR

Application of water to soils to assist in production of crops. Methods of irrigation are;

- **Border.** Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
- **Basin.** Water is applied rapidly to nearly level plains surrounded by levees or dikes.
- **Controlled flooding.** Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
- **Corrugation.** Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
- **Drip (or trickle).** Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
- **Furrow.** Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
- **Sprinkler.** Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
- **Subirrigation.** Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
- **Wild flooding.** Water, released at high points, is allowed to flow onto an area without controlled distribution.

Island : An area of land completely surrounded by water. Compare - Barrier Island. (modified from Jackson, 1997).

Island Arc : A line of volcanic islands found of the ocean that have been created by the convergence of two tectonic plates and the subsequent subduction of one of the plates beneath the other. Subduction cause magma plumes to rise to the Earth's surface creating the volcanic islands.

Isobar : Lines on a map joining points of equal atmospheric pressure.

Isochronous boundary. : A gradational boundary between two sedimentary units indicating that they are approximately the same age. Opposed to a nonisochronous boundary, which by its abruptness indicates that it delineates units having significant age differences.

Isoenzyme (isozyme) : When two different enzymes catalyze the same reaction(s), they are isoenzymes of each other. Isoenzymes could differ from each other in their primary structure or electrophoretic mobility.

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they are isoenzymes of each other. Isoenzymes could differ from each other in their primary structure or electrophoretic mobility.

Isolated System : A system that has no interactions beyond its boundary layer. Many controlled laboratory experiments are this type of system.

Isolation : Any procedure in which an organism present in a particular sample or environment, is obtained in pure culture.

Isoline : Lines on a map joining points of equal value.

Isomorphous Replacement : The replacement of one ion by another in the crystal lattice without changing the structure of the mineral.

Isomorphous substitution : Substitution in a crystalline clay sheet of one atom by a similarly sized atom of lower valence.

Isopod : Aquatic crustacean with a flat, oval body and seven pairs of walking legs of similar size and form, each pair attached to the thorax.

Isostasy : The buoyant condition of the Earth's crust floating in the asthenosphere. The greater the weight of the crust the deeper it floats into the asthenosphere. When weight is removed the crust rises higher.

Isostatic Depression : Large scale sinking of the crust into the asthenosphere because of an increase in weight on the crustal surface. Common in areas of continental glaciation where the crust was depressed by the weight of the ice.

Isostatic Rebound : The upward movement of the Earth's crust following isostatic depression.

Isotherm : Lines on a map joining points of equal temperature.

Isothermal Layer : Vertical layer in the atmosphere where temperature remains unchanged. In the Earth's atmosphere, three isothermal layers are found in the lower regions of the stratosphere, mesosphere, and the thermosphere.

Isotope : Different form of the same element containing the same number of protons and electrons, but differing in the number of neutrons.

Isotope : Different form of the same element containing the same number of protons and electrons, but differing in the number of neutrons.

Isotopic Dating : Dating technique used to determine the age of rock and mineral through the decay of radioactive elements.

Isozyme : See isoenzyme.

J

Jaccard coefficient (S_j) : An association coefficient used in numerical taxonomy; it is the proportion of characters that match, excluding those that both organisms lack.

Jet Stream : Relatively fast uniform winds concentrated within the upper atmosphere in a narrow band. A number of jet streams have been identified in the atmosphere. The polar jet stream exists in the mid-latitudes at an altitude of approximately 10 kilometers. This jet stream flows from west to east at average speeds, depending on the time of year, between 110 to 185 kilometers per hour. Another strong jet stream occurs above the sub-tropical highs at an altitude of 13 kilometers. This jet stream is commonly called the subtropical jet stream. The subtropical jet stream's winds are not as strong as the polar jet stream.

Johnsongrass : Perennial grass that is a problem in many crops. Introduced and tested as a forage species. Didn't produce well as forage plant but became a nuisance.

Joint : A fracture in a rock where no movement has taken place or where no movement has taken place perpendicular to the surface of the fracture. Important in rock weathering because it increases the exposed surface area.

Joint Plane : Joint Plane - A fracture in rock in which there is no displacement of opposite blocks. Joint planes are often mineralized.

Joule : Unit for measuring energy. One joule is the energy used by a force of one Newton in moving its point of application in the direction of the force one meter.

Judicial Order by Consent (JOC) : An administrative order issued by an administrative law judge which in some way modifies limitations of an NPDES permit by consent of both parties and provides interim limitations and conditions.

Jurassic : Geologic period that occurred roughly 144 to 208 million years ago. During this period, the first birds and mammals appear and large areas of the continents are covered by shallow seas.

K

Kame Terrace : A long flat ridge composed of glaciofluvial sediment. This feature forms along the margin of a valley glacier where the glacial ice meets the valley's slope. Sediment is deposited by laterally flowing meltwater streams.

Kame(geology) . : A steep conical hill composed of glaciofluvial materials. This feature forms when glacial crevasses are filled with deposits from sediment filled meltwater. OR An irregular, short ridge or hill of stratified glacial drift.

Kandosolic : A term used in the Australian Soil Classification (Isbell, 1996). To classify Hydrosols. This indicates that the soil would otherwise be classified as a Kandosol apart from the fact that it is saturated in the greater part of the profile for prolonged periods (i.e. 2-3 months) in most years - therefore making it a Hydrosol.

Kandosols : A Soil Order of the Australian Soil Classification (Isbell, 1996). These soils lack strong texture contrast and have massive or only weakly structured B horizons. The B₂ horizon is well developed and has a maximum clay content in some part of the B₂ Horizon which exceeds 15%. They are also not calcareous throughout. OR ASC Soil Order classification—Other soils that (i) have well-developed B₂ horizons in which the major part is massive or has only a weak grade of structure, *and* (ii) have a maximum clay content in some part of the B₂ horizon which exceeds 15%.

Kaolinite : A type of clay that is widespread in tropical and subtropical regions. It is produced from the weathering of granite.

Karst : Topography with sinkholes, caves and underground drainage that is formed in limestone, gypsum or other rocks by dissolution (dissolving). OR Landform type with limestone bedrock and dominated by geomorphic features created from solution chemical weathering.

Karst Topography : An irregular land surface in a limestone region. The principal features are depression (e.g. Dolines which sometimes contain thick soils which have been washed off the rest of the surfaces leaving them bare and rocky.) Drainage is usually by underground streams.

Karyogamy : Fusion in a cell of haploid (N) nuclei to form a diploid (2N).

Katabatic Wind : Any wind blowing down the slope of a mountain.

Kelvin Scale : Scale for measuring temperature. In this scale, absolute zero is 0

Kelvins, water boils at 373.15 Kelvins and freezes at 273.15 Kelvins.

Kettle : A steep-sided, bowl-shaped depression commonly without surface drainage; usually formed by a large detached block of stagnant ice that had been partially or wholly buried in the drift.

Kettle Hole : Depression found in glacial deposits. Created when a piece of ice from a retreating glacier becomes embedded in soft glacial till or glacial drift deposits. Many are filled with water to form a small lake or pond.

Kettle Moraine : An area of glaciofluvial influenced moraine deposits pitted with kames and kettle holes.

Keystone Species : Species that interacts with a large number of other species in a community. Because of the interactions, the removal of this species can cause widespread changes to community structure. Compare with immigrant species, indicator species, and native species.

Kick net : 500 micron white mesh net is designed to meet the requirements of groups performing USEPA Rapid Bioassessment Protocols for Benthic Invertebrates. (Benthic = bottom dwelling)

Kilocalorie (Kcal) : Unit of energy equal to 1,000 calories.

Kilopascal (kpa) : A unit measurements for quantifying force. Used to measure atmospheric pressure. Equivalent to 10,000 dynes per square centimeter.

Kilowatt (kw) : Unit of electrical power equal to 1,000 Watts.

Kinetic Energy : The energy due to motion.

Kingdom : Top most level of the common system used to classify life. Generally, five kingdoms are recognized: Monera, Protista, Fungi, Animalia, and Plantae.

Kirchoff's Law : This law suggests that good emitters of radiation are also good absorbers of radiation at specific electromagnetic radiation wavelength bands. It also suggests that poor emitters of radiation are also poor absorbers of radiation at specific wavelength bands.

Knickpoint (British spelling) : See nickpoint.

Kochia : Same family as tumbleweed and has the same characteristics.

Koch's Postulates : Set of laws formulated by Robert Koch to prove that an organism is the causal agent of disease.

Koch's Postulates : Set of laws formulated by Robert Koch to prove that an organism is the causal agent of disease.

Köppen Climate Classification : System that uses monthly precipitation and temperature data and total annual precipitation data to classify a location's climate into one of five main categories: Tropical Moist Climates; Dry Climates; Moist

Mid-latitude Climates with Mild Winters; Moist Mid-Latitude Climates with Cold Winters; and Polar Climates. These categories are further divided into number of subcategories. First developed in 1918 by German biologist W. Köppen, this system has undergone a number of modifications.

Krasnozem : A Great Soil Group (Stace *et al.*,1968). These soils are typically red, deep, well-structured, acid and porous soils. They have relatively high clay contents and tend to display a gradual increase in clay with depth.

Krasnozems : GSG classification—Deep, red strongly structured clays soils with clay content gradually increasing with depth and weak horizon differentiation.

Krebs Cycle : The oxidative process in respiration by which pyruvate (via acetyl coenzyme A) is completely decarboxylated to CO₂. The pathway yields 15 moles of ATP (150,000 calories).

Krotovina : See crotovina. OR An animal burrow filled with soil.

K-selected Species (Logistic Strategy) : Long-lived species that produces only a few, often fairly large progeny. Also see r-selected species.

Kstrategy : Ecological strategy where organisms rely on physiological adaptations to environmental resources for continued survival with the community. K strategists are usually stable and permanent members of the community.

Kurosolic : A Great Group description related to Hydrosols in the Australian Soil Classification. Refers to Hydrosols that have a clear or abrupt textural B horizon and the major part of the upper 20 cm of the B₂ horizon is strongly acid.

Kurosols : A Soil Order of the Australian Soil Classification (Isbell, 1996). These soils have a clear or abrupt textural change at the A/B boundary. The upper B₂ horizon is strongly acidic i.e. Less than 5.5 in water. OR ASC Soil Order classification—Soils with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B₂ horizon (or the major part of the entire B₂ horizon if less than 0.2 m thick) is strongly acid.

L

$$L^* = (LD - LU)$$

Where L^* is net longwave radiation at the surface,

LD is atmospheric counter-radiation (greenhouse effect) directed to the Earth's surface,

And LU is longwave radiation lost from the Earth's surface.

La Nina : Condition opposite of an El Nino. In a La Nina, the tropical Pacific trade winds become very strong and an abnormal accumulation of cold water occurs in the central and eastern Pacific Ocean.

Labile : Term applied to denote element that can be solubilized in a relatively short period of time. For instance, a labile nutrient is not directly available, but will be release relatively quickly. OR A measure of weak plasticity used in a consistence test.

Lactation : (Animal science, dairy science) the time between calving that a cow produces milk, usually 10 months.

Lacustrine : Pertaining to lakes. OR Material of lake bed origin. OR A geomorphic process whereby soil forming material is deposited in lakes.

Lacustrine Deposit : Materials deposited by lake waters.

Lacustrine deposit : Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised. OR Clastic sediment and chemical precipitates deposited in lakes.

Lacustrine deposit : Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lag phase : Period after inoculation of fresh growth medium during which population numbers do not increase.

Lagoon : (1) A body of seawater that is almost completely cut off from the ocean by a barrier beach.

(2) The body of seawater that is enclosed by an atoll.

OR A shallow stretch of salt or brackish water, partly or completely separated from a sea or lake by an offshore reef, barrier island, sandbank or spit (modified from Bates and Jackson, 1987).

Lagoon bottom : The nearly level or slightly undulating central portion of a submerged, low-energy, depositional estuarine basin (McGinn, 1982) characterized by relatively deep water (1.0 to >2.5 m). Compare - Bay Bottom.

Lagoon channel : A subaqueous, sinuous area within a lagoon that likely represents a relict channel (paleochannel, Wells et al., 1994) that is maintained by strong currents during tidal cycles (Short, 1975).

Lagoonal deposit : Sand, silt or clay-sized sediments transported and deposited by wind, currents, and storm washover in the relatively low-energy, brackish to saline, shallow waters of a lagoon. Compare - Estuarine Deposit, Marine Deposit.

Lahar : A very rapid type of downslope mass movement that involving mudflows from volcanic ash.

Lake : A man-made impoundment or natural body of fresh water of considerable size, whose open-water and deep-bottom zones (no light penetration to bottom) are large compared to the shallow-water (shoreline) zone, which has light penetration to its bottom.

Lake plain : A nearly level surface marking the floor of an extinct lake filled with well-sorted generally fine-textured sediments that are commonly stratified.

Lakebed : The flat to gently undulating ground underlain or composed of fine-grained sediment deposited in a former lake.

Lamallae : A thin (usually 1cm thick) discontinuous or continuous, generally horizontal layer of fine material (especially clay or iron oxide) that have been pedogenically concentrated (illuviated) within a coarser eluviated layer (sand).

Lamallae : A thin (usually 1cm thick) discontinuous or continuous, generally horizontal layer of fine material (especially clay or iron oxide) that have been pedogenically concentrated (illuviated) within a coarser eluviated layer (sand)

Lamb : (Animal science) a young sheep, less than one year old.

Lamella (plural, lamellae) : (i) A thin layer, platelike arrangement or membrane. (ii) Layers of protoplasmic membranes within the chloroplast that contain the photosynthetic pigments.

Lamella (plural, lamellae) : (i) A thin layer, platelike arrangement or membrane. (ii) Layers of protoplasmic membranes within the chloroplast that contain the photosynthetic pigments.

Laminae : Thin sedimentary layers which are generally <5 cm thick.

Laminar Flow : Movement of water within a stream that occurs as uninterrupted parallel flows. Laminar flow generally occurs in areas where friction is low.

Land application : The beneficial use of biosolids applied to land based upon crop needs and the composition of biosolids.

Land Breeze : Local thermal circulation pattern found at the interface between land and water. In this circulation system, surface winds blow from land to water during the night.

Land capability class : one of eight classes of land in the land capability classification of the USDA – Soil Conservation Service, distinguished according to the risk of land damage or the difficulty of land use.

Land Reclamation : The restoration of productivity to lands made barren through processes such as erosion, mining or land clearing.

Land treatment : The whole range of bmps implemented to control or reduce nonpoint source pollution.

Land use : The way land is developed and used in terms of the types of activities allowed (agriculture, residences, industries, etc.) And the size of buildings and structures permitted. Certain types of pollution problems are often associated with particular land uses, such as sedimentation from construction activities.

The influx of pollutants to a particular water body.

Land : In agriculture, the natural environmental, non-water, area of the Earth in which crops are grown.

Landfall : The coastline location where a tropical storm or hurricane moves from ocean onto land.

Landfill : Pleasant term for a garbage dump which is located in a cavity in the ground so that, when full, it may be covered up and look like part of the land. Today's landfills are sanitary and require special technology to eliminate methane gas and toxic leachate produced by the garbage

Landform : a discernible natural landscape, such as a floodplain, stream terrace, plateau, or alluvial fan. OR Any physical, recognizable form or feature on the earth's surface, having a characteristic shape and range in composition, and produced by natural causes.

Landgrant universities : State colleges and universities started from federal government grants of land to each state to encourage further practical education in agriculture, home economics, and the mechanical arts.

Landsat : Series of satellites launched by NASA for the purpose of remotely monitoring resources on the Earth. The first Landsat satellite was launched by the United States in 1972. Landsat uses two types of sensors to monitor the Earth: Thematic Mapper and Multispectral Scanner. See the following website for more information - Landsat Program.

Landslide : A general term for a mass movement landform and a process characterized by moderately rapid to rapid (greater than 30 cm per year)

downslope transport by means of gravitational stresses, of a mass of rock and regolith that may or may not be water saturated.

Landslide dam : An earthen dam created when a landslide completely blocks a stream or river.

Landslide hazard map : Hazard maps show the areal extent of threatening processes: where landslide processes have occurred in the past, where they occur now, and the likelihood in various areas that a landslide will occur in the future. Co survey, 1988

Landslide inventory maps : Inventories identify areas that appear to have failed by landslide processes, including debris flows and cut-and-fill failures. Co survey, 1988

Landslide or Landslip : The movement down the slope of a large mass of soil or rocks from a mountain or cliff. Often occurs after a torrential rain which soaks into the soil making it heavier and more mobile. Earthquakes and the undermining action of the sea are also causative agents.

Landslide risk map : The description of rocks, esp. In hand specimen and in outcrop, on the basis of such characteristics as color, mineralogic composition, and grain size show landslide hazards and the probability that they will occur, expressed in statistical recurrence rates; risk maps may show cost/benefit relationships, loss potential and other potential socio-economic impacts on an area and/or community.

Landslide susceptibility map : These maps go beyond an inventory map and depict areas that have the potential for landsliding. These areas are determined by correlating some of the principal factors that contribute to landsliding, such as steep slopes, weak geologic units that lose strength when saturated, and poorly drained rock or soil, with the past distribution of landslides. Co survey, 1988.

Landward : Positioned or located away from a water body but towards the land.

Langelier Index (LI) : An index reflecting the equilibrium pH of a water with respect to calcium and alkalinity: used in stabilizing water to control both corrosion and scale deposition.

Langley : Unit of the intensity of radiation measured per minute and equal to one calorie.

Lapidary : Lapidary - The art of cutting gemstones.

Large stones (in tables) . : Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Late blight : Occurs in potatoes. This was the causal agent of the irish potato famine. A soil-borne foliar disease that can also infect potato tubers. Infected plants die.

Latent Heat : Is the energy required to change a substance to a higher state of matter (solid > liquid > gas). This same energy is released from the substance when the change of state is reversed (gas > liquid > solid).

Latent Heat Flux : Latent heat flux is the global movement of latent heat energy through circulations of air and water. Atmospheric circulation moves latent heat energy vertically and horizontally to cooler locations where it is condensed as rain or is deposited as snow releasing the heat energy stored within it.

Latent Heat of Condensation : The amount of heat energy release to the environment when a gas changes its state to a liquid. For one gram of water, the amount of heat energy released is 540 calories at a temperature of 100° Celsius.

Latent Heat of Vaporization : The amount of heat energy required from the environment to change the state of a liquid to a gas. For one gram of water, the amount of heat energy required is 540 calories at a temperature of 100° Celsius.

Lateral Moraine : Moraine that is found along the sides of a glacier. Commonly found on glaciers that occupy a valley.

Lateral Persistence : Lateral Persistence - A stratigraphic unit that is traceable over a broad geographic area.

Laterite : Hard subsurface deposit of oxides of aluminum and iron found in tropical soils where the water table fluctuates with seasonal changes in precipitation.

Lateritic podsol : Great Soil Group Classification, (Stace *et al.*, 1968). These soils are strongly leached with a strong texture contrast between thick sandy A horizons and mottled yellow-brown and red clay B horizons. Nodular pisolitic (secondary concretion generally of a greater length to width ratio e.g. Bullet shape.) Or massive ironstone occurs at the base of the bleached A₂ horizon and in the upper B₂ horizon. The pH trend is acid throughout the profile.

Lateritic podzolic soils : GSG classification—Strong texture contrast with thick, sandy A horizons overlying mottled yellow-brown and red clay B horizons, an horizon of nodular pisolitic, or massive ironstone in the base of the A₂ and upper B horizon, a thick zone of coarsely mottled white, red and yellow clay below the B horizon grading into dominantly white clay above the kaolinised parent rock, and acid reaction throughout the profile.

Laterization : Soil forming process that creates a laterite layer.

Latin binomial : See **binomial nomenclature**.

Latitude : Latitude is a north-south measurement of position on the Earth. It is defined by the angle measured from a horizontal plane located at the Earth's center that is perpendicular to the polar axis. A line connecting all places of the same latitude is termed a parallel. Latitude is measured in degrees, minutes, and seconds. Measurements of latitude range from equator (0°) to 90° North and

South from this point.

Latosol : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. This soil is characterized by a thin O horizon, the presence of a laterite layer, and a deeply weathered profile.

Lattice Structure : The orderly arrangement of atoms in crystalline material.

Laurasia : Northern section of Pangaea.

Lava : Molten magma released from a volcanic vent or fissure.

Lava Flow : Stream of lava flowing from a volcanic vent.

Law of Basin Areas : Morphometric relationship observed in the mean basin area size of stream segments of a particular classification order in stream channel branching. Proposed by R.E. Horton.

Law of Conservation of Energy : This law states that energy can be transferred from one system to another in many forms, however, it can not be created nor destroyed. Thus, the total amount of energy available in the universe is constant.

Law of Stream Lengths : Morphometric relationship observed in the cumulative size of stream segment lengths in stream channel branching. Proposed by R.E. Horton.

Law of Stream Number : Morphometric relationship observed in the number of stream segments of a particular classification order in stream channel branching. Proposed by R.E. Horton.

Law of the Minimum : This biological law suggests that organisms are normally limited by only one single physical factor that is in shortest supply relative to demand.

Lc50 : The concentration of a toxicant or percentage dilution of an effluent that is predicted to be lethal to 50% of a test population of organisms.

LDC : See less developed country.

Leachate : Water that contains solute substances, so that it contains certain substances in solution after percolation through a filter or soil. OR Solution containing material leached from a soil.

Leachate : Liquid "run-off". Leachate from the compost pile contains nutrients generated in the composting process. In contrast, as groundwater and rain flow through a landfill, they pick up weak acids created by decaying organic matter. As these acids react with other garbage, the leachate can become toxic which may contaminate streams and groundwater unless the landfill is properly constructed to contain the run-off.

Leaching : (i) Removal of valuable metals from ores by microbial action. (ii) The

removal of materials in solution from the soil. OR The washing out of material from the soil, both in solution and suspension.

Leaf Drip : The rain water that fall to the ground surface from plant leaves after it has been intercepted by these structures.

Leafy spurge : Perennial with very deep roots. Contains a milky sap that is irritating and poisonous to some animals. Crowds out native plants in grasslands, meadows, and stream banks. Potentially a big problem since it reduces plant diversity in native areas.

Lectins : Plant proteins with a high affinity for specific sugar residues.

Lee : Side of a slope that is opposite to the direction of flow of ice, wind, or water. Opposite of stoss.

Leeward : Downwind side of an elevated area like a mountain. Opposite of windward.

Leghemoglobin : Ironcontaining, red pigment(s) produced in root nodules during the symbiotic association between rhizobia and leguminous plants. The pigment is similar but not identical to mammalian hemoglobin.

Legume : Angiosperm plant species that is a member of the Fabaceae (Pea or Bean) family. These plants form symbiotic relationships with specific bacteria species for the purpose of acquiring nitrogen for growth.

Legume : (Crop science) a family of plants, including many valuable food and forage species, such as peas, beans, soybeans, peanuts, clovers, and alfalfas. They can convert nitrogen from the air to build up nitrogen in the soil. OR A plant of the family Fabaceae (Leguminosae), usually associated with nitrogen fixation.

Lenticular : Lens-shaped soil peds.

Lenticular structure : Soil particles that are arranged around an elliptical or circular plane and are bounded by curved faces i.e. Lens shaped. This structure often occurs in subsoils of Vertosols and can be associated with slickenside development.

Lentil : Lentil - A lens-shaped mass of rock occurring within the strata of some different material.

Less Developed Country (LDC) : Country characterized by minimal industrialization, low technological development, low per capita income, and high population growth rates. Many of these countries are found in Asia, Africa, and Central and South America. Also see more developed country.

Levee : Ridge of coarse deposits found alongside the stream channels and elevated above the floodplain. Forms from the deposition of sediment during floods.

Leveraging nature : To increase or multiply the vigor or benefit of already existing forces in nature to our advantage.

Liana : Species of plant that uses the support of wood plants to elevate its leaves above the forest canopy.

Lichen : Organism that consists of a symbiotic joining of a species of fungi and a species of algae. OR Fungus and an alga or a cyanobacterium living in symbiotic association.

LIDAR (Light Detection and Ranging, also known as Airborne Laser Swath Mapping or ALSM) - : A technology that employs an airborne scanning laser rangefinder to produce detailed and accurate topographic surveys. Lidar can be used to accurately measure the topography of the ground, even where overlying vegetation is quite dense. (see puget sound lidar consortium)

Ligand : Molecule, ion, or group bound to the central atom in a chelate or a coordination compound.

Ligand : Molecule, ion, or group bound to the central atom in a chelate or a coordination compound.

Light : A humanly visible form of electromagnetic radiation. This radiation has a wavelength between 0.40 and 0.71 micrometers (μm).

Light compensation point : Where the rate of photosynthesis is lower than the rate of respiration - usually about 1% of the light intensity of sunlight

Light Non-aqueous Phase Liquid : Light Non-aqueous Phase Liquid - A contaminant that floats on the top of the saturated zone as an isolated layer.

Light Soil (obsolete) : A soil which has a coarse texture and is easily cultivated.

Light soil : The opposite of heavy soil referring to soils that are easy to till. These soils are composed of relatively large particles loosely packed together. The term is applied to sandy soil.

Light Year : Distance that light travels in the vacuum of space in one year. Approximately 9.7 trillion kilometers.

Lightning : Visible discharge of electricity created by thunderstorms.

Lignin : The component of wood responsible for its rigidity.

Lignin : A hard-to-degrade compound that is part of the structure of older or woody plants. The carbon rings in lignin can be degraded by a few fungi.

Lignite : Lignite - A brownish-black coal intermediate between peat and subbituminous in the transformation of plant debris into coal.

Lignite : Low grade coal. Also called brown coal.

Lime : Compounds of calcium used to correct the acidity of soils.

Lime requirement : The amount of lime that is required to raise the ph of an area

of land or mass of soil to a desired value, usually between pH 6 and 7. The limestone required is that to correct the active acidity and reserve acidity.

Lime, agricultural : Soil amendment containing calcium carbonate, magnesium carbonate or other materials to neutralize soil acidity and furnish calcium or magnesium or both for plant growth.

Lime : A material composed of carbonates, oxides, or hydroxides of calcium, magnesium, or both and used to neutralize soil acidity. Commonly, agricultural limestone or mixtures of calcium and magnesium carbonates.

Limestone : Sedimentary rock composed of carbonate minerals, especially calcium carbonate. Limestone can be created by clastic and non-clastic processes. Clastic limestones are formed from the break up and deposition of shells, coral and other marine organisms by wave-action and ocean currents. Non-clastic limestones can be formed either as a precipitate or by the lithification of coral reefs, marine organism shells, or marine organism skeletons. OR Limestone - A sedimentary rock consisting of 50 percent or more calcium carbonate, principally as calcite.

Limestone : A sedimentary rock consisting chiefly of calcium carbonate, primarily in the form of calcite

Limiting Factor : Abiotic condition that most controls the growth of a species. For most terrestrial plants this condition is the supply of the nutrient nitrogen in the soil.

Limnology : The study of the physical, chemical, hydrological, and biological aspects of fresh water or fresh water systems such as lakes and streams.

Limonite : Limonite - A brown, usually earthy hydrated oxide of iron, $2\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$.

Lipid : Is an organic compound composed of carbon atoms that have two hydrogen atoms attached. Lipids are commonly known as fats and oils, and belong to the family of molecules known as hydrocarbons.

Lipids : A generic term for all fats, oils and related fatty compounds.

Lipophilic : Having an affinity for fat.

Lipopolysaccharide (LPS) : Complex lipid structure containing unusual sugars and fatty acids found in many Gramnegative bacteria.

Liquefaction : Temporary transformation of a soil mass of soil or sediment into a fluid mass. Occurs when the cohesion of particles in the soil or sediment is lost. Often triggered by seismic waves from an earthquake. For this condition to take place the pore spaces between soil particles must be at or near saturation.

Liquid : A state of matter where molecules have the ability to flow and the surface of this mass displays the property of surface tension.

Liquid limit : in engineering, the water percentage between a soil's defined liquid and plastic states (consistence).

Liquid limit : . The moisture content at which the soil passes from a plastic to a liquid state.

Lithic : Refers to soils in which the B Horizon directly overlies hard rock. This term is used to describe Tenosols, Calcarosols, Organosols and Rudosols in the Australian Soil Classification (Isbell, 1996).

Lithification : Lithification - The conversion of newly deposited, unconsolidated sediment into a solid, coherent rock by such processes as compaction and cementation or crystallization of minerals, also lithification. OR Process by which sediments are consolidated into sedimentary rock.

Lithocalcic : Describes soils with a calcareous horizon containing more than 50% of hard calcrete fragments and/or carbonate nodules or concretions and/or carbonate-coated gravel. It is used to describe Calcarosols, Chromosols, Dermosols, Kandosols and Sodosols using the Australian Soil Classification (Isbell, 1996).

Lithologic : Lithologic - Pertaining to lithology.

Lithologic Boundary : Lithologic Boundary - A boundary in any stratigraphic section that may be sharp and easily recognized, indicating a pause in sedimentation, or that may be gradational and somewhat arbitrary, indicating continuous sedimentation.

Lithology : Lithology - The physical character of a rock formation described in terms of its structure, texture, color, and mineral composition.

Lithosols GSG classification : A shallow soil showing minimal profile development and dominated by the presence of weathering rock and rock fragments. Lacking horizons other than an A₁ (one layer only).

Lithosphere : Is the solid inorganic portion of the Earth (composed of rocks, minerals, and elements). It can be regarded as the outer surface and interior of the solid Earth. OR The outer layer of soil and rock on a planet is called the "lithosphere" after the Greek word "lithos" meaning "stone".

Lithotroph : Organism that uses an inorganic substrate such as ammonia or hydrogen as an electron donor in energy metabolism. There are two types of lithotrophs: chemolithotroph and photolithotroph.

Litter : Accumulation of leaves, twigs and other forms of organic matter on the soil surface. In most soils, the surface layer of litter is at various stages of decomposition.

Litterfall : Movement of leaves, twigs and other forms of organic matter from the biosphere to the litter layer found in soil.

Little Climatic Optimum : Time period from 900 - 1200 AD. Warmest period since the Climatic Optimum.

Little Ice Age : Time period from 1550 to 1850 AD. During this period, global temperatures were at their coldest since the beginning of the Holocene.

Littoral Drift : The sediment that is transported by waves and currents through beach drift and longshore drift along coastal areas.

Littoral Transport : The process of sediment moving along a coastline. This process has two components: longshore transport and onshore-offshore transport.

Littoral Zone : The zone along a coastline that is between the high and low-water spring tide marks.

Liverworts : Small non-vascular plants.

Lluviaion : The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Illuviaion : The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

LNAPL : See NAPL

Loading : Amount of a substance entering the environment (soil, water, or air).

Loading Rate : Measure of application amount, based on nutrients, trace metals or total mass of material.

Loam : soil material that is 7% to 27% clay, 28%-50% silt, and less than 52% sand.

Loam : A soil that contains a roughly equal mixture of clay, sand, and silt. Good for growing most crops. OR Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles. OR A medium, textured soil of approximate composition 10 - 25% clay, 25 - 50% silt and <50% sand.

Lobe : A tongue-like extension of some material. For example, the ice lobe of an alpine glacier.

Location : A term used in geography that deals with the relative and absolute spatial position of natural and human-made phenomena.

Locoweed : Mostly perennial plant from the legume family. Occurs mostly on rangeland and is poisonous to livestock.

Lodging : The collapse of top heavy plants, particularly grain crops because of excess growth or beating by rain.

Loess : An aeolian deposit composed mainly of silt which originated in arid regions, from glacial outwash or from alluvium. It is usually of yellowish brown color and has a widely varying calcium carbonate content. In the USSR, loess is regarded as having been deposited by water.

Log growth : A growth phase in which cell production is maximum.

Logarithmic Scale : Measurement scale based on logarithms. Values increase on this scale exponentially.

Long Wave : A large wave in the polar jet stream and the westerlies that extends from the middle to the upper troposphere. Often associated with the formation of a mid-latitude cyclone at the ground surface. Contrasts with short waves. Also called Rossby waves.

Longitude : Longitude is a west-east measurement of position on the Earth. It is defined by the angle measured from a vertical plane running through the polar axis and the prime meridian. A line connecting all places of the same longitude is termed a meridian. Longitude is measured in degrees, minutes, and seconds. Measurements of longitude range from prime meridian (0°) to 180° West and East from this point.

Longshore bar : A narrow, elongate, coarse-textured ridge that once rose near to, or barely above, a pluvial or glacial lake and extending generally parallel to the shore.

Longshore Bar [relict] : A narrow, elongate, coarse-textured ridge that once rose near to, or barely above, a pluvial or glacial lake and extended generally parallel to the shore but was separated from it by an intervening trough or lagoon; both the bar and lagoon are now relict features. (Jackson, 1997).

Longshore Current : A water current that moves parallel to the shoreline.

Longshore Drift : The movement and deposition of coastal sediments because of longshore currents.

Longshore Transport : The transport of sediment in water parallel to a shoreline.

Longwave Radiation : See infrared radiation.

Lophophore : Lophophore - The feeding mechanism of a brachiopod, capable of extracting suspended microorganisms from water.

Lophotrichous : Having a tuft of polar flagella.

Losing Stream (Influent Stream) : Losing Stream (Influent Stream) - Stream or portion of a stream that discharges water into the groundwater.

Lovelock, James E. : British scientist and naturalist who is most famous for his development of the Gaia Hypothesis. This theory suggests that life on the Earth functions like super-organism regulating its environment through biological

interactions that influence the atmosphere, lithosphere, and hydrosphere.

Low Permeability Layers : Low Permeability Layers - Includes soil, sediment or other geologic material that inhibit water movement. These layers may serve as a base material, or confining beds for an aquifer. The Pierre Shale serves as the base of many aquifers in Nebraska.

Low Pressure : An area of atmospheric pressure within the Earth's atmosphere that is below average. If this system is on the Earth's surface and contains circular wind flow and enclosed isobars it is called a cyclone.

Low strength. : The soil is not strong enough to support loads.

Lower Mantle : Layer of the Earth's interior extending from 670 to 2,900 kilometers below the surface crust. Composed of ultramafic rock. This layer is hot and plastic and part of the mantle layer.

Lower order stream : Streams close to source; none to few tributaries.

Lowmoor bog : A bog that is at or only slightly above the water table, on which it depends for accumulation and preservation of peat (chiefly the remains of sedges, reeds, shrubs, and various mosses). Compare - highmoor bog, raised bog.

Lowstand. : The lowest elevation reached by the ocean during a glacial period.

Luminescence : Production of light.

Lunettes : Crescent shaped aeolian deposits of fine sediment located on the eastern (or lee) side of lake beds or playas in semi-arid areas of southern Australia.

Lungfish : Lungfish - A fish of the order Dipneusti or Cladistia that breathes by a modified lunglike air bladder, as well as with gills.

Luvisol Soil : Soil order (type) of the Canadian System of Soil Classification. This soil type is associated with forest vegetation. The most identifying traits of this soil is the presence of calcareous parent material which results in a high pH and strong eluviation of clay from the A horizon.

Luxury consumption. : The absorption by plants of more nutrients than the plant needs, but without the expression of any symptoms of toxicity from the nutrients.

Luxury uptake : The absorption by plants of nutrients in excess of their need for growth. Luxury contents accumulated during early growth may be used for later growth.

Luxury uptake : The absorption by plants of nutrients in excess of their need for growth. Luxury contents accumulated during early growth may be used for later growth.

Lyophilization, Lyophilize : Freeze-drying, (sometimes spelled incorrectly as

liophilization)

Lysimeter : Apparatus installed in the soil for measuring percolation and leaching.

Lysing : A disintegration or breakdown of cells which releases organic matter.

Lysis : Rupture of a cell, resulting in loss of cell contents.

Lysogeny : An association where a prokaryote contains a prophage and the virus genome is replicated in synchrony with the host chromosome.

Lysogeny : An association where a prokaryote contains a prophage and the virus genome is replicated in synchrony with the host chromosome.

Lysosome : Cell organelle containing digestive enzymes.

M

M : Microorganisms - small organisms which require a microscope to be seen. M represents the SS in the mixed liquor and is part of the F/M ratio.

Maar : Volcanic crater (often deep) with little relative relief to the surrounding landscape, which may or may not be filled with a lake. Named after formations in the Eifel district of Germany. Maar volcanoes result from explosions occurring when hot magma rises into rocks near the surface which contain substantial groundwater. This produces high pressure steam which blasts the magma and surrounding rocks into clouds of small particles. These particles deposit on the ground to form rings of ash or tuff around a wide shallow crater. About 40 maar volcanoes with surrounding tuff rings occur in Victoria's Western volcanic plains (Birch 1994).

Lake Bullen Merri near Camperdown is a good example of a maar crater. It is surrounded by a prominent tuff ring.

MacConkey Streak : Laboratory test for the presence of gram negative bacteria. We use this test to detect contamination of Bacillus products such as CF 1000, 1002, 4002 and some of the Enz-Odor® products.

Macroelement : Elements such as nitrogen that are needed in large amounts for plant growth. Nutritive elements needed in large quantities to ensure normal plant development (N,P,K, S, Mg, Ca, Fe).

Macrofauna : Soil animals that are > 1000 micrometers in length (e.g., vertebrates, earthworms, and large arthropods).

Macroinvertebrate Loading : Any nonvertebrate organism that is large enough to be seen without the aid of a microscope.

Macromolecule : Large molecule formed from the connection of a number of small molecules.

Macronutrient : A substance required in large amounts for growth, usually attaining a concentration of > 500 mg kg⁻¹ in mature plants. Usually refers to N, P, K, Ca, Mg, and S.

Macronutrient : A substance required in large amounts for growth, usually attaining a concentration of > 500 mg kg⁻¹ in mature plants. Usually refers to N, P, K, Ca, Mg, and S.

Macronutrient : Nutritional element required by an organism in relatively large quantities. OR A plant nutrient that is present in plant biomass in relatively high concentrations. Carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur. The latter six are called soil-derived macronutrients.

Macroorganism : Living organisms in the soil which are large enough to be seen with the naked eye. Includes mite, millipede centipede, snail, slug, spider, ant, beetle, cut worm, earthworm, rodent.

Macrophytes : Multi-celled plants that grow in or near water. Generally, macrophytes are beneficial to lakes and ponds because they produce oxygen and provide habitat for aquatic invertebrates and fish. However, overabundance of such plants, especially problem species (e.g., curlyleaf pondweed) is related to shallow water depth and high levels of nutrients, such as phosphorus.

Macropore : Larger soil pores, generally having a minimum diameter between 30 and 100 micrometers, from which water drains readily by gravity.

Macropores : Pores >100 μ m in diameter. OR Spaces in soil fabric, generally <2 mm in diameter.

Mafic Magma : Magma that is relative poor in silica but rich in calcium, magnesium, and iron content. This type of magma solidifies to form rocks relatively rich in calcium, magnesium, and iron but poor in silica.

Magma : Magma - Naturally occurring molten or partially molten rock material, generated within the Earth. OR Molten rock originating from the Earth's interior.

Magma Plume : A rising vertical mass of magma originating from the mantle.

Magmatic : Magmatic - Pertaining to magma, the melt that forms igneous rocks before it reaches the surface of the earth; afterwards, it is called lava.

Magnesian : Soils with an exchangeable Ca/Mg ratio of less than 0.1 in the major part of the B2 Horizon. This term is used as a definition within a number of Soil Orders in the Australian Soil Classification (Isbell, 1996). These soils can often be strongly weathered.

Magnetic Declination : The horizontal angle between true north and magnetic north or true south and magnetic south.

Magnetic Field : The space influence by magnetic force. The Earth's magnetic field is believed to be generated by the planet's core.

Magnetic North : See North Magnetic Pole.

Magnetic Reversal : A change in the polarity of the Earth's magnetic field. In the past 4 million years there have been nine reversals.

Magnetic South : See South Magnetic Pole.

Magnetite : Magnetite - Iron sesquioxide, $\text{FeO} \cdot \text{Fe}_2\text{O}_3$, magnetic iron ore.

Magnetosome : Small particle of Fe_3O_4 present in cells that exhibit magnetotaxis

Magnetosphere : Zone that surrounds the Earth that is influenced by the Earth's magnetic field.

Magnetotactic bacteria : Bacteria that can orient themselves in the earth's magnetic field due to the presence of magnetosomes.

Magnitude : (1) The quantifiable size of a natural event.

(2) A quantitative measure of the size of an earthquake using the Richter scale.

Mainland cove : A subaqueous area adjacent to the mainland or a submerged mainland beach that forms a cove or embayment within the larger basin. Compare - Cove, Barrier Cove.

Mammal : Group of warm blooded vertebrate animals. Common characteristics found in these organisms include: hair, milk secretion, diaphragm for respiration, lower jaw composed of a single pair of bones, middle ear containing three bones, and presence of only a left systemic arch.

Management BMPs : Bmps that primarily involve a change in management practices, such as changing the timing, method, and/or amount of the application of a potential pollutant in order to reduce the chance that it will contaminate water resources.

Mangan. : A thin coating of manganese oxide (cutan) on the surface of a sand grain, pebble, soil aggregate, or ped. Mangans also line pores or root channels and bridge sand grains.

Manganic : A horizon with a minimum thickness of 0.1 m that contains 20% or more (by weight or visual estimate) of black manganiferous nodules or concretions which are generally uncemented. Most nodules contain some iron. This term is used as a Subgroup definition for a number of Orders in the Australian Soil Classification (Isbell, 1996).

Manganic horizon : One which contains more than 20% (visual abundance estimate) of black manganiferous nodules or concretions which are mostly uncemented, and has a thickness of 0.1m. Most nodules also contain some iron.

Mangans : Cutans composed of manganese oxides.

Mangrove : Treed wetlands located on the coastlines in warm tropical climates.

Mangrove Swamp : A dense jungle of mangrove trees which have the special adaptation of extending from their branches long arching roots which act as anchors and form an almost impenetrable tangle. They occur in tropical and subtropical areas, particularly near the mouths of rivers.

Mantle : Mantle - A general term for an outer covering of earth material. OR Layer of the Earth's interior composed of mostly solid rock that extends from the base of crust to a depth of about 2,900 kilometers.

Manure : Excreta of animals, with or without an admixture of bedding or litter, fresh or at various stages of decomposition or composting. In some countries the term may denote any fertilizer material. OR Animal excreta with or without a mixture of bedding or litter.

Map : An abstraction of the real world that is used to depict, analyze, store, and communicate spatially organized information about physical and cultural phenomena.

Map Projection : Cartographic process used to represent the Earth's three-dimensional surface onto a two-dimension map. This process creates some type of distortion artifact on the map.

Map scale : Relationship between a certain distance on the map and the corresponding distance on the ground (e.g. 1:10,000, which means 1 cm on the map equals to 10,000 cm or 100 m on the ground); the scale is usually located in the legend box of a map.

Marble : Metamorphic rock created by the recrystallization of calcite and/or dolomite.

Marcasite : Marcasite - A popular term used in the gemstone trade to designate any of several minerals with a metallic luster (especially crystallized pyrite, as used in jewelry) and also polished steel and white metal.

Marine : With reference to ocean environments and processes.

Marine Debris : The human litter that is found in the marine environment.

Marine deposit : Sediments (predominantly sands, silts and clays) of marine origin; laid down in the waters of an ocean. Compare - Estuarine Deposit, Lagoonal Deposit. (Schoeneberger and Wysocki, 2002).

Marine terrace : A constructional coastal strip, sloping gently seaward, veneered by marine deposits (typically silt, sand, fine gravel). Compare - Terrace, Wave-built Terrace. (Jackson, 1997).

Maritime Effect : The effect that large ocean bodies have on the climate of locations or regions. This effect results in a lower range in surface air temperature at both daily and annual scales. Also see Continental Effect.

Maritime Polar Air Mass (mp) : Air mass that forms over extensive ocean areas of the middle to high latitudes. Around North America, these system form over the Gulf of Mexico and the eastern tropical Pacific. Maritime Polar air masses are mild and humid in summer and cool and humid in winter. In the Northern Hemisphere, maritime polar air masses are normally unstable during the winter.

In the summer, atmospheric stability depends on the position of the air mass relative to a continent. Around North America, Maritime Polar air masses found over the Atlantic are stable in summer, while Pacific systems tend to be unstable.

Maritime Tropical Air Mass (mt) : Air mass that forms over extensive ocean areas of the low latitudes. Around North America, these system form over the Gulf of Mexico and the eastern tropical Pacific. Maritime Tropical air masses are warm and humid in both winter and summer. In the Northern Hemisphere, maritime tropical air masses can normally stable during the whole year if they have form just west of a continent. If they form just east of a continent, these air masses will be unstable in both winter and summer.

Marl : Marl - Impure calcium carbonate, usually white to light gray, typically precipitated in freshwater lakes and ponds, largely through the chemical action of aquatic plants; also called bog lime.

Marsh : A transition zone between water and land usually covered by grass.

Masking agent : Substance used to cover up or disguise unpleasant odors. Liquid masking agents are dripped into wastewater, sprayed into the air, or evaporated (using heat) with the unpleasant fumes or odors and then discharged into the air by blowers to make an undesirable odor less noticeable.

Mass : Refers to the amount of material found in an object (usually of unit volume).

Mass Balance : The relative balance between the input and output of material within a system.

Mass Extinction : A catastrophic, widespread perturbation where major groups of species become extinct in a relatively short time compared to normal background extinctions.

Mass flow (nutrient) : Movement of solutes associated with net movement of water.

Mass movement : Dislodgement and downslope transport of soil and rock material as a unit under direct gravitational stress; includes slow displacements, such as creep and solifluction, and rapid movements such as landslides, rock slides, earthflows, debris flows and avalanches; water, ice and to a lesser extent air usually play an important role in the process.

Mass Movement : General term that describes the downslope movement of sediment, soil, and rock material.

Mass Number : Total number of neutrons and protons in the nucleus of an atom. Approximate measure of the mass of an atom. Also see atomic number.

Mass Wasting : General term that describes the downslope movement of sediment, soil, and rock material.

Massive : This term applies to soil horizons greater than 6 mm in thickness, that appear to be coherent or solid and devoid of peds. When displaced, the soil separates into fragments which may be crushed into individual particles. OR The condition of a soil layer in which the layer appears as a coherent or solid mass largely devoid of peds.

Mastitis : (Dairy science) an infection and inflammation of the udder in cows.

Matric Force : Force that holds soil water from 0.0002 to 0.06 millimeters from the surface of soil particles. This force is due to two processes: soil particle surface molecular attraction (adhesion and absorption) to water and the cohesion that water molecules have to each other. This force declines in strength with distance from the soil particle. The force becomes nonexistent past 0.06 millimeters.

Matric potential : Portion of the total soil water potential due to the attractive forces between water and soil solids as represented through adsorption and capillarity.

Matric potential : the amount of work an infinitesimal quantity of water in the soil can do as it moves from the soil to a pool of free water of the same composition and at the same location. This work is less than zero, or negative work, thus reported in negative values. Matric potential nearly equals water potential in nonsalty soils.

Matrix : The fine Material (generally <2mm) forming a continuous phase and enclosing coarser material and/or pores. OR Matrix - The natural material in which a fossil is embedded; also, the finer grained material filling the spaces between larger grains of a sediment or sedimentary rock. OR The smaller grainsize material, typically a cementing agent within a soil or rock in which larger particles are embedded.

Matter : Is the material (atoms and molecules) that constructs things on the Earth and in the Universe.

Mature Soil : A well developed soil usually with clearly defined horizonation.

Maturity : The degree to which a biomass sample is free of organic phytotoxic substances

Maunder Minimum : Period from 1645 to 1715 during which the sun had very little sunspot activity.

Maximum Contaminant Level (MCL) : The maximum level of a contaminant allowed in water by federal law.

Maximum Contaminant Level Goals (MCLGs) : Maximum Contaminant Level Goals (MCLGs) - Public drinking water standards that serve as nonenforceable goals for selected contaminants in drinking water that pose no health risk to people over a lifetime of exposure. A MCLG is a suggested level set by EPA for

water utilities.

Maximum Contaminant Levels (MCLs) : Maximum Contaminant Levels (MCLs) - Legally enforceable drinking water standards required by the Safe Drinking Water Act.

MCRT : Mean Cell Retention Time - days. An expression of the average time that a microorganism will spend in an activated sludge process.

MDC : See more developed country.

Mean : Statistical measure of central tendency in a set of data. The mean is calculated by adding all of the data values and dividing this quantity by the total number of data values.

Mean Sea-Level : The average height of the ocean surface as determined from the mean of all tidal levels recorded at hourly intervals.

Mean Solar Day : Time it takes to complete one Earth rotation relative to the position of the sun (for example, from midnight to midnight). This measurement takes 24 hours and is longer than a sidereal day because it includes the effect of the Earth's movement (Earth revolution) around the sun.

Meander : Meander - About 245 to 65 million years ago. Also the rocks formed during this time. OR Sinuous shaped stream channel. Usually found in streams flowing over a very shallow elevation grade.

Mechanical aeration : The use of machinery to mix air and water so that oxygen can be absorbed into the water. Some examples are paddle wheels, mixers, rotating brushes to agitate the surface of an aeration tank; pumps to create fountains; and pumps to discharge water down a series of steps forming falls or cascades.

Mechanical analysis. : A process by which soil separates, sand, silt, and clay, are measured quantitatively by weight.

Mechanical weathering - : The physical processes by which rocks exposed to the weather change in character, decay, and crumble into soil. Processes include temperature change (expansion and shrinkage), freeze-thaw cycle, and the burrowing activity of animals. Co landslide mitigation plan

Media : The material in the trickling filter on which slime accumulates and organisms grow. As settled wastewater trickles over the media, organisms in the slime remove certain types of wastes thereby partially treating the wastewater. Also the material in a rotating biological contactor (RBC) or in a gravity or pressure filter.

Medial Moraine : Deposit of material found down the center of a glacier. Created when two glacier and their lateral moraines merge.

Median : Statistical measure of central tendency in a set of data. The median is

the value halfway through a data set where the values have been ordered from lowest to highest. In an even data set, the median is the average of the two halfway values.

Medicinal : A plant with health-promoting or curative properties, providing symptomatic relief or affecting physiological functions.

Mediterranean Scrubland : See chaparral.

Medium (plural, media) : Any liquid or solid material prepared for the growth, maintenance, or storage of microorganisms.

Medium textured soil : Very fine sandy loam, loam, silt loam, or silt.

Medium-size water system : A water system that serves 3,300 to 50,000 customers.

Megacyclothem : Megacyclothem - A cycle of cyclothem.

Megaxenolith : Large rock fragments from a different type of rock that are imbedded in a granitic rock.

Meiosis : In eukaryotes, reduction division, the process by which the change from diploid to haploid occurs. OR In eukaryotes, reduction division, the process by which the change from diploid to haploid occurs.

MEK : Methyl ethyl ketone.

Melacic : These soils are similar to Melanic but the ph (15 water) is less than 5.5 and there is no structure requirement. It is a subgroup of the Australian Soil Classification (Isbell, 1996).

Melacic horizon : Same as melanic horizon but ph is less than 5.5 and there is no structure requirement.

Melanic : These soils have either a dark coloured (i.e. Munsell (1992) colour value 3 or less and chroma 2 or less) surface or near surface horizon that has insufficient organic carbon to qualify as a humose horizon, with little or no evidence of stratification (layers). It is used as a Subgroup definition for a number of Orders in the Australian Soil Classification (Isbell, 1996).

Melanic horizon : Dark surface (black when moist) of near-surface horizon that has insufficient organic carbon to qualify as a humose horizon and has little, if any, evidence of stratification. Ph is greater than 5.5.

Melting : The physical process of a solid becoming a liquid. For water, this process requires approximately 80 calories of heat energy for each gram converted.

Melting : The phase change of ice into liquid water.

Meltwater : Water produced from the melting of snow and/or glacial ice.

Member : Member - A lithologic unit subordinate to and comprising a specifically

developed part of a formation.

Membrane : A thin barrier that allows some compounds or liquids to pass through, and stops others. Membranes are commonly used to separate substances by organisms and by man. This takes energy, in water treatment it requires about 90lbs psi which results in the high costs associated with R.O. desanitation.

Mercalli Scale : A scale for rating the power of an earthquake.

Mercaptans : Compounds containing sulfur which have an extremely offensive skunk-like odor. Also sometimes described as smelling like garlic or onions.

Mercator Projection : Map projection system that presents true compass direction. Distortion is manifested in terms of area. Area distortion makes continents in the middle and high latitudes seem larger than they should be. Specifically designed for nautical navigation.

Mercury Barometer : Type of barometer that measures changes in atmospheric pressure by the height of a column of mercury in a U-shaped tube which has one end sealed and the other end immersed in an open container of mercury. The force of the pressure exerted by the atmosphere on the mercury in the open container pushes mercury up the other end of the tube. The height of this level is then used as a measure of atmospheric pressure relative to the surface level of the mercury in the container.

Meridian : A circular arc that meets at the poles and connects all places of the same longitude.

Meridional : Movement of wind or ocean waters in a direction that is roughly perpendicular to the lines of latitude.

Meridional Transport : Transport of atmospheric and oceanic energy from the equator to the poles.

Meristem : The region of active cell-division in plants. The cells so formed then become modified to form the various tissues such as the epidermis and cortex.

Meromictic : Lakes do not exhibit mixing of layers and the layers are usually renamed to MONOLIMNION (similar to the hypolimnion) and MIXOLIMNION (similar to the epilimnion) with the dividing zone being the CHEMOLIMNION containing the CHEMOCLINE

Merostome : Merostome - Member of the class Merostomata, primitive aquatic arthropods that breathe through gills and have seven pairs of locomotory and feeding appendages, includes horseshoe crabs and eurypterids.

Mesa : A flat topped hill that rises sharply above the surrounding landscape. The top of this hill is usually capped by a rock formation that is more resistant to weathering and erosion.

Mesocyclone : A cylinder of cyclonically flowing air that form vertically in a severe thunderstorm. They measure about 3 to 10 kilometers across. About 50 % of them spawn tornadoes.

Mesofauna : Soil animals between 200 to 1000 micrometers in length, including nematodes, oligochaete worms, smaller insect larvae, and small arthropods. OR Small organisms such as worms and insects.

Mesonatric : In these soils, a major part of the upper 0.2 m of the B2 Horizon has an ESP between 15-25. Used as a Great Group definition for Sodosols in the Australian Soil Classification (Isbell, 1996).

Mesopause : Thin boundary layer found between the mesosphere and the thermosphere. It is usually found at an average altitude of 80 kilometers. Coldest temperatures in the atmosphere are found at the mesopause.

Mesophile : Organism whose optimum temperature for growth falls in an intermediate range of approximately 15 to 40°C.

Mesophilic bacteria : This group of bacteria species work to break down organic matter under "warm" conditions of 40 degrees up to 110 degrees. The ideal temperature of their environment is 70 to 90 degrees.

Mesophyte : Plants that have moderate water requirements.

Mesopore : Soil pores ranging in diameter from 0.2 to 50 μ m.

Mesoscale Convective Complex : A cluster of thunderstorms covering an area of 100,000 kilometers or more. Convective circulation within this system encourages the growth of new thunderstorms for up to 18 hours.

Mesosphere : Atmospheric layer found between the stratosphere and the thermosphere. Usually located at an average altitude of 50 to 80 kilometers above the Earth's surface. Air temperature within the mesosphere decreases with increasing altitude.

Mesotrophic : See base status.

Mesotrophic Lake : Lake with a moderate nutrient supply. Also see eutrophic lake and oligotrophic lake.

Mesozoic : Geologic era that occurred from 245 to 65 million years ago.

Messenger RNA (mrna) : RNA molecule transcribed from DNA, which contains the information to direct the synthesis of a particular protein.

Metabolic quotient (qco2) : The ratio of microbial activity to microbial biomass.

Metabolism : All biochemical reactions in a cell, both anabolic and catabolic. OR Sum of the chemical reactions within a cell or whole organism, including the energy-releasing breakdown of molecules (catabolism), and the synthesis of

complex molecules and new protoplasm (anabolism).

metadata : Data about data. Beyond (typical) data requirements. Soil moisture data requires metadata describing the vegetation cover and possible sources of water in order to be interpreted properly.

Metamorphic Rock : A rock that has been derived from other rocks by heat and pressure. The original rock may have been igneous, sedimentary, or another metamorphic rock. OR igneous or sedimentary rock that has changed because of high temperature, high pressure, and the chemical environment while deep in the crust of the earth. Examples: marble, slate, gneiss.

Metamorphism : Process that creates metamorphic rocks.

Metamorphosed : Material (usually sedimentary) that has been altered by heat and/or pressure (e.g. siltstone to schist, limestone to marble).

Metasomatic Metamorphism : Form of metamorphism that causes the chemical replacement of elements in rock minerals when gases and liquids permeate into bedrock.

Meteor : A body of matter that enters the Earth's atmosphere from space. While traveling through the atmosphere, these objects begin to burn because of friction and are sometimes seen as luminous streaks in the sky by ground observers. Many of these objects burn up completely and never reach the Earth's surface.

Meteorology : The scientific study of the atmosphere and its associated phenomena.

Methane : Methane is very strong greenhouse gas found in the atmosphere. Methane concentrations in the atmosphere have increased by more than 140 % since 1750. The primary sources for the additional methane added to the atmosphere (in order of importance) are: rice cultivation, domestic grazing animals, termites, landfills, coal mining, and oil and gas extraction. Chemical formula for methane is CH₄.

Methane gas : Explosive (when highly concentrated) gas that is formed when organic materials decompose in anaerobic conditions which exist in landfills. Landfill operators must have a method of venting methane gas before it becomes volatile.

Methanogenesis : Biological production of methane.

Methanogenic bacterium (methanogen) : Methaneproducing prokaryote; member of the Archaea.

Methanogenic bacterium (methanogen) : Methane-producing prokaryote; member of the Archaea.

Methanotroph : Organism capable of oxidizing methane.

Mg/L : Milligrams per liter = ppm (parts per million) - expresses a measure of the

concentration by weight of a substance per unit volume.

MGD : Million gallons daily - refers to the flow through a waste treatment plant.

Mica : Silicate mineral that exhibits a platy crystal structure and perfect cleavage. Common forms of mica are biotite and muscovite.

Micaceous : Micaceous - Containing the mineral mica.

Microaerophile : Organism that requires a low concentration of oxygen for growth. Sometimes indicates an organism that will carry out its metabolic activities under aerobic conditions but will grow much better under anaerobic conditions.

Microaggregate : Clustering of clay packets stabilized by organic matter and precipitated inorganic materials.

Microarthropod : Invertebrate with jointed legs and exoskeleton; includes insects and arachnids. They form part of the soil mesofauna.

Microbe : Used interchangeably with "microorganism". (See microorganism)

Microbe or microorganism : An imprecise term referring to any organism too small to see with the naked eye. Generally, "microbes" refers to bacteria, fungi, and sometimes protozoa.

Microbe, Soil : A soil microorganism.

Microbial biomass : Total mass of microorganism alive in a given volume or mass of soil.

Microbial mat : A firm structure of layered microorganisms with complementary physiological activities.

Microbial population : Total number of living microorganisms in a given volume or mass of soil.

Microbial : Pertaining to microbes.

Microbiology : Study of microorganisms.

Microbivorous : Feeding on microorganisms, including bacteria and fungi.

Microclimate : The climate of a very small region.

Microcollomorphic : Microcollomorphic - Describing a texture that reflects the morphological features of microscopic particles comprising a colloidal gel.

Microcosm : A community or other unit that is representative of a larger unity.

Microelement : Those elements that are essential for plant growth but are required only in very small amounts. Nutritive elements needed in small quantities for healthy plant development; trace elements (Mn, B, Cl, Zn, Cu, Mo).

Microenvironment : Immediate physical and chemical surroundings of a

microorganism.

Microfauna : Protozoa, nematodes and arthropods generally < 200 micrometers long. OR The small animals that can only be seen with a microscope; they include protozoa, nematodes, etc.

Microfauna : Protozoa, nematodes and arthropods generally < 200 micrometers long.

Microflora : Bacteria (including actinomycetes), fungi, algae, and viruses.

Microhabitat : Clusters of microaggregates with associated water within which microbes function. May be composed of several microsites (e.g., aerobic and anaerobic).

Micro-high : A generic microrelief term applied to slightly elevated areas relative to the adjacent ground surface; changes in relief range from several centimeters to several meters.

Microlife : Life which can only be seen with the use of a microscope. Microorganisms.

Micro-low : A generic microrelief term applied to slightly depressed areas relative to the adjacent ground surface; changes in relief range from several centimeters to several meters.

Micrometer : Onemillionth of a meter, or 10^6 meter, the unit usually used for measuring microorganisms.

Micron : A unit to describe a measure of length, equal to one millionth of a meter.

Micron : A unit of length. One millionth of a meter or one thousandth of a millimeter. One micron equals 0.00004 of an inch.

Micronutrient : Chemical element necessary for growth found in small amounts, usually < 100 mg kg¹ in a plant. These elements consist of B, Cl, Cu, Fe, Mn, Mo, and Zn. OR A plant nutrient that constitutes a low proportion of plant biomass. Also known as *trace element* or *minor element*. Iron, zinc, copper, manganese, molybdenum, nickel, boron, and chlorine.

Microorganism (microbe) : Extremely small organism that can only be seen using a microscope. OR These are microscopic plants and animals. They exist in soil for the purpose of breaking down organic matter into basic mineral elements.

Micropore : Relatively small soil pore, generally found within structural aggregates and having a diameter < 30 micrometers.

Micropores : Pores 5-30mm in diameter.

Microrelief : Small differences in relief that have differences in elevation up to about 2 m.

Microsite : Small volume of soil where biological or chemical processes differ from those of the soil as a whole, such as an anaerobic microsite of a soil aggregate or the surface of decaying organic residues.

Microwave Radiation : Form of electromagnetic radiation with a wavelength between 0.1 to 100 centimeters.

Mid america dairymen (mid am) : (Dairy science) a farmer-owned milk cooperative that purchases milk from new mexico dairy producers. Headquarters in missouri.

Mid-Latitude Cyclone : Cyclonic storm that forms primarily in the middle latitudes. Its formation is triggered by the development of troughs in the polar jet stream. These storms also contain warm, cold and occluded fronts. Atmospheric pressure in their center can get as low as 970 millibars. Also called wave cyclones or frontal cyclones.

Mid-Oceanic Ridge : Chain of submarine mountains where oceanic crust is created from rising magma plumes and volcanic activity. Also associated with this feature is plate divergence which creates a rift zone.

Migration : Movement of organisms in an intentional way between two points in space. Many migrations are seasonal.

MIK : Methyl Isobutyl Ketone.

Milankovitch Theory : Theory proposed by Milutin Milankovitch that suggests that changes in the Earth's climate are caused by variations in solar radiation received at the Earth's surface. These variations are due to cyclical changes in the geometric relationship between the Earth and the sun.

Military Grid Reference System : A simplified subset of the Universal Transverse Mercator (UTM) Grid System. This rectangular coordinate system used to find location of points on the Earth's surface. Based on the Universal Transverse Mercator projection system.

Milking parlor : (Dairy science) a facility that functions to extract milk from a cow by means of vacuum.

Milky Way Galaxy : Aggregation of about 400 billion stars in a flattened, disk-shaped structure in space. Our solar system is found in this structure.

Miller Cylindrical Projection : Map projection that mathematically projects the Earth's surface onto a cylinder that is tangent at the equator. Directions and distances are only true at the equator. Distance, area, and shape distortion increases as one moves towards the poles. Very popular projection used in world maps.

Millibar (mb) : A unit measurements for quantifying force. Used to measure atmospheric pressure. Equivalent to 1000 dynes per square centimeter.

Milo : (Crop science) a small drought-resistant grain sorghum with compact

bearded heads of large yellow or whitish seeds.

Miloginite : The name coined by a resident of Milwaukee, Wisconsin for “sewage sludge”, so he could scam people into buying sludge instead of paying to dispose of it! When this ingredient is listed in a septic product, you can be assured that the product is fraudulent! You don’t use sludge to get rid of sludge!

Mineral : A naturally occurring inorganic substance with definite chemical and physical properties and a definite crystal structure.

Mineral Soil : A soil that is composed predominantly of mineral material cf. ORGANIC SOIL.

Mineral Water : Contains large amounts of dissolved minerals such as calcium, sodium, magnesium, and iron. Some tap waters contain as many or more minerals than some commercial mineral waters. There is no scientific evidence that either high or low mineral content water is beneficial to humans.

Mineralization : Conversion of an element from an organic form to an inorganic state as a result of microbial decomposition. OR The change of an element in an organic form to an inorganic form by microorganisms.

Mineralization : Conversion of an element from an organic form to an inorganic state as a result of microbial decomposition.

MineralN : Nitrogen in its inorganic form, usually as nitrates or ammonium.

Minerals : Supply food and nutrients for plants and microorganisms. Webster defines minerals as “any naturally occurring substance that is neither vegetable nor animal”. In other words, these are the most basic form into which organic matter can be broken. At the mineral stage, the particles are inorganic.

Minimum data set (MDS) : The smallest set of soil properties that can be used to characterize or measure soil quality. The MDS will vary based on the intended land use, soil type, and climate. The first MDS was suggested by Larson and Pierce and included the following: nutrient availability, total organic C, particle size or texture, labile organic C, plant-available water capacity, soil structure, soil strength, maximum rooting depth, pH, and electrical conductivity.

Minimum tillage. : Only the tillage essential to crop production and prevention of soil damage.

Minor elements : See **micronutrients**.

Miocene : Miocene - An epoch or subdivision of the early Tertiary Period.

Miscellaneous area : An area that has little or no natural soil and supports little or no vegetation.

Mississippian : Geologic period that occurred roughly 320 to 360 million years ago. During this period, insects undergo major speciation and ferns first appear.

Trees become a dominant plant form on continents.

Missouri Coteau Escarpment : Missouri Coteau Escarpement - The eastward-facing side of a plateau forming the eastern border of the Great Plains in southern Canada and the Dakotas.

Mistral : Term used to describe a katabatic wind in southern France.

Mites : Very small members of the arachnid which includes spiders; they occur in large numbers in many organic surface soils.

Mitigation : Activities that reduce or eliminate the probability of occurrence of a disaster and/or activities that dissipate or lessen the effects of emergencies or disasters when they actually occur. Co survey, 1988.

Mitochondria : Organelle in a cell that oxidizes organic (see respiration) energy for use in cellular metabolism.

Mitochondrion (plural, mitochondria) : Eukaryotic organelle responsible for processes of respiration and oxidative phosphorylation.

Mitosis : Highly ordered process by which the nucleus divides in eukaryotes.

Mixed Tide : Tides that have a higher high water and lower high water as well as higher low water and lower low water per tidal period.

Mixing Ratio : The ratio between the weight (mass) of water vapor (or some other gas) held in the atmosphere compared to the weight of the dry air in a given volume of air. Usually measured in grams water vapor (or gas) per kilogram of dry air. OR The mass of water vapor in a parcel divided by the mass of the dry air in the parcel (not including water vapor)

Mixotroph : Organism able to assimilate organic compounds as carbon sources while using inorganic compounds as electron donors. Compare with autotroph and heterotroph.

ML : Mixed Liquor - the combination of raw influent and returned activated sludge. (no, not mixed drinks for human consumption)

MLSS : Mixed Liquor Suspended Solids - the volume of suspended solids (see SS) in the mixed liquor (see ML) of an aeration tank.

MLVSS : Mixed Liquor Volatile Suspended Solids - the volume of organic solids that can evaporate at relatively low temperatures (550 C) from the mixed liquor of an aeration tank. This volatile portion is used as a measure or indication of microorganisms present. Volatile substances can also be partially removed by air stripping.

Mode : Statistical measure of central tendency in a set of data. The mode is the most frequently occurring value in a data set. Data sets can contain two or more mode values that occur with the same frequency.

Model : (1) Generalization of reality.

(2) System describing how a phenomenon functions.

(3) Mathematical representation of a system from which predictions or inferences can be made.

Moder : A kind of decomposition and humus formation which reproduces advanced but incomplete humification of the remains of organism due to good aeration.

Moderately coarse textured soil : Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured : Texture group consisting of clay loam, sandy clay loam and silty clay loam textures; see also soil texture.

Moderately fine textured soil : Soil that is clay loam, sandy clay loam, or silty clay loam textured . OR Clay loam, sandy clay loam, and silty clay loam.

Moderately fine textured soil : Soil that is clay loam, sandy clay loam, or silty clay loam textured.

Modern soil. : The portion of a soil section that is under the influence of current pedogenetic conditions. It generally refers to the uppermost soil regardless of age.

Modern solum. : The combination of the A and B horizons in the modern soil.

Moho Discontinuity : The lower boundary of the crust. At this boundary seismic wave velocities show an increase in speed as they enter the upper mantle.

Moist Adiabatic Lapse Rate : See saturated adiabatic lapse rate.

Moisture characteristic curve : See **waterretention curve**.

Moisture Content : The mass of water lost per unit dry mass when the material is dried at 103°C (217°F) for eight hours or more. The minimum moisture content required for biological activity is 12-15%; it generally becomes a limiting factor below 45 or 50%; expressed as a percentage, moisture content is water weight/wet weight.

Moisture release curve : See **waterretention curve**.

Mold : A filamentous fungus.

Molecule : Minute particle that consists of connected atoms of one or many elements.

Molecules : The smallest unit of matter which holds its characteristics.

Mollic epipedon : A surface horizon of mineral soil material that is dark colored and relatively thick, contains at least .58 percent organic carbon, is not massive or

hard or very hard when dry, and has a base saturation of more than 50 percent.

Mollic horizon : a diagnostic epipedon of dark color, of moderate pH, and quite deep.

Mollisols : Other soils that have both of the following:

Either:

A mollic epipedon; or

Both a surface horizon that meets all the requirements for a mollic epipedon except thickness after the soil has been mixed to a depth of 18 cm and a subhorizon more than 7.5 cm thick, within the upper part of an argillic, kandic, or natric horizon, that meets the color, organic-carbon content, base saturation, and structure requirements of a mollic epipedon but is separated from the surface horizon by an albic horizon; and

A base saturation of 50 percent or more (by NH₄OAc) in all horizons either between the upper boundary of any argillic, kandic, or natric horizon and a depth of 125 cm below that boundary, or between the mineral soil surface and a depth of 180 cm, or between the mineral soil surface and a densic, lithic, or paralithic contact, whichever depth is shallowest.

Mollisols : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. A mollisol soil is typically found in semiarid grassland environments. They are rich in organic matter and have an abundance of calcium carbonate nodules within the profile.

Mollusk : Mollusk - Any invertebrate of the phylum Mollusca, characterized by a soft, unsegmented body, unsegmented appendages and, commonly, a protective shell.

Mollweide Projection : Map projection system that tries to present more accurate representations of area. Distortion is mainly manifested in terms of map direction and distance.

Monadock : An isolated hill or mountain of resistant rock rising conspicuously above the general level of a lower erosion surface in a temperate climate representing an isolated remnant of a former erosional cycle in an area that has been beveled to its base level.

Monera : Group, at the kingdom level, in the classification of life. Unicellular organisms that have a prokaryotic cell type.

Monitoring soil quality : Tracking trends in quantitative indicators or the functional capacity of the soil in order to determine the success of management practices or the need for additional management changes. Monitoring involves the orderly collection, analysis, and interpretation of data from the same locations over time. (compare to assessing.)

Monocline : A fold in layered rock that creates a slight bend.

Monoclonal antibody : Antibody produced from a single clone of cells. This antibody has uniform structure and specificity.

Monoculture : Aquaculture in which one species is grown.

Monokaryon : Fungal hypha in which compartments contain one nucleus.

Monolith : Representative vertical section taken from vertical face of a soil profile pit or section, which represents arrangement of soil horizons; there are various methods of how to take and conserve soil monoliths.

Monsoon : A regional scale wind system that predictably change direction with the passing of the seasons. Monsoon winds blow from land to sea in the winter, and from sea to land in the summer. Summer monsoons are often accompanied with precipitation.

Montmorillonite : Montmorillonite - An aluminous clay mineral derived from feldspars or other aluminum-bearing minerals. OR A type of clay that has a large capacity to shrink and expand with wetting and drying.

Montreal Protocol : Treaty signed in 1987 by 24 nations to cut the emissions of chlorofluorocarbons (cfc) into the atmosphere. Since 1987 the treaty has been amended to quicken the reduction in CFC production and use.

Mor : An accumulation of acid organic matter at the soil surface beneath forest.

Moraine : Any type of constructional topographic form consisting of till and resulting from glacial deposition. OR A hill of glacial till deposited directly by a glacier.

Moraine, end : A ridge-like accumulation that is being or was produced at the outer margin of an actively flowing glacier at any given time.

Moraine, ground : An extensive, fairly even layer of till, having an uneven or undulating surface; a deposit of rock and mineral debris dragged along, in, on, or beneath a glacier and emplaced by process including basal lodgement.

Moraine, kame : An end moraine that contains numerous kames.

Moraine, lateral : A ridge-like moraine carried on and deposited at the side margin of a valley glacier.

Moraine, recessional : An end or lateral moraine, built during a temporary but significant halt in the final retreat of a glacier.

Moraine, terminal : An end moraine that marks the farthest advance of a glacier and usually has the form of a massive arcuate or concentric ridge or complex of ridges, underlain by till and other types of drift.

More Developed Country (MDC) : A highly industrialized country characterized

by significant technological development, high per capita income, and low population growth rates. Examples of such countries include the United States, Canada, Japan, and many countries in Europe. Also see less developed country.

Morphological System : This is a system where we understand the relationships between elements and their attributes in a vague sense based only on measured features or correlations. In other words, we understand the form or morphology a system has based on the connections between its elements. We do not understand exactly how the processes work to transfer energy and/or matter through the connections between the elements.

Morphology : Description of landform based on dimensions (i.e. shape and size).

Morphology, soil : The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Morphology, soil. : The physical make-up of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Morphometric characters : Are those to do with depth, dimension, geology of shores, sediment distribution, currents, inflow and outflow of water, etc

Morphometry : The measurement of shape. Measurements are then manipulated statistically or mathematically to discover inherent properties.

Mosasauro : Mosasauro - A genus (the type of the family Mosasauridae) of large, extinct, aquatic, fish-eating lizards related to the recent monitors but having limbs modified into swimming paddles.

Moss : About 9,500 species of plants that belong to the division bryophyta. These low growing plants are common in moist habitats. OR Photosynthetic plants with small leaves that unfurl when moistened (thus the moss appears to swell). When dry, mosses are dark and dull-colored; when moistened, the color changes markedly to a bright, light green to brown. This makes them easy to distinguish from lichens.

Moss peat [Soil Taxonomy] : An accumulation of organic material that is predominantly the remains of mosses (e.g. Sphagnum moss). Compare - Herbaceous peat, sedimentary peat, woody peat, peat, muck, and mucky peat.

Most probable number (MPN) : Method for estimating microbial numbers in soil based on extinction dilutions.

Motile : Motile organisms exhibit or are capable of movement.

Motility : Movement of a cell under its own power.

Mottled horizon : A horizon in which mottle abundance is greater than 10% (visual abundance estimate) and contrast between colours is distinct and prominent.

Mottles. : See Mottling.

Mottling : Patches or spots of different colors usually used for the color pattern developed due to partial anaerobism. OR The presence of more than one soil colour in the same soil horizon, not including different nodule or cutan colours.

Mottling, soil : irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. OR Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage.

Mountain Breeze : Local thermal circulation pattern found in areas of topographic relief. In this circulation system, surface winds blow from areas of higher elevation to valley bottoms during the night.

Mouth : End of a stream. Point at which a stream enters a lake, sea, or ocean.

Movement : A term used in geography that deals with the migration, transport, communication, and interaction of natural and human-made phenomena across the spatial dimension.

MPN index : Most Probable Number of coliform-group organisms per unit volume of sample water. Expressed as a density or population of organisms per 100 mL of sample water

Mrf : Material recovery facility

MRSA : Abbreviation for either Multiple Antibiotic Resistant Staph. or Methicillin Antibiotic Resistant Staph. Alken-Murray does not use Staph. in its products and we test to verify that with QC8. We also test the strains we select with common antibiotics and refuse to use any strains that are resistant to the most commonly used antibiotics, despite other favorable traits, since we do not want to risk responsibility for passing negative traits to pathogens found in nature.

Mrt (mean residence time.) : The average age of the carbon atoms within a soil horizon. Under ideal reducing conditions, the humus in a soil will have a C-14 age that is half the true age of the soil. In oxic soils humus is typically destroyed as fast as it is produced, generally yielding MRT ages no older than 300-1000 years, regardless of the true age of the soil.

MSDS : Material Safety Data Sheet - a document that provides pertinent information and a profile of a particular hazardous substance or mixture. An MSDS is normally developed by the manufacturer or formulator of the hazardous substance or mixture. The MSDS is required to be made available to employees and operators whenever there is the likelihood of the hazardous substance or

mixture being introduced into the workplace. Some manufacturers prepare MSDS for products that are NOT considered to be hazardous to show that the product or substance is NOT hazardous.

Msw : Municipal solid waste

Mucigel : Gelatinous material at the surface of roots grown in normal nonsterile soil. It includes natural and modified plant mucilages, bacterial cells, and their metabolic products (e.g., capsules and slimes), and colloidal mineral and organic matter from the soil.

Mucilage : Gelatinous secretions and exudates produced by plant roots and many microorganisms..

Muck : Unconsolidated soil material consisting primarily of highly decomposed organic material in which the original plant parts are not recognizable (i.e. "sapric" in Soil Taxonomy). It generally contains more mineral matter and is usually darker in color, than peat. Compare - peat, mucky peat, herbaceous peat.

Muckiness, classification. : Highly decomposed organic wet soil.

Mucky peat : Unconsolidated soil material consisting primarily of organic matter that is in an intermediate stage of decomposition such that a significant part of the original material can be recognized and a significant part of the material can not be recognized (i.e. "hemic" in Soil Taxonomy). Compare - peat, muck, herbaceous peat.

Mudflow : Form of mass movement where fine textured sediments and soil mix with water to create a liquid flow.

Mudslide - : An imprecise but popular term coined in California, USA, frequently used by laymen and the news media to describe a wide scope of events, ranging from debris-laden floods to landslides. Not technically correct. Please see mudflow, previous glossary entry. CO Survey, 1988.

Mudstone : Fine grained sedimentary rock composed of lithified silt and clay particles.

Mulch : (i) Any material such as straw, sawdust, leaves, plastic film, and loose soil, that is spread upon the surface of the soil to protect the soil and plant roots from the effects of raindrops, soil crusting, freezing, or evaporation. (ii) To apply mulch to the soil surface.

Mulching : The application of a layer of compost to the surface of the soil, creating an interface that accepts water readily yet resists moisture loss through evapotranspiration.

Mull : A crumbly intimate mixture of organic and mineral material formed mainly by worms, particularly by earthworms.

Multispectral Scanner (MSS) : Remote sensing device found on Landsat satellites that acquires images in four spectral bands from visible to reflected infrared.

Municipal discharge : Discharge of effluent from wastewater treatment plants operated by municipalities or public sewerage authorities; may include wastewater from households, commercial establishments, and industries.

Municipal solid waste : Combined consumer and commercial waste generated within a defined geographic area

Munsell color notation. : Scientific description of color determined by comparing soil to a Munsell Soil Color Chart (Available from Macbeth Division of Kollmorgen Corp., 2441 N. Calvert St., Baltimore, MD 21218). For example, dark yellowish brown is denoted as 10YR3/4m in which the 10YR refers to the hue or proportions of yellow and red, 3 refers to value or lightness (0 is black and 10 is white), 4 refers to chroma (0 is pure black and white and 20 is the pure color), and m refers to the moist condition rather than the dry (d) condition.

Munsell Color System : Colour designation system that specifies the relative degrees of the three simple variables of colour: hue (wavelength), value (degree of lightness or darkness), and chroma (purity or strength). For example: 10YR 6/4 is a colour (of soil) with a hue = 10YR, value = 6, and chroma = 4.

Munsell Notation : A designation of color by degrees of three simple variables - hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Munsell notation. : A designation of color by degrees of three simple variables; hue, value, and chroma. For example, a notation of 10YR 6/4 has a hue of 10YR (yellow-red), value of 6, and chroma of 4.

Murein : See **peptidoglycan**.

Muscovite : Rock forming mineral of the mica group.

Mushroom : Large, sometimes edible, fruiting body produced by some fungi.

Mushroom compost : Cellulose-rich organic matter that has undergone the initial biological decomposition stage; used by mushroom growers

Muskeg : Poorly drained marshes or swamps found overlying permafrost.

Mutagen : Substance that causes the mutation of genes.

Mutagen : Substance that causes the mutation of genes.

Mutant : Organism, population, gene, or chromosome that differs from the corresponding wild type by one or more base pairs.

Mutation : Change in the structure of a gene or chromosome.

Mutton : (Animal science) meat from sheep that are over one year old.

Mutualism : Interaction between organisms where both organisms benefit from the association.

Mutualists : Two species that have evolved together into a mutually beneficial relationship. For example, mycorrhizal fungi get carbon compounds from plant roots and help deliver water and nutrients to the root.

Myalinid : Myalinid - A fossil bivalve with a sharply pointed beak, a short hinge line, and a semi-oval shell that probably preferred quiet water.

Mycelium : A bundle of fungal hyphae that form the vegetative body of many fungal organisms.

Mycelium (plural, mycelia) : Mass of hyphae that form the vegetative body of many fungal organisms.

Mycobacterium : A genus of aerobic bacteria found in soil and water that are capable of biodegrading multi-ring compounds such as pahs.

Mycophage : See mycovirus.

Mycophagous : Organisms that consume fungi, such as mycophagous nematodes.

Mycoplasma : Group of bacteria without a cell walls that do not revert to walled forms. Phylogenetically related to clostridia.

Mycorrhizae : Mutualistic association of a fungus with the root of higher plant. In this relationship, the fungus helps the plant in extracting certain nutrients from the soil. In exchange, the fungus is provided with a habitat and nutrition in the form of carbohydrates.

Mycorrhizal associations : A symbiotic association of certain fungi with roots. The fungi receive energy and nutrients from the plant. The plant receives improved access to water and some nutrients. Except for brassicas (mustard, broccoli, canola) and chenopods (beets, lamb's-quarters, chard, spinach), most plants form mycorrhizal associations.

Mycorrhizosphere : Unique microbial community that forms around a mycorrhiza.

Mycovirus : Virus that infects fungi.

Mytilid : Mytilid - Any bivalve mollusk of the family Mytilidae, characterized by an equivalve and elongated shell.

N

NAcetylglucosamine and NAcetylmuramic acid : Sugar derivatives in the peptidoglycan layer of bacterial cell walls.

Nanopore : Soil pore having dimensions measured in nanometers. Materials encased in nanopores are beyond the reach of microorganisms and enzymes.

NAPL : Non-aqueous phase liquid. This can be lighter than water (LNAPL), or more dense than water (DNAPL).

Native : Growing, living or produced originally in a certain place; indigenous.

Native species : Plants and animal species that have evolved in a specific area over a period of time; naturally occurring species; indigenous.

Natric : Soils where the major part of the upper 0.2 m of the B2 Horizon is sodic. Used as a Great Group definition for Hydrosols and Kurosols in the Australian Soil Classification (Isbell, 1996).

Natric horizon : an argillic horizon with >15% exchangeable sodium.

Natural Gas : Hydrocarbon based gas, mainly composed of methane, commonly found in the pores of sedimentary rocks of marine origin.

Natural Hazards : (1) Natural phenomena that produce negative effects on life.
(2) The study of the hazards of natural phenomena.

Natural Ionizing Radiation : Ionizing radiation that comes from natural sources in the environment.

Natural levee : A long, broad low ridge or embankment of sand and coarse silt, built by a stream on its flood plain and along both sides of its channel, especially in time of flood when water overflowing the normal banks is forced to deposit the coarsest part of its load.

Natural Selection : Environment's influence on the reproductive success of individuals in a population. It results in the exclusion of maladapted genetic traits found within individuals in a population.

Nautiloid : Nautiloid - Any cephalopod with a straight, curved or coiled chambered shell and straight sutures.

Neap Tide : Tide that occurs every 14 to 15 days and coincides with the first and last quarter of the moon. This tide has a small tidal range because the gravitational

forces of the moon and sun are perpendicular to each other. Contrasts with spring tide.

Necessary nutrient. : The elements C, H, O, P, K, N, S, Ca, Mg, K, B, Mn, Cu, Zn, Mo, Cl, Co, Si and F. These must be taken up and utilized in sufficient quantities for plants to complete their life cycles. See essential element.

Necrosis. : The appearance of dead parts of plants due to a lack of plant growth factors or the presence of toxics or disease. Necrosis can also be confused with the normal senescence of plant parts.

Necrotrophic : Nutritional mechanism by which an organism produces a battery of hydrolytic enzymes to kill and break down host cells and then absorb nutritional compounds from the dead organic matter.

Necrotrophic : Organisms that derive their energy from dead cells (Lewis, 1973)

Needle Ice : A form of periglacial ground ice that consists of groups ice slivers at or immediately below the ground surface. Needle ice is about a few centimeters long.

Negative Feedback : Change in the state of a system that counteracts the measured effect of the initial alteration.

Nematicide : See "pesticide"

Nematode : Multicellular eukaryote defined as an unsegmented, usually microscopic roundworm. Various species feed on plants, animals, fungi, and bacteria.

Nematodes : Microscopic, elongated worms that live on other organisms in the soil.

Neotectonic : Recent (Quaternary age) earth movements usually along fault lines.

Net farm income : (Agricultural economics) the money and non-money income farm operators realize from farming as a return for labor, investment, and management after production expenses have been paid. Net farm income is measured in two ways net farm income before inventory adjustment and net farm income after inventory adjustment. Net farm income doesn't include changes in the value of inventories such as crops and livestock at the end of the year.

Net Longwave Radiation (Balance) : Balance between incoming and outgoing longwave radiation. Mathematically expressed as:

Net Primary Productivity : Total amount of chemical energy fixed by the processes of photosynthesis minus the chemical energy lost through respiration.

Net Radiation (Balance) : Balance between incoming and outgoing shortwave and longwave radiations. Mathematically expressed as:

Net Shortwave Radiation (Balance) : Balance between incoming and outgoing shortwave radiations. Mathematically expressed as:

$$K^* = (K + k)(1 - a)$$

Where K^* is surface net shortwave radiation,

K is surface direct shortwave radiation,

k is diffused shortwave radiation (scattered insolation) at the surface,

And a is the albedo of surface.

Neurotoxin : A poisonous compound that acts on the nervous system.

Neutral : Any substance with a ph around 7.

Neutral Atmosphere : Condition in the atmosphere where isolated air parcels do not have a tendency to rise or sink. The parcels of air tend to be same temperature as the air that surrounds them.

Neutral Soil : A soil with ph values 6.5-7.3.

Neutral soil. : A soil having a ph value between 6.6 and 7.3. (See Reaction, soil.)

Neutral Solution : Any water solution that is neutral (ph approximately 7) or has an equal quantity of hydrogen ions (H^+) than hydroxide ions (OH^-). Also see acidic solution and basic solution.

Neutral to Alkaline Peats : GSG classification—These peats may be black and highly granular, dark brown and fibrous, or of some intermediate character and range in depth from about 30 cm to many cm. Lenses of shells and patches of soft carbonates sometimes occur irregularly within the peat and occasionally on the surface.

Neutralism : Lack of interaction between two organisms in the same habitat.

Neutron : Atomic sub-particle found in the nucleus of an atom. This particle is similar in mass to a proton but does not have an electromagnetic charge.

Newton : A unit of force that creates an acceleration on a mass of 1 kilogram equal to 1 meter per second with no friction and under the conditions of a vacuum.

NH₃N : Ammonia nitrogen. (The 3 should be subscripted, but I have not figured out how to make this happen on the internet)

Niche : Functional role of a given organism within its habitat.

Niche Specialization : Process where evolution, through natural selection, adapts a species to a particular set of abiotic and biotic characteristics within a habitat.

Nickpoint (Knickpoint - British spelling) : Point on the long profile of a stream where the gradient is broken sudden drop in elevation. Nickpoints are the locations of rapids and waterfalls.

Nicotinamide adenine dinucleotide (NAD⁺) : Important coenzyme, functioning as a hydrogen and electron carrier in a wide range of redox reactions; the oxidized form of the coenzyme is written NAD⁺, the reduced form as NADH.

Nimbostratus Clouds : Dark, gray low altitude cloud that produces continuous precipitation in the form of rain or snow. Found in an altitude range from the surface to 3,000 meters.

Nitrate : Form of nitrogen commonly found in the soil and used by plants for building amino acids, DNA and proteins. It is commonly produced by the chemical modification of nitrite by specialized bacteria. Chemical formula for nitrate is NO₃⁻.

Nitrate reduction (biological) : Process whereby nitrate is reduced by plants and microorganisms to ammonium for cell synthesis (nitrate assimilation, assimilatory nitrate reduction) or to various lower oxidation states (N₂, N₂O, NO_x) by bacteria using nitrate as the terminal electron acceptor in anaerobic respiration.

Nitric Acid : Acid with the chemical formula: HNO₃.

Nitric Oxide : A gas produced by bacterial action in the soil and by high temperature combustion. Nitric oxide is a component in the production of photochemical smog. This colorless gas has the chemical formula is NO.

Nitrification : Biological oxidation of ammonium to nitrite and nitrate, or a biologically induced increase in the oxidation state of nitrogen.

Nitrifying bacteria : Chemolithotrophs capable of carrying out the transformations from NH₃ to NO₂ or NO₂ to NO₃.

Nitrite : Form of nitrogen commonly found in the soil. It is commonly produced by the chemical modification of ammonium by specialized bacteria. This form is toxic to plants and animals at high concentrations. Chemical formula for nitrite is NO₂⁻.

Nitrogen : An element that is a component of protein structures in living organisms.

Nitrogen : An element essential to the growth and development of plants; occurs in manure and chemical fertilizer and, in excess, can cause waters to become polluted by promoting excessive growth of algae and other aquatic plants.

Nitrogen cycle : Sequence of biochemical changes wherein nitrogen is used by a living organism, transformed upon the death and decomposition of the organism, and converted ultimately to its original state of oxidation.

Nitrogen Dioxide : A gas produced by bacterial action in the soil and by high temperature combustion. Nitrogen dioxide is a component in the production of photochemical smog. This reddish brown gas has the chemical formula NO₂.

Nitrogen draft : Incorporating high-carbon matter like wood chips into the soil

(i.e., mixed into soil, not placed on top) can cause deficiencies in the nitrogen available to plant roots. Organic matter composts and, in order to compost, the high-carbon material requires the nitrogen from the soil to create the desired diet for microbial action.

Nitrogen Fixation : The transformation of elemental nitrogen to an organic form by microorganisms.

Nitrogen Oxides : Consists of two gases nitric oxide (NO) and nitrogen dioxide (NO₂). These gases are produced by bacterial action in the soil and by the high temperature combustion. Both gases are components in the production of photochemical smog.

Nitrogen Saturation : Over abundance of nitrogen in natural ecosystems because of human induced inputs related to agriculture and fossil fuel combustion.

Nitrogenase : Specific enzyme system required for biological N₂ fixation.

Nitrogenous material : Organic matter that is relatively high in nitrogen in relation to carbon.

Nivation : Process where snow patches initiate erosion through physical weathering, meltwater flow, and gelifluction.

Nivation Hollow : Ground depression found in periglacial areas that is created by nivation.

Noctilucent Clouds : High altitude clouds composed of ice crystals that appear to glow silver or bright blue shortly after sunset.

Nodular Agates : Nodular Agates - Any agate that forms in bounded, small cavities in volcanic or sedimentary rocks. Compare to vein agate.

Nodule : Nodule - Bodies that occur as discrete masses within a larger formation. OR A small concretionary deposit usually of sesquioxides or carbonates, usually hard.

Nodule bacteria : See **rhizobia**.

Nodulins : Unique proteins produced in root hairs or nodules in response to rhizobial infection.

Nomenclature : System of naming organisms.

Non-calciic Brown Soils : GSG classification—Very similar to Red-brown Earths but without an A₂ horizon. They have a carbonate-free solum and a neutral to slightly alkaline (with lower base saturation) B horizon; and are also generally thinner soils, varying from about 40 - 80 cm deep.

Non-Clastic Sedimentary Rock : Sedimentary rocks that are created either from chemical precipitation and crystallization, or by the lithification once living organic

matter.

Nonexchangeable cations : Positively charged ions that are held in the lattices of micaceous clays. Also referred to as fixed ions, such as fixed potassium.

Nonhydric soil. : A soil that developed predominantly under oxygenated (aerobic) conditions.

Non-Ionizing Radiation : A form of electromagnetic radiation that does not have enough energy to cause ionization of atoms in living tissue. Examples of this type of radiation include radio waves, microwaves, infrared light, and ordinary light. Also see ionizing radiation.

Nonlegume. : A crop that is not a legume. Usually used as a term to identify plants that do not perform nitrogen fixation.

Non-native Vegetation - : Plants that are not native to the local area. These plants are often invasive and compete with or replace native vegetation. This can affect habitat and food supply for native animal species.

Non-Parametric Statistical Test : Statistical tests that do not assume the sample data is normally distributed.

Nonpoint source controls : General phrase used to refer to all methods employed to control or reduce nonpoint source pollution.

Nonpoint source pollution : Pollution originating from runoff from diffuse areas (land surface or atmosphere) having no well-defined source.

Nonpoint-source Contaminant : Nonpoint-source Contaminant - A contaminant stemming from a diffuse source or sources; dispersed contamination, such as runoff or percolation from agricultural or urban areas.

Nonpolar : Possessing hydrophobic (water repelling) characteristics and not easily dissolved in water.

Non-potable : : Water that is unsafe or unpalatable to drink because it contains pollutants, contaminants, minerals or infective agents.

Non-Renewable Resource : Resource that is finite in quantity and is being used faster than its ability to regenerate itself.

NonSilicate : Rock forming minerals that do not contain silicon.

Nonsymbiotic Mutualism : Mutualistic interaction where the mutualists live independent lives yet cannot survive without each other. For example, pollinating insects like bees and some flowering plants.

Nontarget effect : Impacting organisms other than that intended by a treatment.

Normal Distribution : A common probability distribution displayed by population data. If the values of the distribution are plotted on a graph's horizontal axis and

their frequency on the vertical axis the pattern displayed is symmetric and bell-shaped. The central value or mean represents the peak or the most frequently occurring value.

Normal Fault : Vertical fault where one slab of the rock is displaced up and the other slab down. It is created by tensional forces acting in opposite directions.

Normal Lapse Rate : Average rate of air temperature change with altitude in the troposphere. This value is approximately a decrease of 6.5° Celsius per 1000 meters rise in elevation.

North Magnetic Pole : Location in the Northern Hemisphere where the lines of force from Earth's magnetic field are vertical. This point on the Earth gradual changes its position with time.

North Pole : Surface location defined by the intersection of the polar axis with Earth's surface in the Northern Hemisphere. This location has a latitude of 90° North.

Northcote factual key see : factual key (northcote, 1979).

Northeast Trade Winds : See trade winds.

Northern blot : Hybridization of singlestranded nucleic acid (DNA or RNA) to RNA fragments immobilized on a filter.

Northing : Second measurement of a grid reference used to specific the location of a point on a rectangular coordinate system. The distance measured northward from the origin of a rectangular coordinate system.

Notill : The practice of leaving the soil undisturbed from harvest to planting except for nutrient injection. Planting or drilling is accomplished in a narrow seedbed or slot created by coulters, row cleaners, disk openers, in-row chisels, or rototillers. Weed control is accomplished primarily with herbicides.

NPDES : National Pollutant Discharge Elimination System is the permit program under the federal Clean Water Act.

NPDES Permit : National Pollutant Discharge Elimination System permit is the regulatory agency document issued by either a federal or state agency which is designated to control all discharges of pollutants from point sources into U.S. waterways. NPDES permits regulate discharges into navigable waters from all point sources of pollution, including industries, municipal wastewater treatment plants, sanitary landfills, large agricultural feed lots and return irrigation flows.

N-P-K : N-P-K is an abbreviation for nitrogen (N), phosphorus (P), and potassium (K). In the chemical philosophy, these three elements are considered important to force crop production (as opposed to the organic philosophy goal of improving the biodiversity of the soil). U.S. law requires that the ratio of these three elements be specified on every bag of commercially-available fertilizer. A ratio of 3-1-2 or

4-1-2 is considered good.

Nsw nutrient sensitive waters : Waters subject to excessive growth of microscopic and macroscopic vegetation that need additional nutrient management. In general, management strategies for point and nonpoint source pollution control are designed to prevent any increase in nutrients over background levels.

Nuclear Energy : Energy released when the nucleus of an atom experiences a nuclear reaction like the spontaneous emission of radioactivity, nuclear fission, or nuclear fusion.

Nucleic acid : Polymer of nucleotides.

Nucleoid : Aggregated mass of DNA that makes up the chromosome of prokaryotic cells.

Nucleophilic compound : Chemical that attracts or is drawn to electrondeficient regions in other chemicals; reducing agents act as nucleophilic compounds.

Nucleoside : Nucleotide without the phosphate group.

Nucleus : (1) Dense central portion of an atom that is composed of neutrons and protons.

(2) Structure found in eukaryotic cells that contains the chromosomes.

Nuee Ardente : A glowing cloud of dense hot volcanic gas and ash that moves downslope at high speeds, incinerating the landscape.

Null Hypothesis (H₀) : Is a hypothesis that has been suggested because it is believed to be true or because it is to be used as a starting point for scientific argument. Used in statistical testing to organize arguments.

Nutrient : Substance taken by a cell from its environment and used in catabolic or anabolic reactions.

Nutrient Cycle : The cycling of a single element by various abiotic and biotic processes through the various stores found in the biosphere, lithosphere, hydrosphere, and atmosphere.

Nutrient deficiency. : The lack of an adequate amount of a plant nutrient. Nutrient deficiency may result in a number of symptoms, including poor plant growth, chlorosis or necrosis. Nutrient deficiency symptoms can easily be confused with toxicity symptoms.

Nutrient Exchange : The process by which plant roots exchange an acid for nutrients from the soil.

Nutrient management : A BMP designed to minimize the contamination of surface and ground water by limiting the amount of nutrients (usually nitrogen) applied to the soil to no more than the crop is expected to use. This may involve changing

fertilizer application techniques, placement, rate, or timing. The term fertilizer includes both commercial fertilizers and manure.

Nutrient Management - Identifying : how the major plant nutrients (nitrogen, phosphorous and potassium) are to be annually managed for expected crop production and for the protection of water quality.

Nutrient Management Plan : A written site specific plan which describes how the major plant nutrients (nitrogen, phosphorus and potassium) are to be managed, annually. The goal of farm nutrient management planning is to minimize adverse environmental effects, primarily upon water quality, and avoid unnecessary nutrient applications above the point where long run net farm financial returns are optimized.

Nutrient removal rates : Essentially, estimates of the proportion of the nutrients entering a stormwater treatment basin that are retained and not exported to a receiving waterbody. In 1987, W. W. Walker developed for the U.S. Environmental Protection Agency's (EPA) National Urban Runoff Program computer models that are used by the City to design and define the dimensions of such treatment basins.

Nutrient status : Can be used as a rough guide to the availability of nutrients to plants. It is calculated as the sum of exchangeable calcium, magnesium and potassium (in milliequivalents per 100 g).

The categories used are

- Very low (0 - 3.9);
- Low (4 - 7.9);
- Moderate (8 - 17.9);
- High (>18) (Lorimer and Rowan, 1982).

Nutrient, plant : Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Nutrient. : The elements C, H, O, P, K, N, S, Ca, Mg, K, B, Mn, Cu, Zn, Mo, Cl, Co, Si and F which are required for plant growth.

Nutsedge (or nut grass) : Perennial. Two types: yellow and purple. Major weed of any irrigated system (home or farm). Primarily found in southern new mexico. Very difficult to manage.

O

O Horizon : Topmost layer of most soils. It is composed mainly of plant litter and humus.

Obligate : (i) Adjective referring to an environmental factor (for example, oxygen) that is always required for growth. (ii) Organism that can grow and reproduce only by obtaining carbon and other nutrients from a living host, such as obligate symbiont.

Obligate aerobe : Bacteria which require the presence of oxygen, such as *Pseudomonas fluorescens*. A few strains of this species are capable of utilizing nitrate to allow anaerobic respiration.

Obligate Aerobic Organisms : Can only grow in the presence of oxygen.

Oblique Aerial Photograph : Photograph taken from a non-perpendicular angle from a platform in the atmosphere.

Obliquity : Tilt of the Earth's polar axis as measured from the perpendicular to the plane of the Earth's orbit around the sun. The angle of this tilt varies from 22.5 to 24.5° over a 41,000 year period. Current obliquity is 23.5°.

Obsidian : Glassy dark colored volcanic rock. Usually composed of rhyolite.

Occluded Front : A transition zone in the atmosphere where an advancing cold air mass sandwiches a warm air mass between another cold air mass pushing the warm air into the upper atmosphere.

Ocean : A body of saline water found occupying all or part of the Earth's ocean basins. There are five recognized oceans: the Atlantic, the Southern Ocean, the Pacific Ocean, the Indian Ocean, and the Arctic Ocean.

Ocean Basin : Part of the Earth's outer surface that is comprised of the ocean floor, mid-oceanic ridges, continental rise, and continental slope. The ocean basins are filled with saline water that makes up the oceans.

Ocean Current : Large scale horizontal flow of ocean water that is persistent and driven by atmospheric circulation.

Ocean Floor : Flat plain found at the bottom of the ocean. The ocean floor represents the surface of the oceanic crust. The ocean floor lies between the mid-oceanic ridges and the trenches, usually 5,000 to 7,000 meters below the ocean surface. Also called the abyssal plain.

Ocean Trench : Deep depression found at the edge of the ocean floor. Represents area of tectonic plate subduction.

Oceanic Crust : Basaltic portion of the Earth's crust that makes up the ocean basins. Approximately 5 to 10 kilometers thick. See sima layer.

Oceanic Plate : A rigid, independent segment of the lithosphere composed of mainly basalt that floats on the viscous plastic asthenosphere and moves over the surface of the Earth. The Earth's oceanic plates are an average 75 kilometers thick and were formed less than several hundred million years ago at one of the Earth's mid-oceanic ridges. Also see continental plate.

Oceanography : The scientific study of phenomena found in the world's oceans.

Ochric horizon : a diagnostic epipedon of light color, low humus, or shallow depth.

Oil : Hydrocarbon based liquid commonly found in the pores of sedimentary rocks of marine origin.

Oil Retention Boom : A floating baffle used to contain and prevent the spread of floating oil on a water surface.

Oil seed crops : (Crop science) primarily soybeans, peanuts, cottonseed, and flaxseed used for the production of oils for cooking, protein meals, and nonfood uses. Less common oil crops include sunflower, safflower, castor beans, and sesame.

Old Growth Forest : Climax forests dominated by late successional species of trees that are hundreds to thousands of years old. Examples include virgin uncut forests of Douglas fir, western hemlock, giant sequoia, and coastal redwoods located in western North America. Also see second-growth forest.

Oligocene : Oligocene - An epoch or subdivision of the early Tertiary Period. OR Epoch of the tertiary period, from 38 - 22.5 million years ago.

Oligochaete : A particular class of segmented worms, including the earthworms, which have few (*oligo*) body bristles (*chaeta*).

Oligonucleotide : Short nucleic acid chain, either obtained from an organism or synthesized chemically.

Oligotroph : Microorganism specifically adapted to grow under low nutrient supply. Thought to subsist on the more resistant soil organic matter and be little affected by the addition of fresh organic materials. Sometimes a synonym for autochthonous.

OLIGOTROPHIC lakes have low nutrient status and relatively low primary productivity

Oligotrophic Lake : Lake with a low supply of nutrients in its waters. Also see eutrophic lake and mesotrophic lake.

Olivine : Common silicate mineral found in rocks formed from mafic magma. Its chemical composition varies between Mg_2SiO_4 and Fe_2SiO_4 .

Omnivore : Heterotrophic organism that consumes both plants and other animals as a source of food. Examples of omnivores include pigs, raccoons, rats, bears, turtles, monkeys, and humans. Also see carnivore, herbivore, scavenger, and detritivore.

Omnivorous : Feeding on a variety of foods, such as plants, fungi, bacteria, animals and organic detritus.

Oncolite : Oncolite - A small, often spheroidal, concentrically laminated, calcium-carbonate sedimentary structure formed by the buildup of layered masses of gelatinous sheaths of blue-green algae; generally not more than 10 centimeters in diameter.

One-Tailed Statistical Test : Is an inferential statistical test where the values for which one can reject the null hypothesis are located entirely in one side of the center of the probability distribution.

Onion Skin Weathering : See exfoliation.

Onshore Offshore Transport : The up and down movement of sediment roughly perpendicular to a shoreline because of wave action.

Onyx : Onyx - Term originally applied to agate with straight, parallel bands. Sometimes called sardonyx.

Oogonium : Specialized sexual structure formed as a female gametangium by funguslike organisms in the phylum Oomycota.

Oolitic : Oolitic - Pertaining to oolite, a sedimentary rock made up of round to oval accretionary bodies with diameters ranging from 0.25 to 2 millimeters and usually formed of calcium carbonate.

Oospore : Thickwalled spore formed within an oogonium by funguslike organisms in the phylum Oomycota. OR Thick-walled spore formed within an oogonium by fungus-like organisms in the phylum Oomycota.

Oospore :

Open : (Animal science) a term commonly used to refer to a non-pregnant female.

Open Sea : That part of the ocean that extends from the continental shelf. Compare with coastal zone.

Open System : Is a system that transfers both matter and energy can cross its boundary to the surrounding environment. Most ecosystems are an example of

an open system.

Open Talik : Is a form of localized unfrozen ground (talik) in an area of permafrost. It is open to the ground surface but enclosed to permafrost below and at its sides.

Open Pollinated : Refers to seeds produced from plants which are allowed to pollinate primarily through insects, wind and water. Open-pollinated varieties of the same species often need to be isolated from each other to prevent cross-pollination if seeds are to be saved. Open-pollinated plants, managed carefully, will produce offspring with reliable characteristics, allowing seeds to be saved and grown out year after year, generation after generation.

Operating permit : State operating permit issued under the Virginia Biosolids Use Regulations. Operating permits are site-specific permits.

Operculum : Operculum - The opening of a shell.

Operon : Cluster of genes whose expression is controlled by a single operator; typical in prokaryotic cells.

Opisometer · Mechanical device for measuring non-linear distances on maps.

Optimum : The level of an abiotic factor or condition in the environment within the tolerance range at which a species or population can function most efficiently or with the greatest positive effect to its physiological or reproductive fitness.

Order . : See SOIL ORDER.

Ordovician : Geologic period that occurred roughly 438 to 505 million years ago. During this period, the first fish and fungi species appear.

Organ : Group of cells and tissues that have a particular function for an organism.

Organelle : Membraneenclosed body specialized for carrying out certain functions; found only in eukaryotic cells.

Organic : (1) Relating to an organism.

(2) Derived from an organism.

Organic : A substance that contains carbon-to-carbon bonds. Literally refers to something derived from plant or animal matter. Includes anything that is or was living, made from something living, excreted from something living. The term "organic" is used to describe a philosophy of working within the laws and systems existing in nature to achieve a healthy environment that is bountiful long-term. Healthy soil is the foundation of this philosophy, therefore, the term comes up frequently in discussions of home composting.

Organic Contaminants : Synthetic trace organics include pesticides and polychlorinated biphenyls (PCB's).

Organic fertilizer : A fertilizer of natural mineral or biological origin, usually processed only physically not involving chemical manufacturing or alteration. Definitions may be provided by a certifying organization. Term used in contrast to chemical fertilizer. Other criteria may include considerations of nutrient concentration and solubility in the naturally occurring material.

Organic material of intermediate decomposition(e) : This symbol is used with O to indicate organic materials of intermediate decomposition. The fiber content of these materials is 17 to 40 percent (by volume) after rubbing.

Organic materials : Plant derived organic accumulations.

Organic materials [soil survey] : Unconsolidated sediments or deposits in which carbon is an essential, substantial component. Several types of organic materials (deposits) can be identified based on the composition of the dominant fibers (grassy organic materials, herbaceous organic materials, mossy organic materials, woody organic materials). Compare - herbaceous peat, moss peat, sedimentary peat, woody peat.

Organic Matter : Portion of the soil that includes microflora and microfauna (living and dead) and residual decomposition products of plant and animal tissue; any carbon assembly (exclusive of carbonates), large or small, dead or alive, inside soil space; generally consists primarily of humus.

Organic matter, active fraction : The highly dynamic or labile portion of soil organic matter that is readily available to soil organisms. May also include the living biomass. Particulate organic matter (POM) and light fraction (LF) are measurable indicators of the active fraction. POM particles are larger than other SOM and can be separated from soil by sieving. LF particles are lighter than other SOM and can be separated from soil by centrifugation.

Organic matter, stabilized organic matter : The pool of soil organic matter that is resistant to biological degradation because it is either physically or chemically inaccessible to microbial activity. These compounds are created through a combination of biological activity and chemical reactions in the soil. Humus is usually a synonym for stabilized organic matter, but is sometimes used to refer to all soil organic matter.

Organic nitrogen : The nitrogen combined in organic molecules such as proteins, amines, and amino acids.

Organic soil : Soil that contains a high percentage ($>200 \text{ g kg}^{-1}$, or $>120180 \text{ g kg}^{-1}$ if saturated with water) of organic carbon.

Organic waste : Waste material which comes mainly from animal or plant sources. Organic waste generally can be consumed by bacteria and other small organisms. Inorganic wastes are chemical substances of mineral origin.

OrganicN : Nitrogen in organic material.

Organism : Any form of life. OR Any form of animal or plant life.

Organosols : Soils that are dominantly made up of organic materials. A Soil Order of the Australian Soil Classification (Isbell, 1996).

ORGANOSOLS Soils that are dominantly made up of organic materials. A Soil Order of the Australian Soil Classification (Isbell, 1996). OR ASC Soil Order classification—Soils that are not regularly inundated by saline tidal waters and have more than 0.4m of organic materials in the upper 0.8 m either extending down from the surface or cumulatively; or have organic materials extending from the surface to a minimum depth of 0.1 m directly overlying rock or other hard layers.

Organotroph : Organism that obtains reducing equivalents (stored electrons) and carbon from organic substrates.

Origin : The arbitrary starting point on a graph or grid coordinate system. Defined by the intersection of the x and y-axes. Also see false origin.

Orogenesis : The process of mountain building through tectonic forces of compression and volcanism.

Orogenic Belt : A major range of mountains on the continents.

Orogeny : The term given to periods of mountain building, folding and faulting.

Orographic Precipitation : Is precipitation that forms when air is forced to rise because of the physical presence of elevated land. As the parcel rises it cools as a result of adiabatic expansion at a rate of approximately 10° Celsius per 1,000 meters until saturation. The large amounts of precipitation along the west coast of Canada are due mainly to this process.

Orographic Uplift : Uplift of an air mass because of a topographic obstruction. Uplift also causes the cooling of the air mass. If enough cooling occurs condensation can occur and form into orographic precipitation.

ORP : Oxidation reduction potential - the degree of completion of a chemical reaction by detecting the ratio of ions in the reduced form to those in the oxidized form as a variation in electrical potential measured by an ORP electrode assembly.

Orthic : This term is used to describe Tenosols in the Australian Soil Classification (Isbell, 1996).

It refers to soils with a B Horizon

- That is weakly developed in terms of colour, structure, texture and segregations;
- Or a B2 Horizon with less than 15% clay;

Or a transitional horizon (C/B) occurring in fissures in the parent rock or weathered rock.

Orthographic Projection : Map projection that presents the Earth's surface in two-dimensions as if it were being observed from a great distance in space. Distortion of areas and angles becomes greater as you move from the center of the projection to its edges.

ORW (Outstanding Resource Waters) : unique waters of exceptional state or national recreational or ecological significance that require special protection to maintain existing uses.

OSHA : The Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA) is a law designed to protect the health and safety of industrial workers and treatment plant operators. It regulates the design, construction, operation and maintenance of industrial plants and wastewater treatment plants. The Act does not apply directly to municipalities, EXCEPT in those states that have approved plans and have asserted jurisdiction under Section 18 of the OSHA Act. Wastewater treatment plants have come under stricter regulation in all phases of activity as a result of OSHA standards, which also refers to the federal and state agencies which administer OSHA.

Osmosis : Diffusion of water through a membrane from a region of low solute concentration to one of higher concentration.

Osmotic potential : Portion of total soil water potential due to the presence of solutes in soil water.

Osmotolerent : Organisms that grow over a wide range of salt concentration.

Ostracode : Ostracode - Any minute, aquatic crustacean belonging to the subclass Ostracoda, characterized by a bivalve shell hinged along the dorsal side; also Ostrocod.

Outcrop : Area of exposed bedrock at the Earth's surface with no overlying deposits of soil or regolith.

Outer Core : Outer region of the Earth's core. It is believed to be liquid nickel and iron and has a density of about 11 grams per cubic centimeter. It surrounds the inner core and has an average thickness of about 2,250 kilometers.

Outfall : The place where a wastewater treatment plant discharges treated water into the environment.

Outgassing : The release of gas from cooling molten rock or the interior of the Earth. Much of the atmosphere's gaseous constituents, like water vapor, nitrogen, and argon, came from outgassing.

Output : Movement of matter, energy, or information out of a system. Also see input.

Outwash : Glacially deposited soil parent material worked and graded by water action from the melting glacial ice.

Outwash Plain : A flat or gentle sloping surface of glaciofluvial sediments deposited by meltwater streams at the edge of a glacier. Usually found in close spatial association with moraines.

Outwash, glacial : Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial meltwater.

Ovendry soil : Soil that has been dried at 105°C until it reaches constant mass.

Over Drafting : Removing water from an aquifer faster than it can be replaced. This normally results in ground subsidence.

Overbank deposit : Fine-grained alluvial sediments deposited from floodwaters outside of the fluvial channel.

Overbank Flow : Movement of flood waters outside a stream channel during period of high discharge.

Overthrust Fault : Fault produced by the fracturing of rock in a fold because of intense compression.

Overturnd Fold : A fold in rock layers where one limb is pushed past the perpendicular. This results in both limbs having dips in the same direction.

Oxbow Lake : Is portion of abandoned stream channel filled with stagnant water and cut off from the rest of the stream. Oxbow lakes are created when meanders are cut off from the rest of the channel because of lateral stream erosion.

Oxic : An environment with oxygen. OR A soil having a high redox potential. Such soils typically are well drained, seldom being waterlogged or lacking in oxygen. Rubification in such soils tends to increase with age.

Oxidation : (1) Chemical attachment of free oxygen to other elements and compounds. One of the types of chemical weathering.

(2) Loss of an electron during a chemical reaction from one atom to another. OR Process by which a compound gives up electrons, acting as an electron donor, and becomes oxidized.

Oxidation : Combining elemental compounds with oxygen to form a new compound. A part of the metabolic reaction.

Oxidation state : Number of electrons to be added (or subtracted) from an atom in a combined state to convert it to the elemental form.

Oxidation state : Number of electrons to be added (or subtracted) from an atom in a combined state to convert it to the elemental form.

Oxidationreduction (redox) reaction : Coupled pair of reactions, in which one

compound becomes oxidized, while another becomes reduced and takes up the electrons released in the oxidation reaction.

Oxidative phosphorylation : Synthesis of ATP involving a membrane-associated electron-transport chain and the creation of a proton-motive force. Also called electron-transport chain phosphorylation.

Oxidative phosphorylation : Synthesis of ATP involving a membrane-associated electron-transport chain and the creation of a proton-motive force. Also called electron-transport chain phosphorylation.

Oxidizing bacteria : Any substance such as oxygen (O₂) and chlorine (Cl₂), that can accept electrons. When oxygen or chlorine is added to wastewater, organic substances are oxidized. These oxidized organic substances are more stable and less likely to give off odors or to contain disease bacteria.

Oxidizing Environment : Oxidizing Environment - An environment in which oxygen combines with other elements.

Oxisol : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. These soils are found in moist tropical environments. They are extremely weathered and very old. Layers within the profile have accumulations of mineral oxides and have a lack of base cations available for exchange.

Oxyaquic : This term is used to describe Hydrosols in the Australian Soil Classification (Isbell, 1996). Soils with a seasonal or permanent water table where the major part of the solum (or the subsoil if the profile is layered) is whole coloured.

Oxygen Demand : See: BOD and CO

Oxygen demand : Chemical and biological oxygen demand (COD and BOD) are measures of the oxygen consumed when a substance degrades. Materials such as food waste and dead plant or animal tissue use up dissolved oxygen in the water when decomposed through chemical or biological processes.

Oxygenic photosynthesis : Use of light energy to synthesize ATP and NADPH by noncyclic photophosphorylation with the production of oxygen from water during carbon dioxide fixation.

Oxygenic photosynthesis : Use of light energy to synthesize ATP and NADPH by noncyclic photophosphorylation with the production of oxygen from water.

Ozonation : The application of ozone to water, wastewater, or air, generally for the purposes of disinfection or odor control.

Ozone : Tri-atomic oxygen that exists in the Earth's atmosphere as a gas. Ozone is highest in concentration in the stratosphere (10-50 kilometers above the Earth's surface) where it absorbs the sun's ultraviolet radiation. Stratospheric ozone is

produced naturally and helps to protect life from the harmful effects of solar ultraviolet radiation. Over the last few decades levels of stratospheric ozone have been declining globally, especially in Antarctica. Scientists have determined that chlorine molecules released from the decomposition of chlorofluorocarbons are primarily responsible for ozone destruction in the stratosphere. It is also abundant near the Earth's surface in highly polluted urban centers. In these areas, it forms as a by product of photochemical smog, and is hazardous to human health.

Ozone Hole : Is a sharp seasonal decrease in stratospheric ozone concentration that occurs over Antarctica in the spring. First detected in the late 1970s, the ozone hole continues to appear as a result of complex chemical reaction in the atmosphere that involves cfc's.

Ozone Layer : Atmospheric concentration of ozone found at an altitude of 10 to 50 kilometers above the Earth's surface. This layer is important to life on the Earth because ozone absorbs harmful ultraviolet radiation.

Ozonosphere : Another name for the ozone layer.

P

P horizons : Commonly known as peat. These horizons, dominated by decomposing organic matter have accumulated under water or excessive wetness (mcdonald *et al.*, 1990). P Horizons are further divided into P1 and P2.

Pacific High : High pressure system that develops over the central Pacific Ocean near the Hawaiian Islands. Also called the Hawaiian High.

PAH : Polycyclic Aromatic Hydrocarbons. (rarely, but sometimes used as the abbreviation for polyaluminum hydroxide)

Palaeolacustrine : Remnant lake formations.

Palaeolake : Lake extant during a prior geological period.

Paleozoic : Geological time period that groups a number of the older epochs (i.e. Cambrian to Permian 550 - 250 million years ago) ([link to Geological timechart](#)).

Pale : excessive development, usually very old.

Paleo soil tongue. : A soil tongue that formed during a previous soil-forming interval.

Paleoclimate : Climatic conditions in the geological past reconstructed from a direct or indirect data source.

Paleoclimatology : Scientific study of the Earth's climate during the past. OR The study of prehistoric earthquakes through the examination of soils, sediments, and rocks.

Paleolake : An ancient lake that existed in the past when hydrological conditions were different.

Paleosol : A soil exhibiting features that are the result of some past conditions and processes.

Paleozoic : Geologic era that occurred from 570 to 245 million years ago.

Palinspastic reconstruction. : Diagrammatic reconstruction used to obtain a picture of what geologic and/or soil units looked like before their tectonic deformation.

Palsa : A mound of peat that develops as the result of the formation of a number ice lenses beneath the ground surface. Typical size is 1 to 7 meters high, 10 to 30 meters wide, and 15 to 150 meters long. Found in the high latitudes. Similar to a

pingo.

Paludal : Sediments derived from swampy conditions.

Pan : A hardened and/or cemented horizon in or below the soil profile.

Pan or PAN : (1) Collection of chemicals found in photochemical smog - See peroxyacyl nitrates (PAN).

(2) Compact soil horizon that has a high clay content.

(3) Large natural basin or depression found in desert climates.

Pan. : A layer of soil that is compacted, hardened, or high in clay. Hardpan, claypan, fragipan.

Pangaea : Hypothetical super continent that existed in the geological past. Its break-up created the current configuration of landmasses found on the Earth.

Pans : Hard or cemented layers interfering with air, water and root penetration.

Parallel : A line parallel to the equator and connecting all places of the same latitude.

Parametric Tests : Statistical tests that assume the sample data is normally distributed.

Parapanic : A term used as a Subgroup definition for Podosols in the Australian Soil Classification (Isbell, 1996). It refers to soils with a strongly coherent (i.e. Consistence 4-5) B Horizon e.g. **Parapanic**, Pipey, Semiaquic PODOSOL.

Parasexual cycle : Nuclear cycle in which genes of haploid nuclei recombine without meiosis.

Parasexual cycle : Nuclear cycle in which genes of haploid nuclei recombine without meiosis.

Parasite : Consumer organism that feeds on a host for an extended period of time. Feeding causes the host to be less fit and may eventually cause premature death.

Parasitism : Feeding by one organism on the cells of a second organism, which is usually larger than the first. The parasite is, to some extent, dependent on the host at whose expense it is maintained.

Parent Material : The earthy materials

Both mineral and organic-from which soil is formed.

Parent material : . The unconsolidated organic and mineral material in which soil forms.

Parent material : The rock from which a soil profile develops.

Parent material : The unconsolidated organic and mineral material in which the soil forms.

Parent material : The unconsolidated organic and mineral material in which the soil forms. OR The unconsolidated organic and mineral material in which the soil forms.

Parasitism : One organism living on or in another to obtain nourishment, without providing any benefit to the host organism.

Parna : Aeolian-deposited clay particles whose source is believed to be the rivers and lakes of the Lake Eyre and Murray-Darling Basins.

Particle density : Density of the soil particles, the dry mass of the particles being divided by the solid (not bulk) volume of the particles, in contrast with bulk density.

Particle Density : The weight per unit volume of soil solids only.

Particle size : Effective diameter of a particle measured by sedimentation, sieving or micrometric methods.

Particle size analysis : The measurement of the relative amounts of coarse sand, fine sand, silt and clay size particles in a soil sample (as determined in the laboratory). Also called 'mechanical analysis'.

Particle size distribution : The amount (percent) of each of sand, silt, and clay in a soil sample. When the percents of each of these are added together, they should sum to 100%.

Particulate : Free suspended solids.

Particulate Matter : Particles of dust, soot, salt, sulfate compounds, pollen, or other particles suspended in the atmosphere.

Parts per billion : Expressed as ppb: a unit of concentration equivalent to the $\mu\text{g}/\text{l}$ (micrograms per liter). Sea water is generally considered to be 3.5% salt, or 35,000,000ppb. OR

Number of parts of a substance found in one billion parts of a particular gas, liquid, or solid.

Parts per million : Expressed as ppm: a measure of concentration. One ppm is one unit weight of solute per million unit weights of solution. In water analysis the ppm is equivalent to mg/l (milligrams per liter). Sea water is generally considered to be 3.5% salt, or 35,000ppm. PPM is the most common measurement of impurities.

Parts Per Million (ppm) : Number of parts of a substance found in one million parts of a particular gas, liquid, or solid.

Parts per million (ppm) : A volume unit of measurement; the number of parts of a substance in a million parts of another substance. For example, 10 ppm nitrate in water means 10 parts of nitrate in a million parts of water.

Parts per thousand : Expressed as ppt, a measure of concentration. One ppt is one unit weight of solute per thousand unit weights of solution. Sea water is generally considered to be 3.5% salt, or 35ppt.

Passive Remote Sensing : Form of remote sensing where the sensor passively captures electromagnetic radiation reflected or emitted by an object.

Pasteurization : (Dairy science) the process of heating milk to kill pathogens that may be harmful to humans.

Pasture : Grassland used for grazing of mainly domestic herbivores. OR (Animal science) a fenced area of forage, usually improved, on which animals are grazed.

Paternoster Lakes : A linear series of mountain valley lakes that are formed from glacial erosion. They form behind glacial moraines or in glacially carved out rock basins. The name of this feature is related to the series of lakes looking like a string of beads.

Pathogen : Organism able to inflict damage on a host it infects.

Pathogen : An organism, chiefly a microorganism, including viruses, bacteria, fungi, and all forms of animal parasites and protozoa, capable of producing an infection or disease in a susceptible host.

Pathogen Reduction : Decreasing the presence of disease-causing organisms through sewage sludge processing and site management practices.

Pathogenic organisms : Bacteria, viruses or cysts which cause disease (typhoid, cholera, dysentery) in a host (such as a person). There are many types of bacteria (non-pathogenic) which do NOT cause disease. Many beneficial bacteria are found in wastewater treatment processes actively cleaning up organic wastes.

Pathogenicity : Ability of a parasite to inflict damage on the host.

Pathogensuppressive soil : Soil where a pathogen does not establish or persist, a pathogen establishes but causes little or no damage, or a pathogen causes disease for a while, but the disease becomes less important even though the pathogen persists in soil.

Patterned Ground : Term used to describe a number of surface features found in periglacial environments. These features can resemble circles, polygons, nets, steps, and stripes. The development of some of these shapes is thought to be the result of freeze-thaw action.

PCB : Polychlorinated biphenyls. Aka polychloro-biphenyls. Difficult to remediate chemical used in old-style transformers. Concentrated PCBs used to be referred

to as "1268".

Peak Annual Flow : The largest discharge produced by a stream during a one year period.

Peat : Unconsolidated soil material consisting largely of undecomposed, or only slightly decomposed, organic matter accumulated under conditions of excessive moisture.

Peat (: I) *fibric peat*—undecomposed or weakly decomposed organic material; (ii) *hemric peat*—moderately to well-decomposed organic material; (iii) *sapric peat*—strongly to completely decomposed organic material.

Peatland : A generic term for any wetland where partially decayed plant matter accumulates; mire, moor and muskeg are terms used for peatlands in Europe and Canada; see also bog and fen.

Peaty horizon : This is a surface or near-surface layer of organic materials at least 0.2m thick overlying mineral soil and which does not qualify as an Organosol.

Peaty podzols : GSG classification—Soils consisting essentially of some depth of acid fibrous peat or sandy peat overlying sandy mineral soil that has most of the features of humus podzols but generally lacks a distinct A₂ horizon.

Pebbles : A rounded piece of rock that is larger than gravel.

Pecan nut casebearer : Pecan pest.

Pectin : Important component of the plant cell walls containing chains of galacturonic acid that is often esterified with a methyl group.

Ped :

Ped shape : Refers to the shape of natural soil aggregates. Descriptive terms used are:

Platy—The soil particles are flat or plate-like;

Prismatic—The soil particles are prism-shaped with well-defined flat surfaces;

Columnar—This ped shape is similar to prismatic, but the peds are larger and their tops are domed;

Polyhedral—Interlocking peds with many re-entry angles;

Angular blocky—Soil particles are approximately cubic with six relatively flat, equal faces. Edges are angular;

Sub-angular blocky—This ped shape is similar to angular blocky, but the edges of peds are rounded;

Granular—These peds are spheroids or polyhedrons having planar or curved surfaces which are relatively non-porous.

Pedal : A general soil science term indicating that soil structure is present. In the Australian Soil Classification (Isbell, 1996), pedal is used as a Great Group class for Calcarosols - where the subsoil (B) horizon has a grade of structure that is stronger than weak.

Pedal : Describes a soil in which some or all of the soil material occurs in the form of peds in the moist state.

Pedality : Refers to the relative proportion of peds in the soil (as strongly pedal, weakly pedal or non-pedal).

Pediment : A gradually sloping bedrock surface located at the base of fluvial-eroded mountain range. Found in arid locations and normally covered by fluvial deposits.

Pediplain : An arid landscape of little relief that is occasionally interrupted by the presence of scattered inselbergs. Formed by the coalescence of several pediments.

Pedochronology . : The study of pedogenesis with regard to the determination of when soil formation began, how long it occurred, and when it stopped. Also known as soil dating. Two ages and the calculated duration are important:

t_o = age when soil formation or aggradation began, ka

t_b = age when the soil or stratum was buried, ka

t_d = duration of soil development or aggradation, ky

Pedochronological estimates are based on available information. All ages should be considered subject to +50% variation unless otherwise indicated.

Pedogenic : Material formed by pedological processes (soil forming processes) exhibiting pedological features. OR The natural process of soil formation.

Pedogenic Regime : The particular soil forming process that operates in a certain climate. Some of the main processes are: laterization, salinization, podzolization, calcification, and gleization.

Pedology : The study of soils as naturally occurring phenomena taking into account their composition, distribution, and method of formation.

Pedon : A three-dimensional body of soil with lateral dimensions (1 to 10 m²) large enough to permit the study of horizon shapes and relations.

Pedosphere : The thin outer layer of the Earth which is made up of soil. The pedosphere acts as an integrator between the atmosphere, biosphere, lithosphere, and hydrosphere of the Earth.

Pedotransfer function (PTF) : A mathematical relationship between two or more soil properties that shows a reasonably high level of statistical confidence. PTF's are used to predict difficult-to-measure soil properties from readily obtained

properties of the same soil.

Pedoturbation : All mixing of soil components that is not caused by illuviation.

Pedunit : A selected column of soil containing sufficient material in each horizon for adequate laboratory characterization. Also referred to as PEDS.

Pell : low chroma, dull color.

Pelletization : In this process biosolids are first stabilized (see definition), then completely dried and pressed into small pellets. The pellets are then used as fertilizer since they are high in nitrogen.

Pellicle : Relatively rigid layer of proteinaceous elements just beneath the cell membrane in many protozoa and algae.

Peneplain : A large flat or gently undulation area. Its formation is attributed to progressive erosion by rivers and rain, which continues until almost all the elevated portions of the land surface are worn down. When a peneplain is elevated, it may become a plateau which then forms the initial stages in the development of a second peneplain.

Penetration resistance or penetrability : The ease with which a probe can be pushed into the soil.

Pennsylvanian : Geologic period that occurred roughly 286 to 320 million years ago. During this period, the first reptiles and winged insects appear.

Pepper weevil : Chile pest that is a concern in new mexico.

Peptidoglycan : Rigid layer of cell walls of bacteria, a thin sheet composed of Nacetylglucosamine, Nacetylmuramic acid, and a few amino acids. Also called murein.

Peraquic . : A condition that results from a high soil water table.

Perched ground water : *Unconfined ground water separated from the underlying main body of ground water by unsaturated rock. Agi*

Perched Water Table : Water table that is positioned above the normal water table for an area because of the presence of a impermeable rock layer.

Perched watertable : The surface of a local zone of saturation held above the main body of groundwater by an impermeable layer, usually clay, and separated from it by an unsaturated zone. OR The upper limit of perched water.

Percolate : To ooze or trickle through a permeable substance; infiltrate.

Percolating water : Water that passes through rocks or soil under the force of gravity.

Percolation : The downward movement of water in soil.

Percolation (soil water) : The downward or lateral movement of water through soil.

Percolation (soil water) : The downward or lateral movement of water through soil.

Percs slowly (in tables) . : The slow movement of water through the soil, adversely affecting the specified use.

Perennial : A plant that continues to grow from year to year.

Perennial Plant : Plant species that lives for more than two years.

Perennial stream : A watercourse that flows throughout the year or most of the year (90%), in a well defined channel. Same as a live stream.

Performance standard : A limitation on the emission or discharge of a pollutant that may be expressed as an emission or discharge standard or as a requirement for specific operating procedures.

Peribacteroid membrane : Plant-derived membrane surrounding one to several rhizobia within host cells of legume nodules

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Peridotite : Coarse grained ultramafic igneous rock composed mainly of olivine and pyroxene. The mantle is thought to be composed primarily of this rock type.

Periglacial : Pertaining to processes, conditions, areas, climates and topographic features occurring at the immediate margins of glaciers and ice sheets and influenced by cold temperature of the ice.

Perihelion : It is the point in the Earth's orbit when it is closest to the sun (147.5 million km). Perihelion occurs on the 3rd or 4th of January.

Period : Geologic time unit that is shorter than an era but longer than a epoch.

Periodic Table : Table that describes some of the chemical properties of the known elements.

Periplasmic space : Area between the cell membrane and the cell wall in Gram-negative bacteria, containing certain enzymes involved in nutrition.

Peristaltic pump : A type of positive displacement pump

Perithecium : Flask-shaped ascocarp open at the tip; containing asci of fungi in the phylum Ascomycota.

Peritrichous flagellation : Having flagella attached to many places on the cell surface.

Perlite : Volcanic mineral used as an amendment in potting soil.

Permafrost : Permanently frozen subsoil.

Permafrost : (i) permanently frozen subsurface material underlying the solum; (ii) perennially frozen soil horizon where temperature remains below 0°C throughout the year and in which Cryosols form.

Permanent grassland : Natural (mainly steppe areas) or agricultural soils with grass cover not normally ploughed.

Permanent pasture : (Animal science) pasture of perennial or self-seeding annual plants maintained through several years of grazing.

Permanent wilting point : Greatest water content of a soil at which indicator plants, growing in that soil wilt and fail to recover when placed in a humid chamber. Often estimated by the water content at -1.5-mpa soil matric potential.

Permanently flooded. : A condition where standing water covers the soil surface throughout normally wet years.

Permeability : The ease with which air, or plant roots penetrate into or pass through a specific horizon.

Permeability : The quality of soil that allows air or water to move through it. OR The ease with which gases, liquids, or plant roots penetrate or pass through the soil or a layer of soil. Permeability is determined by soil texture, structure, and porosity.

Permian : Last geologic period in the Paleozoic era. Occurred from 286 to 245 million years ago. This period saw the mass extinction of many corals, brachiopods, and trilobites. It also saw the diversification and growing dominance of the reptiles.

Peroxyacetyl Nitrate (PAN). : Chemical found in photochemical smog. Formed from photochemical reactions involving nitric oxide (NO) and volatile organic compounds (vocs). Quite damaging to plants.

Persistence : Refers to a slowly decomposing substance which remains active in the natural cycle for a long period of time.

Pesticide : Any substance that is intended to prevent, destroy, repel, or mitigate any pest.

Pesticide management : A BMP designed to minimize contamination of soil, water, air, and nontarget organisms by controlling the amount, type, placement, method, and timing of pesticide application necessary for crop production.

Petrocalcic : Soils with a B Horizon that directly overlies a calcrete pan. This term is used as a Great Group or Subgroup distinction for a number of Soil Orders in the Australian Soil Classification (Isbell, 1996)

Petroferric : These soils have ferruginous or ferromanganiferous nodules or concretions cemented into indurated blocks or large irregular fragments. Used

as a Great Group definition for a number of Orders in the Australian Soil Classification .

Petroferric horizon : Ferruginous or ferromanganiferous nodules or concretions cemented in place into indurated blocks or large irregular fragments.

Petroreticulite horizon : A reticulate horizon that is always indurated in the greater part both before and after exposure.

Pfrp : Process to further reduce pathogens.

pH : pH is an expression of the intensity of the basic or acidic condition of a liquid. Mathematically, pH is the logarithm (base 10) of the reciprocal of the hydrogen ion concentration. The pH may range from 0 to 14, where 0 is most acidic, 14 most basic, and 7 is neutral. Natural waters usually have a pH between 6.5 and 8.5.

Ph (SOIL) : This is a measure of soil acidity and soil alkalinity on a scale of 0 (extremely acidic) to 14 (extremely alkaline). A pH of 7 is neutral. Ph gives an indication of the availability of plant nutrients and relates to the growth requirements of particular crops. In most agricultural soils, pH is usually between 4 and 8.5. Excessive acidity or alkalinity makes the soils inhospitable for plant and microbial growth. Microorganisms don't flourish in low pH and enzyme activity also changes with the change in pH. Aluminium and Manganese solubility increases in acidic soils and becomes toxic to microorganisms (Coyne, 1999). Acid soils are usually deficient in necessary nutrients e.g. Calcium and magnesium.

pH Value : A numerical designation of acidity and alkalinity in soil. (See Reaction, soil)

pH, Soil : The negative logarithm of the hydrogen ion concentration of a soil solution. The degree of acidity or alkalinity of a soil expressed in terms of the pH scale, from 2 to 10.

Phage : See **bacteriophage**.

Phanerozoic : Geologic eon that occurs from 2500 million years ago to today. During this time period, life becomes more diversified and complex.

Phase : A state of matter. This can be solid, liquid or gaseous, in some cases, plasma.

Phase Change : Reorganization of a substance at the atomic or molecular level resulting in a change of the physical state of matter. For example, a change from solid to liquid to a gas.

Phase, soil : A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

Phenocrysts : Large crystals set in a fine-grained ground mass.

Phenol : An organic compound that is an alcohol derivative of benzene.

Phenols : Organic compounds

Phenotype : Observable properties of an organism.

Phloem : Food conducting tissue in vascular plants.

Phosphate : A nutrient needed for plant and animal growth and is also a fundamental element in metabolic reactions. High levels of this nutrient can lead to overgrowth of plants, increased bacterial activity, and decreased dissolved oxygen levels. Phosphate comes from several sources including human and animal waste, industrial pollution, and agricultural runoff.

Phosphobacterium : Bacterium that is especially good at solubilizing the insoluble inorganic phosphate in soil.

Phosphodiester bond : Type of covalent bond linking nucleotides together in a polynucleotide.

Phospholipid : Lipids containing a substituted phosphate group and two fatty acid chains on a glycerol backbone.

Phosphorous : The eleventh-most abundant mineral in the earth's crust and does not exist in a gaseous state. It is an essential nutrient for all life forms. Phosphorus plays a role in dna (deoxyribonucleic acid), the basic building block of life. Phosphorus in freshwater and marine systems exists in either a particulate phase (found in sediment plumes) or a dissolved phase (mixed in with the seawater).

Phosphorous (P) : An element essential to the growth and development of plants; occurs in manure and chemical fertilizer and, in excess, can cause waters to become polluted by promoting excessive growth of algae and other aquatic plants.

Phosphorus : An element essential to the growth and development of plants, but which, in excess, can cause unhealthy conditions that threaten aquatic animals in surface waters.

Phosphorus : Key nutrient influencing plant growth in most lakes and ponds, where it is the least available nutrient and therefore limits the growth of algae and aquatic vegetation. Phosphorus is abundant in plant and animal matter and attaches to fine soil particles. Stormwater transports phosphorus, increasing levels in waterbodies and causing algae populations to increase. This in turn causes a decline in water transparency and can accelerate eutrophication. With very high phosphorus concentrations, intense "blooms" of algae may occur, coloring the water green and releasing strong odors when they decay.

Phosphorus cycle : Sequence of transformations undergone by phosphorus where it is transformed between soluble and insoluble, and organic and inorganic forms.

Phosphorus fixation : A chemical process by which phosphate in solution is

precipitated from solution and into relatively insoluble iron and aluminum compounds in acid soils and into sparingly soluble calcium and magnesium compounds in basic soils.

Photic zone : Uppermost layer of a body of water or soil that receives enough sunlight to permit the occurrence of photosynthesis.

Photoautotroph : Organism able to use light as its sole source of energy and carbon dioxide as sole carbon source.

Photochemical Smog : Photochemical smog is a condition that develops when primary pollutants (oxides of nitrogen and volatile organic compounds created from fossil fuel combustion) interact under the influence of sunlight to produce a mixture of hundreds of different and hazardous chemicals known as secondary pollutants. Also see industrial smog.

Photodissociation : The splitting of a molecule by photon normally from the sun.

Photogrammetry : The science of using aerial photographs and other remote sensing imagery to obtain measurements of natural and human-made features on the Earth.

Photoheterotroph : Organism able to use light as a source of energy and organic materials as carbon source.

Photon : A discrete unit of radiant energy.

Photoperiod : The duration of the daylight period.

Photoperiodism : (1) Mechanism possessed by some organisms to use photoperiod to sense seasonal time.

(2) Response by organisms to changes in the duration of day and night.

Photophosphorylation : Synthesis of high-energy phosphate bonds, as ATP, using light energy.

Photosphere : Visible surface of sun from which radiant energy is released.

Photosynthesis : Process of using light energy to synthesize carbohydrates from carbon dioxide.

Photosynthesis : Is the chemical process where plants and some bacteria can capture and organically fix the energy of the sun. This chemical reaction can be described by the following simple equation:



The main product of photosynthesis is a carbohydrate, such as the sugar glucose, and oxygen which is released to the atmosphere. All of the sugar produced in the photosynthetic cells of plants and other organisms is derived from the initial chemical combining of carbon dioxide and water with sunlight. This chemical

reaction is catalyzed by chlorophyll acting in concert with other pigment, lipid, sugars, protein, and nucleic acid molecules. Sugars created in photosynthesis can be later converted by the plant to starch for storage, or it can be combined with other sugar molecules to form specialized carbohydrates such as cellulose, or it can be combined with other nutrients such as nitrogen, phosphorus, and sulfur, to build complex molecules such as proteins and nucleic acids. Also see chemosynthesis.

Photosynthesis : The process by which green plants combine water and carbon dioxide to form carbohydrates under the action of light. Chlorophyll is required for the conversion of light energy into chemical energy.

Photosynthetic Autotroph : An organism that produces food molecules inorganically by using light and the chemical process of photosynthesis. Plants are the dominant photosynthetic autotrophs on the Earth. This organism does not require outside sources of organic food energy for survival.

Phototaxis : Movement toward light.

Phototroph : Organism that uses light as the energy source to drive the electron flow from the electron donors, such as water, hydrogen, or sulfide.

Phototroph : A microorganism which gains energy from sunlight (radiant energy).

Phytoextraction : Use of plants to extract contaminants (such as metals) from the environment (especially soil). When the plants are saturated with contaminants they are harvested.

Phytomining : Use of plants to extract inorganic substances of economic value (precious metals, etc.)

Phytoremediation : Use of plants to remediate contaminated soil or groundwater.

Phyovolatilization : Use of plants to volatilize contaminants (solvents, etc.) From soil or water.

Phycobilin : Watersoluble pigment that occurs in cyanobacteria and functions as the light-harvesting pigments for Photosystem II.

Phycobilin : Water-soluble pigment that occurs in cyanobacteria and functions as the light-harvesting pigments for Photosystem II.

Phycobiont : The algal or cyanobacterial partner in a lichen.

Phyllite : Fine-grained low-grade metasedimentary rock intermediate in metamorphic-grade between a slate and a schist.

Phylogenetic Classification : Classification of organisms based on genetic connections between other species.

Phylogeny : Ordering of species into higher taxa and the construction of

evolutionary trees based on evolutionary (genetic) relationships.

Phylum : A group or category used in the taxonomic and/or phylogenetic classification of organisms. A phylum is composed of one or more classes. In the classification of plants the category division is often used synonymously.

Phymatotrichum root rot : Occurs in pistachios and grapes (sometimes in alfalfa or cotton). Can kill plants within two weeks. Plugs water-conducting tissue of the plant. Only found in three states: arizona, new mexico, and texas.

Physical and chemical treatment : : As applied to water, processes used in water treatment facilities to alter the composition of water. Physical processes are for instance filtration such as is used at the water uptake point in Aqua Genesis' desalination plants. Chemical treatment can be coagulation, chlorination, fluoridation, liming, or ozone treatment. IN O.R. desalination treatments are far greater on the chemical size both before and after passing through the O.R. filters.

Physical Geography : Field of knowledge that studies natural features and phenomena on the Earth from a spatial perspective. Subdiscipline of Geography.

Physical root restriction(d) : This symbol indicates noncemented, root-restricting layers in naturally occurring or human-made sediments or materials. Examples are dense basal till, plowpans, and other mechanically compacted zones.

Physical Weathering : The communiton of rocks into smaller fragments by physical forces such as frost action or exfoliation.

Physical Weathering : Breakdown of rock and minerals into small sized particles through mechanical stress.

Physicochemical : Characters are those such as temperature profiles, ph, inorganic ion content and distribution, po₂, oxygen profiles with depth, etc

Physiographic province : A region of which all parts are similar in geologic structure and climate and which has consequently had a unified geomorphic history; a region whose relief features and landforms differ significantly from that of adjacent regions.

Physiological Drought : A temporary daytime state of drought in plants due to the losses of water by transpiration being more rapid than uptake by roots although the soil may have an adequate supply. Such plants usually recover during the night.

Phytoaccumulation : See phytoextraction A process in which plants are able to degrade (break down) organic pollutants through their metabolic processes.

Phytoavailable : Available to vegetation.

Phytolith : Opaline formation in plant tissue that remains in the soil after the softer plant tissue has decomposed.

Phytophthora root rot (chile wilt) : Occurs in chile. Causes complete plant loss late in the season. Severe under conditions of excess moisture. Develops rapidly and can kill whole field if conditions are favorable.

Phytoplankton : Microscopic marine plants that live in the upper layer of the world's oceans and float freely in the water column.

Phytotoxic : Detrimental to plant growth; caused by the presence of a contaminant.

Phytotoxin : Substance causing growth reduction or death in plants.

PIB : Product Information Bulletin. General information on a product.

Piedmont Glacier : A large glacier formed from the merger of several alpine glaciers.

Pigment : Organic substance found in plant and animal cells that creates coloring.

Pilot tests : The testing of a technology under actual site conditions in order to identify potential problems before implementation.

Pin Flocc : Excessive solids carryover. May occur from time to time as small suspended sludge particles in the supernatant. There are two kinds: grey -ashlike, inert, has low BOD - indicates old sludge; and brown, but a portion neither settles nor rises, has high BOD - indicates young sludge

Pingo : A large conical mound that contains an ice core. This feature can be up to 60 to 70 meters in height. Form in regions of permafrost. Common in the Mackenzie Delta region of Canada. Also see the related palsa.

Pink bollworm : Cotton pest.

Pink root : Occurs in onions. Fungal disease that attacks roots, reducing bulb size and quality.

Pioneer Community : Community dominated by pioneer species of plants.

Pioneer Species : Plant species that dominate a community in the early stages of succession.

Pipey (b horizon) : These horizons are characterised by 'pipes' of bleached A2 horizon that penetrate (mostly vertically) into the B horizon. This results in a tongued A/B boundary on a profile face. The presence of a pipey horizon is used at the Great Group level within the Podsol Order of the Australian Soil Classification (Isbell, 1996), e.g. Parapanic, **Pipey**, Semiaquic **PODOSOL**.

Piping (in tables) : Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pisolitic : Comprising concentric nodules.

Pitfall trap : A small container (trap) buried so the rim is at the level of the soil

surface. It is used to catch soil arthropods that move across the ground surface.

Pitted Topography : Landscape characterized by numerous kettle holes on a glacial outwash plain.

Pitting (in tables). : Pits caused by melting ground ice. They form on the soil after plant cover is removed.

Place : A term used in geography that describes the factors that make the location of natural and human-made phenomena unique.

Plagioclase Feldspar : A type of feldspar that is rich in sodium and calcium. Common rock forming mineral.

Plagioclimax : A plant community which is maintained by continuous human activity of a specific nature, such as burning or grazing.

Plane of the Ecliptic : Hypothetical two-dimensional surface in which the Earth's orbit around the sun occurs.

Planet : (1) Any one of the nine primary celestial bodies that orbit the sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto.

(2) A similar body orbiting another star.

Plankton : A general term for the entire community of microscopic free-floating organisms, including phytoplankton, zooplankton, and a host of other marine organisms. Plankton serves as the primary food source for most marine ecosystems. Many animals like the blue whale feed entirely on planktonic organisms. OR Minute plant (phytoplankton) and animal organisms (zooplankton) that are found in aquatic ecosystems.

Plant : Organisms belonging to the kingdom Plantae. These organisms have the following general characteristics: lack of locomotion, lack of a nervous system, and cellulose cell walls. Most plants can photosynthesize.

Plant Available Nitrogen (PAN) : Plant available nitrogen is a calculated quantity of nitrogen made available during the growing season after application of biosolids. PAN includes a percentage of the organic nitrogen (20 percent in year 1), a percentage of the ammonium N (depends on pH and incorporation) and all the nitrate nitrogen in the biosolids.

Plant available water capacity (pawc) : The amount of soil water that can be extracted by the plant. It is defined as the difference in soil moisture content between the field capacity and the wilting point. It is expressed as millimetres of plant-available water within the root zone.

Plant available waterholding capacity : See available waterholding capacity.

Plant growthpromoting rhizobacteria (PGPR) : Broad group of soil bacteria that exert beneficial effects on plant growth usually as root colonizers. Many are

members of the genus *Pseudomonas*.

Plant nutrient : See essential element.

Plant residue : After a plant's yield has been harvested, that remaining portion of the plant which is ready to decompose in the soil.

Plantae : Group, at the kingdom level, in the classification of life. Multicellular organisms that have a eukaryotic cell type, chloroplasts, mitochondria and a cell wall composed of cellulose.

Plaque : Localized area of lysis or cell inhibition caused by virus infection on a lawn of cells.

Plasma membrane : See cytoplasmic membrane.

Plasmid : Covalently closed, circular piece of DNA which, as an extrachromosomal genetic element, is not essential for growth.

Plasmogamy : Fusion of the contents of two cells, including cytoplasm and nuclei.

Plasmogamy : Fusion of the contents of two cells, including cytoplasm and nuclei.

Plastic : Describes soil materials which are in a condition that allows them to undergo permanent deformation when force is applied without appreciable volume change or elastic rebound or without rupture. OR A moist or wet soil that can be molded without rupture.

Plastic Deformation : Irreversible change in the shape of a material without fracture as the result of the force of compression or expansion.

Plastic limit : (engineering) the water content at which the soil rolled to a 1/3-cm wire begins to crumble.

Plastic limit : The water content of the soil above which the soil will compress and shear when compacted - leading to structural degradation occurs. OR The moisture content at which a soil changes from semisolid to plastic.

Plastic soils : A soil capable of being moulded or permanently deformed in shape without a change in volume, rebound or texture.

Plasticity index : (engineering) the water content percentage between the liquid limit and the plastic limit.

Plasticity index : . The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastid : Specialized cell organelles containing pigments or protein materials.

Plate count : Number of colonies formed on a solid culture medium when uniformly inoculated with a known amount of soil, generally as a dilute soil suspension. The technique estimates the number of certain organisms present in the soil sample.

Plate Tectonics : Theory suggesting that the Earth's surface is composed of a number of oceanic and continental plates. Driven by convection currents in the mantle, these plates have the ability to slowly move across the Earth's plastic asthenosphere. This theory is very important to geology and geomorphology because it helps to explain the occurrence and formation of mountains, folds, faults, volcanoes, earthquakes, ocean trenches, and the mid-oceanic ridges.

Plateau Basalt : An accumulation of horizontal flows of basaltic lava. Also called flood basalts.

Platform : Horizontal sedimentary deposits found on top of continental shield deposits.

Platy : Soil aggregates that are horizontally elongated.

Platy structure : Peds are layered in plate-like sheets. This type of structure is usually associated with soils which have been subjected to compaction and is not normally associated with undisturbed soil profiles.

Playa : A dry lake bed found in a desert.

Pleistocene : The epoch of the Quaternary Period of geologic time, following the Pliocene Epoch and preceding the Holocene (approximately 2 million to 10 thousand years ago). OR First epoch of the Quaternary period, from 2 million years ago to 10 000 years ago.

Pleistocene Epoch (Ice Age) : Period of time from about 2 million years ago to 10,000 years ago. During this period areas of land at higher and middle latitudes were covered with glacial ice.

Pleistocene Period : The period following the Pliocene period, extending from 2,000,000-10,000 years BP. In Europe and North America, there is evidence of four or five periods of intense cold during this period, when large areas of the land surface were covered by ice - glacial periods. During the interglacial periods, the climate ameliorated and the glaciers retreated.

Pleistocene. : An epoch of geologic time extending from 10 ka to 1.8 Ma; it includes the last Ice Age.

Pleochroism (minerals) . : The changes in color when some transparent minerals are rotated in plane polarized light. It is expressed in terms of the nature and intensity of the color change.

Plinthite(v) : This symbol indicates the presence of iron-rich, humus-poor, reddish material that is firm or very firm when moist and hardens irreversibly when exposed to the atmosphere and to repeated wetting and drying.

Plinthite : The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in

platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Pliocene : An Epoch (within the Tertiary Period) in the geological time scale (1.6 - 5 million years ago).

Plio-pleistocene : A period of time extending from the end of the Pliocene Epoch into the beginning of the Pleistocene Epoch. This time period is also extends from the end of the Tertiary Period into the start of the Quaternary Period, approximately 5 to 1 million years ago.

Ploughing (tillage) : mechanical cultivation of agricultural soils by the plough to different depths (20 - 30cm) deep, creating arable land.

Plowpan . : A compacted layer formed in the soil directly below the plowed layer.

Plucking : Erosive process of particle detachment by moving glacial ice. In this process, basal ice freezes in rock surface cracks. As the main body of the glacial ice moves material around the ice in the cracks is pulled and plucked out. Also called quarrying.

Pluton : Any mass of intrusive igneous rock.

Pluvial Period : A period of hundreds of thousands of years of heavy rainfall.

Pocosin : A bog formed in shallow depressions with poor drainage, supporting predominantly evergreen shrubs or small trees.

Podosol : These soils have a B Horizon dominated by the accumulation of compounds of organic matter, aluminium and/or iron. These horizons may occur individually or in combination within a profile. A Soil Order of the Australian Soil Classification (Isbell, 1996).

Podosol diagnostic horizon : Various B horizons consisting of illuvial accumulations of amorphous organic matter-aluminium and aluminium-silica complexes, with or without iron in various combinations.

Podosols : ASC Soil Order classification—Soils with B horizons dominated by the accumulation of compounds of organic matter, aluminium and/or iron.

Podzol Soil : (1) Soil order (type) of the Canadian System of Soil Classification. This soil type is often found under coniferous forests. Its main identifying traits are a poorly decomposed organic layer, an eluviated A horizon, and a B horizon with illuviated organic matter, aluminum, and iron.

(2) Soil commonly found under coniferous forests.

Podzolization : Soil forming process that produces a strongly leached soil with a

distinctive iron hardpan layer in the B horizon. Common in cool, moist forest environments.

Podzols : GSG classification— Acid sandy soils with strongly differentiated horizons including a bleached horizon above a coffee coloured pan and coloured subsoil.

Point bar : Elongated, gently to moderately inclined low ridge within the stream channel built up by channelled stream flow.

Point Bar [coastal] : Low, arcuate subaerial ridges of sand developed adjacent to an inlet formed by the lateral accretion or movement of the channel. OR Stream bar deposit that is normally located on the inside of a channel bend.

Point source : Any confined and discrete conveyance from which pollutants are or may be discharged. These include pipes, ditches, channels, tunnels, conduits, wells, containers, and concentrated animal feeding operations. OR a stationary location from which pollutants are discharged. It is a single identifiable source of pollution, such as a pipeline or a factory.

Point source pollution : Water pollution that is discharged from a discrete location such as a pipe, tank, pit, or ditch. OR Pollution from a single identifiable source

Polar : Possessing hydrophilic characteristics and generally water soluble.

Polar Axis : Is a line drawn through the Earth around the planet rotates. The point at which the polar axis intercepts the Earth's surface in the Northern Hemisphere is called the North Pole. Likewise, the point at which the polar axis intercepts the Earth's surface in the Southern Hemisphere is called the South Pole.

Polar Cell : Three-dimensional atmospheric circulation cell located at roughly 60 to 90° North and South of the equator. Vertical air flow in the Polar cell consists of rising air at the polar front and descending air at the polar vortex.

Polar Easterlies : Winds that originate at the polar highs and blow to the subpolar lows in a east to west direction.

Polar flagellation : Condition of having flagella attached at one end or both ends of the cell.

Polar Front : Weather front located typically in the mid-latitudes that separates arctic and polar air masses from tropical air masses. Along the polar front we get the development of the mid-latitude cyclone. Above the polar front exists the polar jet stream.

Polar High : Surface area of atmospheric high pressure located at about 90° North and South latitude. These high pressure systems produced by vertically descending air currents from the polar vortex.

Polar jet stream : Relatively fast uniform winds concentrated within the upper atmosphere in a narrow band. The polar jet stream exists in the mid-latitudes at an altitude of approximately 10 kilometers. This jet stream flows from west to east at speeds between 110 to 185 kilometers per hour. Also see jet stream and subtropical jet stream.

Polar stratospheric clouds : High altitude clouds found in the stratosphere where the temperature is less than -85° celsius. Commonly found over antarctica. Have a role in the creation of the ozone hole over antarctica.

Polar vortex : high pressure system located in the upper atmosphere at the polar regions. In this system, air in the upper troposphere moves into the vortex center and then descends to the earth's surface to create the polar highs.

Polder : A term used in Holland for an area reclaimed from the sea or lake. A dyke is constructed around the area which is then drained by pumping the water out. Polders form valuable agricultural land or pasture land for cattle.

Polled : (Animal science) naturally hornless cattle; having no horns.

Pollutant : A substance that has a harmful effect on the health, survival, or activities of humans or other living organisms. OR Any substance, biological or chemical, in which an identified excess is known to be harmful to desirable organisms (both plants and animals). Some pollutants are toxic or poisonous. Others are dangerous because they stick to feathers (oil and tar) making it impossible for birds to fly or find food, or clog throats and stomachs, and entangle necks (plastic bags and strips) of marine creatures.

Pollution : Physical, chemical, or biological change in the characteristics of some component of the atmosphere, hydrosphere, lithosphere, or biosphere that adversely influences the health, survival, or activities of humans or other living organisms.

Polybetahydroxybutyrate (PHB) : Common storage material of prokaryotic cells consisting of betahydroxybutyrate or other betaalkanoic acids.

Polyclonal antiserum : Mixture of antibodies to a variety of antigens or to a variety of determinants on a single antigen.

Polyclonal antiserum : Mixture of antibodies to a variety of antigens or to a variety of determinants on a single antigen.

Polyculture : Fish farming in which 2 or more compatible or symbiotic species of fish are grown together. Also known as Multiculture.

Polycyclic landform : Landform that shows the repeated influence of one or more major geomorphic processes over geological time. Major geomorphic processes are: weathering, erosion, deposition, and massive earth movements caused by plate tectonics.

Polygenetic landform : Landform that shows the influence of two or more major geomorphic processes. Major geomorphic processes are: weathering, erosion, deposition, and massive earth movements caused by plate tectonics.

Polygenic Soil : A soil that has been formed by two or more different and contrasting processes so that all of the horizons are not genetically related.

Polyhedral structure : A soil structural unit whereby soil particles are arranged around a point and bounded by more than six relatively flat but dissimilar faces.

Polymer : Large molecule formed by polymerization of monomeric units. OR A chemical formed by the union of many monomers (a molecule of low molecular weight). Polymers are used with other chemical coagulants to aid in binding small suspended particles to form larger chemical flocs for easier removal from water. All polyelectrolytes are polymers, but not all polymers are polyelectrolytes.

Polymerase chain reaction (PCR) : Method for amplifying DNA *in vitro*, involving the use of oligonucleotide primers complementary to nucleotide sequences in target genes and the copying of the target sequences by the action of DNA polymerase.

Polypedon : An identifiable soil with distinct characteristics found in a location or region. Composed of numerous pedons.

Polysaccharide : Long chain of monosaccharides (sugars) linked by glycosidic bonds.

Polysaccharides : Carbohydrates made up of monosaccharides (simple sugars). Starch and cellulose are polysaccharides.

Polysome : Strings of ribosomes attached by strands of mrna.

Ponding : Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Pool : Scoured depression found on the bed of streams. Associated with riffles.

Poor filter : Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets : Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Poorly Drained : See strongly anaerobic.

Poorly graded. : Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Population : (1) Refers to all the individuals of a given species in a specific area or

region at a certain time. Its significance is more than that of a number of individuals because not all individuals are identical. Populations contain genetic variation within themselves and between other populations.

(2) A statistical population is the entire collection of people, animals, plants or things from which we may collect data from.

Population : All the individuals of a species in a given area.

Population crash : Sudden decline in the number of individuals found in a population because of a scarcity of environmental resources that are required for survival, growth, and reproduction.

Population density : Number of individuals of a particular species found in a specified area.

Population parameter : A value used to represent a certain quantifiable characteristic of a population. For example, the population mean is a parameter that is often used to indicate the central value of quantity.

Pore : A discrete volume of soil atmosphere completely surrounded by soil (cf. PORE SPACE).

Pore ice : A form of periglacial ground ice that is found in the spaces that exist between particles of soil.

Pore space : Portion of soil bulk volume occupied by soil pores.

Pore spaces : The area of the soil through which water and air move. The space between soil particles.

Pore volume (pore space) : The volumetric percentage of soil bulk that is occupied by air and water not by solid particles.

Pore water pressure : A measure of the pressure produced by the head of water in a saturated soil and transferred to the base of the soil through the pore water. This is quantifiable in the field by the measurement of free water surface level in the soil. Pore water pressure is a key factor in failure of a steep slope soil, and operates primarily by reducing the weight component of soil shear strength. Chatwin and others, 1994.

Pore water, or interstitial water - : *Subsurface water in an interstice, or pore. Agi*

Porin : A protein channel in the lipopolysaccharide layer of Gram-negative bacteria.

Porosity : Volume of pores in a soil sample (nonsolid volume) divided by the bulk volume of the sample. OR The volume of the soil mass occupied by pores and pore spaces.

Posilac : (dairy science) Trade name for rbst marketed by Protiva, a unit of

Monsanto.

Positive feedback : Change in the state of a system that enhances the measured effect of the initial alteration.

Post-glacial : Refer to the Holocene.

Potable water : Water that is safe and palatable for human consumption.

Potable water. : Water that does not contain objectionable pollution, contamination, minerals, or infective agents and is considered satisfactory for drinking.

Potassium fixation : A physical process by which potassium ions are trapped in the lattice of micaceous clays.

Potential energy : Is the energy that a body possesses by virtue of its position and that is potentially transformable into another form of energy.

Potential evapotranspiration : Is a measure of the ability of the atmosphere to remove water from the surface through the processes of evaporation and transpiration assuming no limitation on water supply.

Potentially mineralizable nitrogen (PMN) : A test measuring the amount of soil organic nitrogen converted to plant available forms under specific conditions of temperature, moisture, aeration, and time. It is a measure of biological activity and indicates the amount of N that is relatively rapidly available.

POTW : Publicly Owned Treatment Works, as opposed to an industrially owned facility or pipe system.

Pour plate : Method for performing a plate count of microorganisms. A known amount of a serial dilution is placed in a sterile Petri dish and then a melted agar medium is added and the inoculum mixed well by gently swirling. After growth the number of colony forming units is counted.

Powdery mildew : Occurs mostly in chile and grapes. Foliar disease that causes leaf curling and premature leaf drop. This exposes the fruit to the sun, resulting in sun scald.

Powertakeoff (PTO) : (crop science) A powered shaft, usually extending from the rear of the tractor and driven by the tractor motor, to supply rotative power to an attached or trailing implement such as a combine, hay baler, mower, etc.

Ppb : See parts per billion.

Ppm : See parts per million.

ppm : Parts Per Million - the unit commonly used to designate the concentration of a substance in a wastewater in terms of weight ie. one pound per million pounds, etc. ppm is synonymous with the more commonly used term mg/L

(milligrams per liter).

Ppt : See parts per thousand.

Prairie soils : GSG classification— Moderately deep, mildly acid to mildly alkaline soils with thick, dark, moderately structured topsoils.

Precambrian : Span of geologic time that dates from 4.6 billion to 570 million years ago. Made up of three geologic eras: Hadean, Archean, and Proterozoic.

Precambrian shield : Another term for shield.

Precession of the Equinox : Wobble in the Earth's polar axis. This motion influences the timing aphelion and perihelion over a cyclical period of 23,000 years.

Precipitable water : Amount of water potentially available in the atmosphere for precipitation. Usually measured in a vertical column that extends from the earth's surface to the upper edge of the troposphere.

Precipitate : Solidification of a previously dissolved substance from a solution. OR An insoluble reaction product in an aqueous chemical reaction. OR Rain, snow, and other forms of water that fall to earth.

Precipitation : Rain, snow, and other forms of water that fall to earth.

Precipitation : The fall of condensed moisture as rain, snow, hail or sleet.

Precipitation process : The altering of dissolved compounds to insoluble or badly soluble compounds, in order to be able to remove the compounds by means of filtration.

Predation : Relationship between two organisms whereby one organism (predator) engulfs or captures and digests the second organism (prey). OR Biological interaction between species where a predator species consumes a prey species.

Predator : Consumer organism who feeds on prey. The process of consumption involves the killing of the prey.

Prediction : Forecast or extrapolation of the future state of a system from current or past states.

Preferential flow : The process whereby free water and its constituents move by preferred pathways through a porous medium.

Preliminary treatment : The removal of metal, rocks, rags, sand, eggshells, and similar materials which may hinder the operation of a treatment plant. Preliminary treatment is accomplished by using equipment such as racks, bar screens, comminutors, and grit removal systems.

Preparation : Treatment of materials prior to composting, including grinding, shredding, sorting and adding sewage sludge.

Presence of slickensides(ss) : This symbol indicates the presence of slickensides. Slickensides result directly from the swelling of clay minerals and shear failure, commonly at angles of 20 to 60 degrees above horizontal. They are indicators that other vertic characteristics, such as wedge-shaped peds and surface cracks, may be present.

Pressure : Is defined as the force acting on a surface from another mass per unit area.

Pressure gradient force : Force due to spatial differences in atmospheric pressure. Usually expressed in millibars or kilopascals per unit distance (meters or kilometers). This force is primarily responsible for the formation of wind.

Pressure melting point : temperature at which minerals deep within the earth and ice below the surface of a glacier are caused to melt because of the introduction of pressure.

Pressure potential : the amount of work an infinitesimal amount of soil water can do in moving from a pool of pure water under pressure common to that soil position to a pool of pure water at the same location and at normal atmospheric pressure.

Pre-treatment : : Processes used to reduce or eliminate wastewater pollutants from before they are discharged, or in this case, physical treatments such as the mechanical filtration for the uptake of ocean water before use in the desalination plant.

Pretreatment facility : Industrial wastewater treatment plant consisting of one or more treatment devices designed to remove sufficient pollutants from wastewaters to allow an industry to comply with effluent limits established by the US EPA General and Categorical Pretreatment Regulations or locally derived prohibited discharge requirements and local effluent limits. Compliance with effluent limits allows for a legal discharge to a POTW.

Prevailing wind : Dominant direction that a wind blows from for a location or region.

Prey : Organism that is consumed by a predator.

Primary carnivore : See secondary consumer.

Primary consumer : Organisms that occupy the second trophic level in the grazing food chain. These organisms are herbivores.

Primary ecological processes : Ecological processes including the water cycle (the capture, storage and redistribution of precipitation), energy flow (conversion of sunlight to plant and animal matter), and the nutrient cycle (the cycle of nutrients such as nitrogen and phosphorus through the physical and biotic components of the environment).

Primary Mineral : 1. A mineral such as feldspar or mica which occurs or occurred originally in an igneous rock. 2. Any mineral which occurs in the parent material of the soil. OR A mineral that has not been altered chemically since crystallization and deposition from molten lava. See also secondary mineral. OR A mineral that has not been altered chemically. Contrasted with secondary mineral (clays).

Primary nutrient : The elements P, K and N. These must be taken up and utilized in sufficient quantities for plants to complete their life cycles. Normally present in quantities > 1%.

Primary pollutant : Air pollutants that enter the atmosphere directly. Also see secondary pollutant.

Primary producer : Organism that adds biomass to the ecosystem by synthesizing organic molecules from carbon dioxide and simple inorganic nutrients.

Primary succession : succession on soil or sediments that do not contain an active seed bank.

Primary treatment : A wastewater treatment process that takes place in a rectangular or circular tank and allows those substances in wastewater that readily settle or float to be separated from the water being treated.

Primary wave : See p-wave.

Prime meridian : The location from which meridians of longitude are measured. Has the measure of 0° of longitude. The prime meridian was selected by international agreement to run through greenwich, england.

Primer : Molecule (usually a polynucleotide) to which DNA polymerase can attach the first nucleotide during DNA replication.

Prior stream : The course of a former stream responsible for the nearby sediments that did not carry water other than local drainage. A low ridge built up from materials deposited by stream flow along a former stream channel (mcdonald *et al.*, 1990).

Prismatic : A type of soil structure in which the soil ped is in the shape of a prism.

Prismatic structure : A soil structural unit whereby soil particles are arranged around a vertical axis and bounded by relatively flat faces. The top of the prisms are also relatively flat. Prismatic structure is often associated with subsoil sodicity.

Probability : Statistical chance that an event will occur.

Probiotic : A commercial product containing selected strains of natural commensal species of bacteria, known to thrive in the acid pH of the digestive system, while producing valuable food-digesting enzymes, without causing any harm to the host organism. Such products often contain "prebiotic" nutrients, compounds which selectively encourage growth of the included beneficial bacteria, enhancing

their ability to “out-compete” undesirable organisms, including pathogenic (disease-causing) species.

Procaryote : Microorganisms which do NOT have an organized nucleus surrounded by a nuclear membrane. Bacteria and Archaea stand alone in this primitive kingdom. Plants, fungi, animals, birds, fish and all other organisms fit into the kingdom of “Eucaryotes”.

Process water : Water that serves in any level of the manufacturing process of certain products. In our case, salt or brackish water entrained into the system before discharge.

Processes : Physical, chemical and biological mechanisms that follow fundamental scientific laws. Examples include pedogenic processes, geomorphic processes, and ecological processes.

Process-response system : This is a system that integrates the characteristics of both morphological and cascading systems. In a process-response system, we can model the processes involved in the movement, storage, and transformation of energy and/or matter between system elements and we fully understand how the form of the system in terms of between measured features.

Producer : An organism that can synthesize the organic nutrients in requires for growth through processes like photosynthesis.

Product water : Water that has passed through our desalination device sold to the local municipality and also used as chill water in the Delta T units.

Productivity : Rate of energy fixation or storage of biomass by plants. Usually expressed per unit area and time. OR The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile : A vertical section through a soil from the surface into the relatively unaltered material. OR The vertical section of the soil from the soil surface down through the horizons including the parent material. It consists of two parts the solum and the parent material. The face of soil exposed in a vertical section.

Profile, soil : A vertical section of the soil extending through all its horizons and into the parent material.

Progeny : (animal science) The offspring of animals.

Progradation : The natural extension of a shoreline seaward.

Progradation. : The building outward toward the sea of a shoreline or coastline by nearshore deposition.

Progressive succession : succession where the developing plant community becomes complex and contains more species and biomass over time.

Prokaryote : Organism lacking a unit membrane-bound nucleus and other

organelles, usually having its DNA in a single circular molecule. OR Organisms whose cells have their genetic material in the form of loose strands of DNA found in the cytoplasm. They also do not have a membrane-bound nucleus and have few specialized structures located within their cell boundary.

Promoter : Site on DNA where the RNA polymerase binds and begins transcription.

Propagule : Cell unit capable of developing into a complete organism. OR Structure that develops into a plant.

Propagule : Cell unit capable of developing into a complete organism.

Prophage : State of the genome of a temperate virus when it is replicating in synchrony with that of the host, typically integrated into the host genome.

Proportional : Cause and effect relationship between two variables where a positive or negative change in the quantity of one causes a predictable similar quantity change in the other.

Prosthetic group : Tightly bound, nonprotein portion of an enzyme. OR Tightly bound, nonprotein portion of an enzyme; not the same as coenzyme.

Protection of soil : Conscious process necessary for soil and soil properties preservation realised at different levels (personal, local, national, continental) and using information obtained by soil research. Sustainability is the result of this process.

Protein : Constituent of living matter containing nitrogenous compounds.

Protein supplement : (Animal science) a feed containing protein, vitamins, and minerals which is fed to livestock to provide a complete diet.

Proterozoic : Geologic eon that occurred from 570 to 2500 million years ago. During this time period, the first single-celled and multi-celled eukaryotic organisms evolved and developed.

Protista : Old taxonomic term referring to algae, fungi, and protozoa (collectively, the eukaryotic protists), and the prokaryotes. OR Group, at the kingdom level, in the classification of life. Organisms that are mainly unicellular and have a eukaryotic cell type. A few multicellular members exist.

Protocooperation : See synergism.

Proton : A sub-particle of an atom that contains a positive charge.

Proton motive force (PMF) : Energized state of a membrane created by expulsion of protons through action of an electron transport chain.

Protoplasm : Complete cellular contents, cytoplasmic membrane, cytoplasm, and nucleus; usually considered the living portion of the cell, thus excluding those

layers peripheral to the cell membrane.

Protoplasm : Substances making up a cell including its exterior membrane.

Protoplast : Cell from which the wall has been removed.

Protozoa : Single-celled organisms with animal-like cells, including amoeba, ciliates, and flagellates. OR A group of motile microscopic animals (usually single-celled and aerobic) that sometimes cluster into colonies and often consume bacteria as an energy source.

Provirus : See **prophage**.

Proximal : A deposit of material that is closest to the source area.

Proxy data : Data that measures the cause and effect relationship between two variables indirectly. OR A mineral having the characteristic outward form of another mineral or object it replaces.

Pseudomorph :

Pseudomurein : A modified peptidoglycan found in methanogenic archaea.

Pseudopodium (plural, pseudopodia) : Protrusion of an amoeboid cell formed by the extrusion or streaming of the cytoplasm (but still enclosed in the membrane) for the purpose of movement or feeding.

Pseudopodium (plural, pseudopodia) : Protrusion of an amoeboid cell formed by the extrusion or streaming of the cytoplasm (but still enclosed in the membrane) for the purpose of movement or feeding.

Psychrometer : Instrument used to measure atmospheric humidity. It consists of two thermometers (wet-bulb and a dry-bulb) one of which has its bulb covered by a moistened wick. Humidity is determined by the difference in readings between the two thermometers after air has passed over both of them for a specific time period.

Psychrometric table : Table of values that allows for the determination of relative humidity and dew point from dry-bulb and wet-bulb temperatures recorded on a psychrometer.

Psychrophile : Organism able to grow at low temperatures and showing a growth temperature optimum < 15°C.

Psychrophile : Organism able to grow at low temperatures (0C) and showing a growth temperature optimum < 15°C. Not able to grow above 20C. OR This group of bacteria species work to break down organic matter under "cold" conditions of 0 degrees up to over 55 degrees. They generate low levels of heat.

Psychrophilic bacteria : Bacteria whose optimum temperature range is between 0 and 20 C (32 to 68 C), such as those found in Alken Clear-Flo® 7018.

Psychrotroph : Organism able to grow at 0C and above 20C

Public contact or public use sites : Land with a potential for use or contact by the public. This includes parks, ball fields, cemeteries, plant nurseries, turf farms, golf courses, schools, lawns, home gardens, road banks, residential land or other similar areas. It does not include agricultural land.

Publicly owned treatment works (potw) : Wastewater treatment facilities owned by the state or a unit of local government; usually designed to treat domestic wastewaters, but may also treat a significant amount of industrial waste.

Puddle : To destroy the structure of the surface soil by physical methods such as the impact of raindrops, poor cultivation with implements, and trampling by animals.

Puddled soil. : Dense, massive, structureless (no aggregates) soil artificially compacted when wet. Characteristic of structureless compressed clay.

Puncture vine (goat heads) : Annual plant notorious for its seed pods that can puncture automobile tires and lower the quality of hay and forage crops. Move by attaching to anything that comes by. Difficult to manage.

Pure culture : Population of microorganisms composed of a single strain. Such cultures are obtained through selective laboratory procedures and are rarely found in a natural environment.

Putrefaction : Biological decomposition of organic matter with the production of ill-smelling products associated with anaerobic conditions.

Putrescible Waste : - Organic materials prone to degrade rapidly, giving rise to obnoxious odors.

P-wave : A seismic wave that moves material in push-pull fashion in the direction of its travel. This type of seismic wave can travel through solids, liquids, and gases. Also called a primary wave.

Pyramid of Biomass : Graphic model describing the distribution of biomass in an ecosystem or community at the trophic level. Also see pyramid of numbers.

Pyramid of Numbers : Graphical model describing the number of organisms that exist at each trophic level in a community or an ecosystem. Also see pyramid of biomass.

Pyroclastic material : Pieces of volcanic rock thrown out in a volcanic explosion.

Pyroxene : A group of single chained inosilicate minerals whose basic chemical unit is the silica tetrahedron (sio₄). They are common rock forming minerals and are found in most igneous and metamorphic rocks. They form at high temperatures with very little water in the crystallization environment.

$$Q^* = (K + k)(1 - a) - LU + LD$$

Where Q^* is surface net radiation (global annual values of $Q^* = 0$, because input equals output, local values can be positive or negative),

K is surface direct shortwave radiation,

k is diffused shortwave radiation (scattered insolation) at the surface,

a is the albedo of surface,

LD is atmospheric counter-radiation (greenhouse effect) directed to the Earth's surface,

And LU is longwave radiation lost from the Earth's surface.

Q

Q10 : Relative increase in a reaction rate with temperature. It is expressed as the increase over a 10°C interval.

Quantitative revolution : Time in the history (after 1950) of physical geography when measurement became the central focus of research. This measurement was used primarily for hypothesis testing. With measurement came mapping, models, statistics, and mathematics. Researchers began investigating process rather than mere description of the environment.

Quarrying : See plucking.

Quartz : Mineral with the chemical formula SiO_2 . Quartz is common in continental crust but rare in oceanic crust.

Quartzite : Metamorphic rock rich in quartz created by the recrystallization of sandstone.

Quaternary : Quaternary - The second period of the Cenozoic era, following the Tertiary, beginning 1.6 million years ago and extending to the present; also, the corresponding system of rocks; consists of two unequal epochs; the Pleistocene, up to about 10,000 years ago, and the Holocene, since that time. OR Geologic period that occurred roughly 1.6 million years ago to today. During much of this period continental glaciers in the Northern Hemisphere covered large regions of land surface in the high and mid-latitudes. *Homo sapiens* appear about 200,000 years BP (before present) and become the first species to alter the Earth's environment on a large-scale.

Quaternary : Period of geological time covering the Holocene plus the Pleistocene. Up to 2.6 million years ago.

Quaternary Era : The period of geological time following the Tertiary Era, it includes the Pleistocene and Holocene periods and extends from 2,000,000 - 0 years BP.

Quaternary : A period of geologic time that includes the past 1.8 Ma. It consists of two epochs—the Pleistocene and Holocene.

Quick test, soil : simple, routine analysis on soils, usually to measure pH, soluble salts, and nutritional status.

R

R horizon : soil horizon found beneath the c horizon. Consists of consolidated rock showing little sign of weathering or pedogenesis. OR These horizons contain continuous rock of a moderately strong to very strong nature such as bedrock (mcdonald *et al.*, 1990).

R layer : Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

R/O unit : Reverse Osmosis Unit for water purification in small aquariums and miniature yard-ponds, utilizes a membrane under pressure to filter dissolved solids and pollutants from the water. Two different filter membranes can be used: the CTA (cellulose triacetate) membrane is less expensive, but only works with chlorinated water and removes 50-70% of nitrates, and the TFC membrane, which is more expensive, removes 95% of nitrates, but is ruined by chlorine. R/O wastes water and a system that cleans 100 gallons a day will cost from \$400 to \$600 with membrane replacement adding to the cost. A unit that handles 140 gallons a day will cost above \$700.00.

Rack : Evenly spaced parallel metal bars or rods located in the influent channel to remove rags, rocks, and cans from wastewater.

Radarsat : Satellite program established by the Canadian Space Agency for the purpose of remotely sensing the Earth's resources. Radarsat uses an active sensing system that transmits microwaves. See the following website for more information - Radarsat.

Radiant energy : energy in the form of electromagnetic waves and photons. In some cases it refers to the radiation emitted from the sun.

Radiation : The emission of energy from an object in the form of electromagnetic waves and photons.

Radiation fog : A type of fog that is also called ground fog. Radiation fog is generated by near surface cooling by radiation loss during the evening hours. For the fog to develop, the overnight cooling must cause saturation occur. This type of fog is normally quite shallow.

Radioactive decay : Natural decay of the nucleus of an atom where alpha or beta particle and/or gamma rays are released at a fixed rate.

Radioimmunoassay : An immunological assay employing radioactive antibody

or antigen for the detection of certain substances in body fluids.

Radioisotope : An isotope of an element that undergoes spontaneous decay with the release of radioactive particles

Radioisotope or Radioactive Isotope : A unstable isotope of an element. This material decays spontaneously and releases subatomic particles and electromagnetic energy.

Radiometer : General name for an instrument used to measure radiation over a specific wavelength range.

Radiometrics : Radiometrics is a measure of the natural radiation in the earth's surface, which can tell us about the distribution of certain soils and rocks. Geologists and geophysicists routinely use it as a geological mapping tool to tell them where certain rock types change. Radiometrics is also useful for the study of geomorphology and soils.

Radiometrics is also known as Gamma-Ray Spectrometry. A radiometric survey measures the spatial distribution of three radioactive elements (potassium-K, thorium-Th and uranium-U) in the top 30-45 cm of the earth's crust. The abundances of K, Th and U are measured by detecting the gamma-rays produced during the natural radioactive decay of these elements.

Radionuclide : An isotope of artificial or natural origin that exhibits radioactivity.

Rain : A form of precipitation. It is any liquid deposit that falls from clouds in the atmosphere to the ground surface. Rain normally has a diameter between than 0.5 and 5.0 millimeters.

Rain gauge : Instrument that measures the rain that falls at a location over a period of time.

Rain Splash : The redistribution of soil particles on the surface by the impact of rain drops. On slopes this can cause a large amount of erosion.

Rain Splash Erosion : See rain splash.

Raindrop impact : force exerted by a falling raindrop on a rock, sediment, or soil surface.

Rainfall Interception : The interception and accumulation of rainfall by the foliage and branches of vegetation.

Rainshadow effect : Reduction of precipitation commonly found on the leeward side of a mountain. The reduction in precipitation is the result of compression warming of descending air.

Rainsplash : Soil erosion caused from the impact of raindrops.

Rainwash : The erosion of soil by overland flow. Normally occurs in concert

with rainsplash.

Raised Beach : A beach raised by earth movement thus forming a narrow coastal plain. There may be raised beaches at different levels resulting from repeated earth movement.

Raised Bed : A slightly dome-shaped or flat-topped ridge of soil. Raised beds are generally a series of parallel ridges formed by cultivation with shallow furrows in between. Bed size depends on the crop grown and the number of plant rows per bed but is usually in the range of four- to eight-inches high and two- to four-foot wide, with one to three rows per bed. Advantages of raised beds include improved soil drainage, earlier soil warming, and easier picking of some crops. But beds also dry out more quickly and make irrigation a more critical requirement for many crops.

Ram (or buck) : (Animal science) a male sheep of any age.

Random : Process or event that occurs by chance.

Range : A statistical measure of the dispersion of observation values in a data set. Determined by taking the difference between the largest and the smallest observed value.

Rangeland : Land-use type that supplies vegetation for consumption by grazing and browsing animals. This land-use type is normally not intensively managed. OR (Animal science) a large open land area on which livestock wander and graze. The native vegetation is mainly grasses, forbs, and shrubs.

RAS : Return activated sludge - settled activated sludge that is collected in the secondary clarifier and returned to the aeration basin to mix with incoming raw settled wastewater.

RASVSS : Return Activated Sludge Volatile Suspended Solids.

Raw Humus : A humus form consisting predominantly of well preserved, though often fragmented plant remains with few fecal pellets.

RBC : Rotating biological contactor - an attached culture wastewater treatment system

Rbst : (dairy science) Recombinant BST, produced by genetically modified bacteria. Increases milk yield of dairy cows when administered properly.

Reach : An expanse of a stream channel.

Reaction center : A photosynthetic complex containing chlorophyll (or bacteriochlorophyll) and other components, within which occurs the initial electron transfer reactions of photophosphorylation

Reaction, soil : A measure of acidity or alkalinity of a soil. expressed in pH - values. A soil that tests to pH 7.0 is described as precisely neutral in reaction

because it is neither acid or alkaline.

Reaction, soil. : A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as pH:

- *Extremely acid- below 4.5*
- *Very strongly acid-4.5 to 5.0*
- *Strongly acid-5.1 to 5.5*
- *Medium acid-5.6 to 6.0*
- *Slightly acid-6.1 to 6.5*
- *Neutral-6.6 to 7.3*
- *Mildly alkaline-7.4 to 7.8*
- *Moderately alkaline-7.9 to 8.4*
- *Strongly alkaline-8.5 to 9.0*
- *Very strongly alkaline-9.1 and higher*

Reagent : A pure chemical substance that is used to make new products or is used in chemical tests to measure, detect, or examine other substances.

Realized niche : Describes the part of the fundamental niche that a species actually occupies.

Reannealing : Process where two complementary single strands of DNA automatically hybridize back into a single, doublestranded molecule upon cooling.

Recalcitrant : Resistant to microbial attack. OR Term generally applied to organic matter that is quite stable or nutrients that are stable and not subject to release into soluble form. OR Resistant to microbial attack.

Receiving water : Body of water that receives runoff or wastewater discharges; may be a river, stream, lake, estuary, or groundwater.

Receiving waters : A river, lake, ocean, stream or other watercourse into which wastewater or treated effluent is discharged.

Recessional moraine : moraine that is created during a pause in the retreat of a glacier. Also called a stadial moraine.

Recharge Area : Recharge Area - The area where water predominantly flows downward through the unsaturated zone to become groundwater.

Recharge area : The area on the earth's surface that receives water for storage into a particular aquifer.

Recharge Area : An area where rainwater soaks through the ground to reach an aquifer.

Recharge rate : The rate at which waters flow into a void (down a thermodynamic gradient) to replace water removed. Used in ground water context it is the rate at which water can be extracted without over drafting the aquifer.

Recirculation : Recycling water after it is used. Often it has to pass a wastewater purification system before it can be reused.

Recombinant DNA : DNA molecule containing DNA originating from two or more sources.

Recombination : Process by which genetic elements in two separate genomes are brought together in one unit.

Reconnaissance gology/mapping : A general, exploratory examination or survey of the main features of a region, usually preliminary to a more detailed survey. It may be made in the field or office, depending on the extent of information available. Chatwin and others, 1994.

Recovery rate : a measure of a reverse osmosis system's efficiency: generally measured as amount of water produced divided by amount of water used: a rate of 25% is usually considered efficient

Recreation area : Any area used by the public for recreation is a recreation area. Examples include, but are not limited to, golf courses, parks, campgrounds, picnic grounds, athletic fields, fairgrounds, race tracks and others.

Rectangular coordinate system : System that measures the location of points on the earth on a two-dimensional coordinate plane. See the universal transverse mercator (utm) grid system.

Recumbent fold : A fold in which the axial plane is almost horizontal.

Recurrence interval : The average time period that separates natural events of a specific magnitude. For example, floods of a specific stream discharge level.

Recycle : The use of water or wastewater within (internally) a facility before it is discharged to a treatment system.

Red and Brown Hardpan Soils : GSG classification—Soils have simple, shallow to moderately deep profiles of red earthy and massive soil sharply overlying an indurated pan resulting from silica cementation and clay deposition.

Red Bed : Red Bed - A sedimentary rock layer composed largely of sandstone and shale, deposited in continental environments. These layers are predominantly red in color.

Red calcareous soils : GSG classification—see Grey-brown and Red Calcareous Soils.

Red clays : GSG classification—See Grey, Brown and Red Clays.

Red earths : GSG classification—Massive, reddish sandy profiles with a gradual increase in clay content with depth over a diffuse to gradual boundary.

Red podzolic soils : GSG classification—Strongly differentiated duplex soils with light to medium textured A₁ horizon over a pale or bleached A₂ over a reddish, firm to friable B horizon with generally polyhedral structure.

Redbrown earths : Great Soil Group Classification (Stace *et al.*, 1968). The surface soil is moderately thick and mildly acid to neutral, and the B Horizons are usually alkaline and may contain carbonates. These soils are typical of semiarid to subhumid climates and develop on various parent materials.

The characteristic features of a red-brown earth include

- An A horizon which is grey-brown to red-brown *loamy sand to sandy clay loam*;
- An A horizon which is weakly structured to massive;
- An abrupt to clear boundary between the A and B horizons;
- A B horizon with a brighter brown to red *clay* and a well developed medium prismatic to blocky structure.

Red-brown Earths : GSG classification—The characteristic features of these soils are grey-brown to red-brown loamy A horizons, weakly structured to massive, an abrupt to clear boundary between A and B horizons, and brighter brown to red clay B horizons with well-developed medium prismatic to blocky structure.

Redox : 1. a term for the overall reactions in which one substance is oxidized while another is reduced by the electron transfers. 2. the electron density of the media. Redox is measured in units of millivolts.

Redoxic : These are soils with a seasonal or permanent water table where the major part of the solum is mottled. This term is used as a Suborder definition for Hydrosols in the Australian Soil Classification (Isbell, 1996).

Redoximorphic features : Irregular spots of different colors that vary in number and size. They generally indicate poor aeration and impeded drainage.

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Redoximorphic features : Irregular spots of different colors that vary in number and size. They generally indicate poor aeration and impeded drainage.

Reducing agent : Any substance, such as the base metal (iron) or the sulfide ion that will readily donate (give up) electrons. The opposite of an oxidizing agent.

Reducing Environment : Reducing Environment - An environment in which oxygen is removed from compounds.

Reducing equivalent (power) : Electrons stored in reduced electron carriers such as NADH, NADPH and FADH₂.

Reduction : (1) Chemical process that involves the removal of oxygen from a compound.

(2) A form of chemical weathering. OR Process by which a compound accepts electrons.

Reduction potential : Inherent tendency of a compound to act as an electron donor or an electron acceptor. Measured in millivolts.

Reduction, source reduction , : Practices which result in the reduction of wastes without additional energy expended for recycling, composting, disposal, etc. Examples are: minimal packaging, lowering demand for disposable products, leaving grass clippings and leaves on the lawn, and learning to read/write/review data online *without* printing it onto paper

Reductive dechlorination : Removal of Cl as Cl from an organic compound by reducing the carbon atom from CCl to CH.

Reef : A ridge of rocks found in the tidal zone along a coastline. One common type of reef is the coral reef. OR A ridge-like or mound-like structure, layered or massive, built by sedentary calcareous organisms; it is wave resistant and stands above the surrounding contemporaneously deposited sediment.

Re-entrants : A prominent indentation in an escarpment, ridge or shoreline.

Reference Dose (RfD) : Reference Dose (RfD) - Maximum daily exposure to a chemical that is judged to be without risk of adverse systematic health effects over a person's lifetime. It formerly was called the Acceptable Daily Intake.

Reference map : Map that shows natural and human-made objects from the geographical environment with an emphasis on location. Compare with thematic map.

Reference soil condition : The condition of the soil to which functional capacity is compared. . Soil quality is usually assessed by comparing a soil to a reference condition. The reference condition may be data from a comparable benchmark soil, baseline measurements taken previously on the same soil, or measurements from a similar soil under undisturbed vegetation, or under similar management.

Reflected infrared radiation : Form of electromagnetic radiation with a wavelength between 0.7 to 3.0 micrometers (µm).

Reflected wave : A water wave that reflects off the shore or another obstacle and is redirected towards the sea or lake.

Reflection (atmospheric) : Process where insolation is redirect by 180° after striking a particle. This redirection causes 100 % loss. Most of the reflection in the

earth's atmosphere occurs in clouds because of light's interception with particles of liquid and frozen water. The reflectivity of a cloud can range from 40-90 %. OR Process of returning sound or light waves back to their source.

Refractory materials : Material difficult to remove entirely from wastewater such as nutrients, color, taste, and odor-producing substances and some toxic materials.

Reg : A rocky desert landscape. See desert pavement.

Region : A term used in geography that describes an area of the Earth where some natural or human-made phenomena display similar traits.

Regional metamorphism : Large scale metamorphic modification of existing rock through the heat and pressure of plutons created at tectonic zones of subduction.

Regolith : The unconsolidated mantle of weathered rock, soil and superficial deposits overlying solid rock. OR The unconsolidated mantle of weathered rock and soil material on the Earth's surface, sometimes considered to be loose earth materials above solid rock. OR Loose layer of rocky material overlying bedrock.

REGOLITH : This is defined as weathered material between the soil and hard rock. Soil surveyors tend to restrict this term to the weathered C horizon of the soil, whereas geologists adhere to the depth of any unconsolidated material to hard rock (e.g.the depth of Tertiary and Quaternary unconsolidated sediments).

Regolith : Mantle of loose and weathered material overlying the bedrock.

Regosol soil : soil order (type) of the canadian system of soil classification. This type is any young underdeveloped soil that lacks identifying soil horizons.

Regression : Regression - The withdrawal of a sea from a continent.

Relative humidity : The ratio between the actual amount of water vapor held in the atmosphere compared to the amount required for saturation. Relative humidity is influenced by temperature and atmospheric pressure.

Relict landform : Landform in which the formative geomorphological processes are no longer active.

Relict soil. : A surface soil that was partly formed under climatic conditions significantly different from the present.

Relict-tidal inlet : A channel remnant of a former tidal inlet. The channel was cutoff or abandoned by infilling from migrating shore sediments. Compare - Inlet, Tidal Inlet. (Schoeneberger and Wysocki, 2005).

Relief : The range of topographic elevation within a specific area. OR The elevations or inequalities of a land surface, considered collectively.

Remediation : See **bioremediation**.

Remote sensing : The gathering of information from an object or surface without

direct contact.

Remote sensor : Mechanical devices used to remotely sense an object or phenomenon.

Rendzinas : GSG classification—Shallow to very shallow soils formed from limestones and marls; typically they are black, very dark brown or dark grey clay loams or light clays of strong, very fine crumb to granular structure and loose, soft consistence which usually continues throughout their thin sola.

Replication : Conversion of one doublestranded DNA molecule into two identical doublestranded DNA molecules.

Representative fraction : The expression of map scale as a mathematical ratio.

Repression : Process by which the synthesis of an enzyme is inhibited by the presence of an external substance (the repressor).

Reptile : Group of terrestrial vertebrate animals that includes turtles, tortoises, snakes, lizards, crocodiles, and alligators.

Reseeding Annual : An annual crop that produces and drops seed which will germinate and grow readily without human intervention the following year.

Reserve acidity : Soil acidity that is held to the soil particles. Reserve acidity is the major fraction of acidity in soils.

Reserve Capacity : Extra treatment capacity built into wastewater treatment plants and sewers to be able to catch up with future flow increases due to population growth.

Reservoir : In the context of human pathogens, a place where diseasecausing organisms reside when they are not living in a human host. ORA natural or artificial holding area used to store water.

Reservoir (Groundwater) : Reservoir (Groundwater) - For any given area, the subsurface storage space between the water table and the base of the principal aquifer—includes one or more aquifers and any associated fine-grained material (usually excludes any perched aquifer).

Residual accumulation of sesquioxides(o) : This symbol indicates a residual accumulation of sesquioxides.

Residual material : unconsolidated and partly weathered mineral materials derived from rock in place.

Residue : Leaves, stems, stalks, stubble, and other plant parts that are left on the soil surface after the harvested portion of a crop is removed. Crop residue protects the soil surface, improves water infiltration, and reduces crusting, erosion, and evaporation. But large amounts of residue also can keep soil excessively cool and wet early in the growing season.

Residuum(residual soil material). : Unconsolidated, weathered or partially weathered mineral material that accumulated as consolidated rock disintegrated in place. Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Resource : Anything obtained from the environment to meet the needs of a species.

Resource partitioning : The evolutionary process of species living in the same ecosystem dividing up resources so that each species develops dissimilar resource requirements to avoid competition. Also see ecological niche, fundamental niche, and realized niche.

Respiration : Catabolic reactions producing ATP in which either organic or inorganic compounds are primary electron donors and exogenous compounds are the ultimate electron acceptors. OR The metabolic function of consuming oxygen.

Respiration Rate : The rate of carbon dioxide release (or oxygen consumption) by biological respiration. Soil respiration rate is a measure of the size and activity of the overall population of soil organisms. Soil microbes generally make the largest contribution to soil respiration, although measurements in the field can include significant contributions from larger organisms and plant roots. Soil temperature, moisture, aeration, and food supply all have major effects on biological activity, and therefore respiration rate, so these factors must be taken into account when interpreting and comparing respiration measurements.

Restricting horizon : The soil horizon that most restricts movement of water or air movement vertically through the soil, or restricts root growth down into soil. Restricting horizons are often termed PANS.

Restriction endonuclease (restriction enzyme) : Enzyme that recognizes and cleaves specific DNA sequence, generating either blunt or singlestranded (sticky) ends.

Restriction endonuclease (restriction enzyme) : Enzyme that recognizes and cleaves specific DNA sequence, generating either blunt or single-stranded (sticky) ends.

Restriction fragment length polymorphism (RFLP) : Method to identify differences between similar genes from different organisms. Digestion of genes with restriction endonucleases followed by separation of the resulting fragments by gel electrophoresis yields banding patterns that are characteristic of the individual gene.

Retention mechanism : The process by which a substance (i.e. Nutrient) is retained within the soil profile. Examples include precipitation, adsorption, nutrient cycling, and binding into organic matter.

Reticulate horizon : This is intended for strongly developed reddish, yellowish and greyish or white, more or less reticulately mottled horizons that can be hand-augured or cut with a spade. Ferruginous nodules or concretions may be present.

Reticulate mottling : Soil horizons which have strongly developed reddish, yellowish, greyish or white mottling that forms a 'net' or 'mesh' type pattern.

Retrogressive succession : succession where the plant community becomes simplistic and contains fewer species and less biomass over time.

Retrovirus : Virus containing single-stranded RNA as its genetic material and producing a complementary DNA by action of the enzyme reverse transcriptase.

Reverse fault : This vertical fault develops when compressional force causes the displacement of one block of rock over another.

Reverse Osmosis (RO) : Reverse Osmosis (RO) - Water treatment used to remove dissolved inorganic chemicals and suspended particulate matter from a water supply. Water, under pressure, is forced through a semipermeable membrane that removes molecules larger than the pores of the membrane. Large molecules are flushed into waste waters. Smaller molecules are removed by an activated carbon filter.

Reverse Osmosis process : The Reversed Osmosis (RO) process uses a semi-permeable membrane to separate and remove dissolved solids, organics, pyrogens, submicron colloidal matter, viruses, and bacteria from water. The process is called 'reverse' osmosis since it requires pressure to force pure water across a membrane, and against the osmotic gradient. For municipal systems this requires the water be pressurized to 800psi which is a very costly proposition.

Reverse transcription : Process of copying information found in RNA into DNA.

Revolution : See Earth revolution.

Rhizine : Root-like structure of lichen and other organisms.

Rhizobacteria : Bacteria that aggressively colonize roots.

Rhizobia : Bacteria capable of living symbiotically in roots of leguminous plants, from which they receive energy and often fix molecular dinitrogen. Collective common name for *Rhizobium* and closely related genera. OR Bacteria capable of living symbiotically in roots of leguminous plants, from which they receive energy and often fix molecular dinitrogen. Collective common name for *Rhizobium* and closely related genera.

Rhizoid : Rootlike structure that helps to hold an organism to a substrate. OR Root-like structure of mosses and ferns used to attach to a substrate.

Rhizomorph : Mass of fungal hyphae organized into long, thick strands usually with a darkly pigmented outer rind and containing specialized tissues for

absorption and water transport.

Rhizomorph : Mass of fungal hyphae organized into long, thick strands usually with a darkly pigmented outer rind and containing specialized tissues for absorption and water transport.

Rhizoplane : Plant root surfaces and usually strongly adhering soil particles.

Rhizosphere : Zone of soil under the influence of plant roots in which the kinds, numbers, or activities of microorganisms differ from that of the bulk soil. OR The soil close to plant roots where there is usually an abundant and specific microbiological population. OR Soil that surrounds and is influenced by the roots of a plant.

Rhizosphere : The narrow region around roots where most soil biological activity occurs. Soil organisms take advantage of the sloughed and dead root cells and the root exudates found in this region.

Rhizosphere competence : Ability of an organism to colonize the rhizosphere.

Rhumb line : A line of constant compass direction or bearing which crosses the meridians at the same angle. A part of a great circle.

Rhyolite : A fine grained extrusive igneous rock that is rich in quartz and potassium feldspar. Derived from felsic magma.

Rhyolite : Fine-grained acidic volcanic rock mineralogically similar to granite, but possessing less quartz.

Ria coast : An extensively carved out coast with conspicuous headlands and deep re-entrants.

Ribbon falls : Spectacular narrow waterfalls that occur at the edge of a hanging valley.

Ribonucleic acid (RNA): Polymer of nucleotides connected via a phosphateribose backbone, involved in protein synthesis.

Form of nucleic acid. Ribonucleic acid is used by most organisms to read the genetic information found in dna and to produce specific organic molecules used in the development and functioning of cells.

Ribosomal RNA (rrna) : Types of RNA found in the ribosome; some participate actively in the process of protein synthesis.

Ribosome : The organelle where protein synthesis occurs; the message encoded in mrna is translated here.

Richter scale : A logarithmic measurement scale of earthquake magnitude. This scale measures the energy released by the largest seismic wave associated with the earthquake.

Riffle : Bar deposit found on the bed of streams. Associated with these deposits are pools.

Riffles : Areas of a stream or river characterized by a rocky substrate and turbulent, fast-moving, shallow water.

Rift : Zone between two diverging tectonic plates. The mid-oceanic ridge is an area where such plate divergence is occurring.

Rift valley : Steep sided valley found on the earth's surface created by tectonic rifting.

Rill : A small intermittent water course with steep sides. OR a small, eroded ditch, usually only a few inches deep and hence no great obstacle to tillage operations.

Rill Erosion : The formation of rills as a consequence of poor cultivation.

Rime : Deposit of ice crystals that occurs when fog or super cooled water droplets comes in contact with an object with a temperature below freezing (0° Celsius). This deposit develops outward on the windward side of the object.

Ring of Fire : See Circum-Pacific Belt.

Rip current : A strong relatively narrow current of water that flows seaward against breaking waves.

Riparian : Pertaining to the area along the banks of a river, stream, or lake. OR Relating to the bank or shoreline of a body of water.

Riparian Vegetation : Plants normally found along the banks and beds of streams, creeks, and rivers. Riparian vegetation includes understory, ground cover, and wetland plants, not just trees.

Rippable : Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Ripple : Stream bed deposit found streams. Ripples are only a few centimeters in height and spacing and are found in slow moving streams with fine textured beds.

Rip-rap : Rip-rap - A foundation or sustaining wall of stones thrown together without order, as in deep water, on a soft bottom, or on an embankment slope to prevent erosion.

Risk : The probability of occurrence or expected degree of loss, as a result of exposure to a hazard. Co survey, 1988

River : A watercourse that flows at all times, receiving ground or surface water, for example, from other streams or rivers. The terms "river" and "stream" are often used interchangeably, depending on the size of the water resources and the

region in which they are located.

River basin : The land area drained by a river and its tributaries. There are 17 major river basins in north carolina.

Rivers, streams : Natural water courses, or altered water courses including intermittent streams, which have flowing water at some time during the year and which drain landscapes.

Robinson projection : map projection system that tries to present more accurate representations of area. Distortion is mainly manifested in terms of map direction and distance.

Roche moutonnee : A feature of glacial erosion that resembles an asymmetrical rock mound. It is smooth and gently sloping on the side of ice advance. The lee-side of this feature is steep and jagged.

Rock : A compact and consolidated mass of mineral matter. Three types of rock are recognized: igneous, sedimentary, and metamorphic.

Rock cycle : General model describing the geomorphic and geologic processes involved in the creation, modification and recycling of rocks.

Rock flour : Very finely ground rock fragments that form between the base of a glacier and the underlying bedrock surface.

Rock Fragments : Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders. OR If round, mineral or rock particles 2 millimeters to 25 millimeters in diameter; if flat, mineral or rock fragments (flagstone) 15 to 38 centimeters long.

Rock mechanics : The theoretical and applied science of the mechanical behavior of rocks, representing a "branch of mechanics concerned with the response of rock to the force fields of its physical environment."

Rock slide : Large scale mass movement of rock materials downslope.

Rockfall : Type of mass movement that involves the detachment and movement of a small block of rock from a cliff face to its base. Normally occurs when the rock has well defined bedding planes that are exaggerated by freeze-thaw action or thermal expansion and contraction.

Roll cloud : A dense, cigar shaped cloud found above the gust front of a thunderstorm. Air within the cloud rotates around the long axis.

Root exudates : Substances released from plant root system in drops or small quantities of carbohydrates, organic acids, vitamins and many other substances essential for life of soil micro-organisms.

Root mottled : Root mottled - Bearing molds of plant roots.

Root nodule : Specialized structure occurring on roots, especially of leguminous plants, in which bacteria fix dinitrogen and make it available for the plant.

Root zone : The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). : Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Rossby wave : See long wave.

Rotation (or crop rotation) : (Crop science) the growing of different crops, in recurring succession, on the same land.

Rotational slip : Form of mass movement where material moves suddenly along a curvilinear plane. Also called a slump.

Roughped (R) : Peds are evident and characteristically more than 50% of the peds are rough-faced, that is, they have relatively porous surfaces. They tend to have less clearly defined faces than smooth faced peds.

Rough-ped fabric : Peds are evident. Characteristically, more than 50% of the peds are matt or rough-faced;

Routine storage : The storage of biosolids (for extended periods of time) until the land is in a condition to receive the biosolids.

Row crops : (crop science) The rows or planting beds are far enough apart to permit the operation of machinery between them for cultural operations.

RR : Respiration rate - the weight of oxygen utilized by the total weight of MLSS in a given time.

R-Selected Species (Malthusian Strategy) : A species that shows the following characteristics: short life span; early reproduction; low biomass; and the potential to produce large numbers of usually small offspring in a short period of time. Also see K-selected species.

Rstrategy : Ecological strategy where organisms rely on high reproductive rates for continued survival within the community. Populations of rstrategists are subject to extreme fluctuations.

Rubification. : The reddening of soils through the release and precipitation of iron as an oxide during weathering. Munsell hues and chromas of well-drained soils generally increase with soil age. ORThe development of red color in soil - reddening.

Rudosols : These soils have limited pedological organisation as well as minimal development of the A1 horizon. A Soil Order of the Australian Soil Classification (Isbell, 1996).

Rudosols : ASC Soil Order classification—Soils with negligible pedologic

organisation. They are usually young soils in the sense that the soil forming factors have had little time to pedologically modify parent rocks or sediments. The component soils can vary widely in terms of texture and depth; many are stratified and some are highly saline.

Runoff : Precipitation that reaches the composting pad directly without going through the composting materials. OR Runoff - Water that flows over the land surface after rainfall, snowmelt or irrigation that eventually reaches streams, lakes, marshes, etc.

Runoff Pollution : (Also stormwater, urban runoff, and storm drain pollution) rain and water from irrigation, garden hoses, or other activities that washes pollutants off of streets, parking lots, yards, and landscapes and into the storm drain system.

Rutile : Rutile - Titanium dioxide, TiO_2 , a mineral that often occurs in long, slender crystals.

S

Safe yield : : The annual amount of water that can be taken from a source of supply over a period of years without depleting that source beyond its ability to be naturally refilled. This term is not applicable to the oceans.

Sag pond : A small body of water occupying an enclosed depression or sag formed where active or recent fault movement has impounded drainage. Agi

Sagenitic : Sagenitic - A term to describe clusters of needle-like or tabular crystals of minerals that occur as inclusions in usually quartz or agate.

Salinas : Depressions holding salty groundwater that are often evaporative.

Saline discharge : Underground saline water which flows or seeps out at the soil surface; salinity may be concentrated by subsequent evaporation.

Saline Lake : Saline Lake - A lake with brackish or saline water, usually about 10 to 15 parts per thousand sodium chloride.

Saline soil : Soil containing sufficient soluble salt to adversely affect the growth of most crop plants. OR A soil containing enough soluble salts to reduce its fertility.

Saline-sodic soil : Salt-affected soils with a high exchangeable sodium percentage (ESP) greater than 15%, pH usually less than 8.5; in general these soils are not suitable for agriculture.

Salinity : Concentration of dissolved salts found in a sample of water. Measured as the total amount of dissolved salts in parts per thousand. Seawater has an average salinity of about 34 parts per thousand (ppt). OR A measure of the total soluble salts in a soil. A saline soil is one with an accumulation of free salts at the soil surface and/or within the profile affecting plant growth and/or land use. It is generally attributed to changes in land use or natural changes in drainage or climate, which affects the movement of water through the landscape. Salinity levels of soil or water can be tested using Electrical Conductivity (EC).

Salinization : The process of accumulation of salts in soil. OR Pedogenic process that concentrates salts at or near the soil surface because evapotranspiration greatly exceeds water inputs from precipitation.

Salt : (1) The mineral sodium chloride.

(2) Compounds that are produced as the result of a metal atom replacing a hydrogen atom in an acid.

Salt : (1) The mineral sodium chloride.

(2) Compounds that are produced as the result of a metal atom replacing a hydrogen atom in an acid.

Salt Marsh : Coastal wetland ecosystem that is inundated for some period of time by seawater. Plants that exist in this community have special adaptation to survive in the presence of high salinities in their immediate environment. Generally, found poleward of 30° North and South latitude.

Salt-affected soil : Soil that has been adversely affected by the presence of soluble salts, with or without high amounts of exchangeable sodium. See also saline soil, saline-sodic soil, and sodic soil.

Saltation : Transport of sediment initiated by moving air or water where particles move from a resting surface to the transport medium in quick continuous repeated cycles.

Salts : The products, other than water, of the reaction of an acid with a base. Salts commonly found in soils break up into cations and anions when dissolved in water.

Saltwater classifications : (See also Classifications)

Class SA: suitable for commercial shellfishing and all other tidal saltwater uses.

Class SB: saltwaters protected for primary recreation, which includes swimming on a frequent or organized basis, and all Class SC uses.

Class SC: saltwaters protected for secondary recreation, fishing, and Propagation and survival of aquatic life; all saltwaters are classified to protect these uses at a minimum.

Saltwater intrusion : The invasion of saltwater into freshwater aquifers in coastal and inland areas. This condition can be cause when groundwater, which charges the aquifer, is withdrawn faster than it is recharged by precipitation.

Salty water (in tables.) : Water that is too salty for consumption by livestock.

Sand : As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sample : A sample is a subset group of data selected from a larger population group. Most samples are drawn at random to guaranty equal representation in the data.

Sand : Soil particle between 0.05 and 2.0 mm in diameter. OR Mineral rock fragments that range in diameter from 2-0.05 mm in the USDA system.

Sand dune : A hill or ridge of aeolian sand deposits with a minimum height of less than one meter and a maximum height of about 50 meters. Found in hot deserts and along sandy coastlines.

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Sand filtration : Sand filtration is a frequently used and very robust method to remove suspended solids from water. The filtration medium consists of a multiple layer of sand with a variety in size and specific gravity. Sand filters can be supplied in different sizes and materials both hand operated and fully automatically. Beach wells use this method.

Sand ripples : Another term used for wind ripples.

Sand Sea : A large region of sand and sand dunes in a desert. Common to erg deserts.

Sand Sheet : Deposit of sometimes stratified less well sorted sand that almost resemble dunes. Common in northern Europe. Believed to form when windblown materials settle on areas of patchy snow.

Sand Wedge : A form of ice wedge that contains accumulations of wind blown sand in long vertical layers. A form of periglacial ground ice.

Sandpoint Well : Sandpoint Well - A well constructed by driving or jetting a pointed well screen connected to a small- diameter pipe into water-bearing sand or gravel.

Sandstone : Sandstone - A medium-grained, clastic sedimentary rock composed of sand-sized fragments 1/16 to 2 millimeters in diameter that are more or less firmly united by a natural cement.

Sandstone. : Sedimentary rock containing dominantly sand-size particles.

Sandy (G) : Soil material is coherent, with few if any peds. The soil mass appears as closely packed sand grains.

Sandy fabric : The soil material consists of closely packed sand grains which are weakly cohesive with few if any peds;

Sandy soils : Low total quantity of pore space even though individual pores are large. Water retention is low.

Sanitization : Elimination of pathogenic or deleterious organisms, insect larvae, intestinal parasites, and weed seeds.

Sanitized compost : Compost which has gone through a pathogen reduction cycle so that disease producing organisms in the finished compost are below the level of a health risk.

Santa Ana Wind : A warm, dry chinook like wind that occurs in southern California. Originates from the east off an elevated desert plateau.

Sapric : Non-fibrous organic material.

Sapric soil material (muck) : The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprist : Organic soils in which most of the plant matter has decomposed (less than 1/3 of fibers remain visible after rubbing) and the original tissue cannot be recognized.

Saprolite : Decomposed rock that has maintained characteristics that were present as an unweathered rock.

Saprolite (soil science) : Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Saprophyte : Nonparasitic nutritional mechanism by which an organism obtains its food exclusively from the degradation of nonliving organic material.

Saprophytic : Bacteria that breakdown bodies of dead plants and animals (non-living organic material), returning organic materials to the food chain. Saprophytic bacteria are usually non-pathogenic, too. Most Alken Clear-Flo® products are saprophytic.

Saprophytic fungi : Fungi that decompose dead organic matter.

SAR : Sodium Adsorption Ratio - this ratio expresses the relative activity of sodium ions in the exchange reactions with the soil.

Sater mark : See HIGH WATER MARK.

Saturated adiabatic lapse rate (salr) : The rate of decline in the temperature of a rising parcel of air after it has reached saturation. This rate is less than the dry adiabatic lapse rate (9.8° celsius per 1000 meters) because of the heat energy added to the ascending air parcel from condensation and deposition processes.

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Saturated flow : movement of water through soil by gravity flow, as in irrigation or during a rainstorm.

Saturated Flow The : Movement of water in a soil that is completely filled with water.

Saturated Formation (zone) : Saturated Formation (zone) - Portion of a soil profile

or geologic formation where all voids, spaces or cracks are filled with water. No air is present. There may be multiple water-bearing formations within a saturated formation. These water-bearing formations often are separated by layers of clay or other impermeable layers.

Saturated soil. : A soil for which the entire profile is saturated with water.

Saturated Thickness (zone) : Saturated Thickness (zone) - The total thickness of a saturated formation.

Saturated zone : The area below the water table where all open spaces are filled with water.

Saturation : Atmospheric condition where water is changing its phase to liquid or solid. At saturation, relative humidity is 100 % unless there is a shortage of deposition nuclei or condensation nuclei. Generally, this process is caused by the cooling of the atmosphere. OR The condition of a liquid when it has taken into solution the maximum possible quantity of a given substance.

Saturation mixing ratio : mass of water vapor that a kilogram of dry air can hold at saturation. Measured in grams.

Saturation Mixing Ratio : Mass of water vapor that a kilogram of dry air can hold at saturation. Measured in grams.

Saturation of air : The condition under which the amount of water vapor in the air is the maximum possible at the existing temperature and pressure. Condensation or sublimation will begin if the temperature falls or water vapor is added to the air.

Saturation vapor pressure : The maximum partial pressure that water vapor molecules would exert if the air were saturated with vapor at a given temperature. Saturation vapor pressure is directly proportional to the temperature.

Savanna : A tropical or sub-tropical plant community characterized by trees and shrubs scattered among a cover of grasses, herbs and forbs. The climate of a savanna is tropical with a dry season occurring in the low sun period of the year.

Scale : The precipitate that forms on surfaces in contact with water as the result of a physical or chemical change. OR Various calcium compounds are most often the cause of scaling.

Scaphopod : Scaphopod - Any benthic, marine, univalve mollusk belonging to the class Scaphopoda, characterized by an elongated body completely surrounded by a mantle and a tubular, calcareous shell open at both ends.

Scarification : Extensive movements of soil, sediment, and rock material caused by humans.

Scattering (atmospheric) : Is an atmospheric process where small particles and

gas molecules diffuse part of the incoming solar radiation in random directions without any alteration to the wavelength of the electromagnetic energy. Scattering does, however, reduce the amount of incoming radiation reaching the earth's surface. A significant proportion of scattered shortwave solar radiation is redirected back to space. The amount of scattering that takes place is dependent on two factors: wavelength of the incoming radiation and the size of the scattering particle or gas molecule. In the earth's atmosphere, the presence of a large number of particles with a size of about 0.5 μm results in shorter wavelengths being preferentially scattered. This factor also causes our sky to look blue because this color corresponds to those wavelengths that are best diffused.

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Scavenger : Heterotrophic organism that mainly consumes dead animals or the parts of dead animals for food. These organisms do not kill their food. Examples of carnivores include flies, various species of vultures, crabs, and hyenas. Also see herbivore, detritivore, omnivore, and carnivore.

SCFM : Cubic feet of air per minute at standard conditions of temperature, pressure and humidity (0 , 14.7 psi and 50% relative humidity).

Schist : A medium to coarse grained metamorphic rock with well developed bedding planes derived from the foliated recrystallization of platy like minerals like mica.

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Science : Science is a way of acquiring knowledge. To do science, one must follow a specific universal methodology. The central theme in this methodology is the testing of hypotheses and the ability to make predictions. The overall goal of science is to better understand nature and our Universe.

Scientific method : The approach science uses to gain knowledge. This method tries to be unbiased and neutral. Involves inductive and deductive reasoning, hypothesis testing and falsification, and predictive model testing.

Scientific Method : The approach science uses to gain knowledge. This method tries to be unbiased and neutral. Involves inductive and deductive reasoning, hypothesis testing and falsification, and predictive model testing.

Sclerite : Sclerite - A hard chitinous or calcareous plate, piece or spicule.

Sclerophyllous vegetation : Term used to describe drought resistant vegetation common in mediterranean climates. Some common adaptations present in this type of vegetation include: deep roots, reduced leaf area exposed to the atmosphere, and waxy thick leaves with closing stomata which resist water loss.

Sclerotia : Spherical resting stages of fungi.

Sclerotium : Modified fungal hyphae that form a compact, hard vegetative resting structure with a thick pigmented outer rind.

Sclerotium : Modified fungal hyphae that form a compact, hard vegetative resting structure with a thick pigmented outer rind.

Scoria : Scoria - see "clinker"

Scoring function : A standardization procedure used to convert measured values or subjective ratings to unitless values usually between 0 and 1. This allows all soil property measurements to be integrated into one value or index for soil quality. The four general types of scoring functions used in soil quality assessments are:

- more is better (higher measurements mean higher soil quality, e.g. SOM)
- less is better (lower measurements mean higher soil quality, e.g. salinity)
- optimum range (a moderate range of values is desirable, e.g. pH)
- undesirable range (a specific range of values is undesirable)

Scour : (1) Refers to the erosive power of water.

(2) Abrasive effects of rocks and sediments incorporated in the ice base of a glacier.

Scree : An accumulation of weathered rock fragments at the base of a steep rock slope or cliff.

Screen : Remnant of Ordovician metasedimentary 'country' rocks (older rocks into which granitics intruded) which separate different granitic plutons, but also used here to describe steeply dipping metasedimentary rocks intruded by granitics, as occurs near metasediment-granitic boundaries. Screens may be kilometres wide to only a few metres wide.

Screening : Use of screens to remove coarse floating and suspended solids from liquids. OR The sifting of compost through a screen to remove large particles and improve consistency and quality of the end product.

Scytonemin : A pigment produced by cyanobacteria that absorbs UV radiation, and thereby acts as a passive sunscreen.

Sea : (1) A body of saline water found on the Earth's continental surface.

(2) A portion of a ocean that is in close proximity to a continent.

Sea arch : A coastal landform composed of rock that resembles an arch. These landforms are created when waves erode through a thin headland from both sides.

Sea breeze : Local thermal circulation pattern found at the interface between land and water. In this circulation system, surface winds blow from water to land during the daytime.

Sea cliff retreat - : A cliff formed by wave action, causing the coastal cliff to erode and recede towards land. Agi

Sea smoke : See evaporation fog.

Sea stack : A steep pillar of rock located in the ocean a short distance from the coastline. These landforms are created when waves erode through a thin headland from both sides.

Sea-floor spreading : The process of oceanic crust creation and sea-floor movement that occurs at the mid-oceanic ridge.

Sea-level : The average surface elevation of the world's oceans.

Sea-level pressure : Average atmospheric pressure at sea-level. This value is 1013.2 millibars.

Seamount : A volcanic mountain found on an ocean basin that has an origin not related to a mid-oceanic ridge or a tectonic subduction zone.

Seasonal High Water Table : The minimum depth from the soil surface at which redoximorphic features are present in the soil.

Seasons : Time periods generally based on the changes in the intensity and duration of sunlight as received in the middle and high latitudes. Four seasons are normally recognized: Spring; Summer; Fall; and Winter. The astronomical definition is more precise and suggests the following time periods for the four seasons: Spring - March 22 to June 21; Summer - June 22 to September 22; Fall - September 23 to December 22; and Winter - December 23 to March 21.

Seaward : Positioned or located away from land but towards an ocean or sea. OR The mixture of water and various dissolved salts found in the world's oceans and seas.

Secchi disk : An 8-inch diameter plate (usually all-white or with alternating black and white quadrants) used to measure transparency. Attached to a length-

calibrated cord, the disk is lowered into the lake until it disappears. It is then raised until it becomes visible. The average of these depths is the Secchi disk reading. About 30 citizen lake monitors regularly collect Secchi disk readings as part of the Eagan citizen lake monitoring program. Invented by an astrophysicist and scientific advisor to the Pope, the first disk was lowered into the Mediterranean Sea by Fr. Pietro Angelo Secchi on April 20, 1865.

Second Law of Thermodynamics : This law states that heat can never pass spontaneously from a colder to a hotter body. As a result of this fact, natural processes that involve energy transfer must have one direction, and all natural processes are irreversible. This law also predicts that the entropy of an isolated system always increases with time.

Secondary Aquifer : Secondary Aquifer - Any aquifer that is not the main source of water to wells in a given area, includes perched aquifers, and in Nebraska, the Chadron Formation, the Dakota Group in some areas and several Paleozoic units.

Secondary Carnivore : See tertiary consumer.

Secondary consumer : Organisms that occupy the third trophic level in the grazing food chain. These organisms are carnivores. Also known as a primary carnivore.

Secondary fault. : A minor fault that bifurcates from or is associated with a primary fault. Movement on a secondary fault never occurs independently of movement on the primary, seismogenic fault.

Secondary metabolite : Product of intermediary metabolism released from a cell, such as an antibiotic.

Secondary Mineral : Those minerals that form from the material released by weathering. The main secondary minerals are the clays and oxides. OR A mineral, such as clay, formed from decomposition of primary minerals and reconstitution into a new mineral.

Secondary nutrient : the nutrient Ca, Mg, and S used in large amounts by plants but less often deficient than the primary nutrients N, P, and K.

Secondary nutrient. : The elements S, Ca, Mg. These must be taken up and utilized in sufficient quantities for plants to complete their life cycles. Normally present in quantities of 0.01-0.5 %. See essential element.

Secondary Permeability : Secondary Permeability - The open spaces developed in rocks after they are deposited, often the result of water dissolving the rocks or fractures.

Secondary pollutant : atmospheric pollutants that are created chemically in the atmosphere when primary pollutants and other components of the air react. Also see primary pollutant.

Secondary Substance : Organic chemical produced by a plant that has no direct function in its metabolism. Many of these chemicals are toxic and are believed to be created by the plant to reduce herbivore damage or the negative effects of competition by other plants.

Secondary Succession : Succession on a previously vegetated surface. The soil or substrate on this location contains an active seed bank.

Secondary Treatment : A wastewater treatment process used to convert dissolved or suspended materials into a form more readily separated from the water being treated. Usually the process follows primary treatment by sedimentation. The process commonly is a type of biological treatment process followed by secondary clarifiers that allow the solids to settle out from the water being treated.

Secondary wave : See s-wave or shear wave.

Second-Growth Forest : Stand of forest that is the result of secondary succession.

Section : A surveyed parcel of land containing 640 acres one square mile.

Sedge : Grass-like plant that is adapted to grow in moist habitats.

Sediment : Sediment - Solid, fragmental materials or dissolved rock material that originates from decomposition of rocks and is transported to a basin of deposition by wind, water, or ice. OR Particles and/or clumps of particles of sand, clay, silt, and plant or animal matter carried in water.

Sediment : Particles of matter that enter the water cycle. They are produced by the action of weathering and erosion.

Sediment : Accumulated organic and inorganic matter on the bottom of a waterbody. It includes decaying algae and weeds and soil and organic matter from the drainage basin.

Sediment Plume : A cloud of sediment that occurs when heavy rains or floods wash large amounts of sediment into the ocean. Visible from the air, apparent in satellite images and ctd data.

Sediment Rating Curve : Numerical expression or graphical curve that describes the quantitative relationship between stream discharge and the sediment transported by a particular stream.

Sedimentary Rock : Rocks formed by the deposition, alteration and/or compression, and lithification of weathered rock debris, chemical precipitates, or organic sediments. Also see clastic vs non-clastic sedimentary rocks.

Sedimentology : Sedimentology - The study of sedimentary (glacier-, wind- or water-deposited) rocks and the processes by which they were formed, soil genesis and morphology - the origin of soils and changes in them over time, respectively.

Sediments : Soil, sand, and minerals washed from land into water, usually after rain.

Seed : Fertilized ovule of a plant that contains an embryo and food products for germination. Once germinated, the embryo can grow into a mature individual.

Seed Bank : Collection of seeds available for germination in the soil.

Seed Dispersal : Movement of a plant seed away from the parent plant by a passive or active mechanism.

Seed Scarification : To abrade, scratch, or modify the surface for increasing water absorption.

Seedbed : Soil or land prepared to promote germination of seed or receipt of transplanted seedlings and to support their subsequent growth.

Seeding : Introduction of microorganisms (such as ALKEN CLEAR-FLO® 1000 series for aquaculture, 4000 series for grease, and 7000 series for industrial and municipal wastewater) into a biological oxidation unit to minimize the time required to build a biological sludge. Also referred to as inoculation with cultured organisms.

Seedstock : (animal science, plant science) Pedigreed or well-bred livestock which is maintained for breeding purposes. A specially selected strain of plants or seeds which are to be used as parents for future generations.

Seepage : Seepage - Movement of water into or through a porous material. Seepage occurs from canals, ditches, and other water storage facilities. It sometimes is used to describe water escaping from municipal landfill sites. OR

(1) The gradual movement of water into the soil layer.

(2) Slow movement of sub-surface water to the surface. This flow is not great enough to call it a spring.

Seepage Lake : A lake that gets its water primarily from the seepage of groundwater.

Segregated Ice : A form of periglacial ground ice that consists of almost pure ice that often exists as an extensive horizontal layer. The ice layer grows because of the active migration of water from around the feature. These features are found just below the active layer.

Segregations : Accumulations of minerals in the soil due to the concentration of constituents. They occur as a result of chemical or biological action. They can develop *in situ* by either current or relict pedogenic processes (mcdonald *et al.*, 1990).

Segregations are described by their nature, abundance and form

- **Nature** calcareous (carbonate), gypseous (gypsum), manganiferous (manganese) and ferromanganiferous (iron-manganese).
- **Abundance**

Very few	<2%
Few	2-10%
Common	10-20%
Many	20-50%
Very many	>50%
- **Form**

C	Concretions	Spheroidal formations (concentric in nature).
N	Nodules	Irregular rounded formations (not concentric or symmetric). Can have a hollow interior.
F	Fragments	Broken pieces of segregations.
X	Crystals	Single or complex clusters of visible crystals.
S	Soft segregations	Finely divided soft segregations. They contrast with surrounding soil in colour and composition but are not easily separated from the soil as separate bodies.

Seif : (1) A large sand dune that is elongated in the general direction of the dominant winds.

(2) A sand dune formed by winds from multiple directions.

Seine net : A net designed to collect aquatic organisms inhabiting natural waters from the shoreline to 3' depths is called a seine net. Most often a plankton seine.

Seismic : Seismic - Pertaining to an earthquake or Earth vibration, including those artificially induced. OR Shaking displacement usually caused by an earthquake.

Seismic : Shaking displacement usually caused by an earthquake.

Seismic Wave : Successive wave-type displacement of rock usually caused by an earthquake.

Seismograph : Instrument that measures the energy contained in seismic waves from an earthquake or other type of ground displacement.

Seismology : A branch of science focused on the study of earthquakes and seismic activity.

Selection harvest : (Forestry) harvesting individual trees or small groups or trees at periodic intervals (usually 8 to 15 years) based primarily on their vigor and age. Selection harvesting perpetuates and uneven-aged stand.

Selective medium : Medium that allows the growth of certain types of microorganisms in preference to others. For example, an antibiotic-containing medium allows the growth of only those microorganisms resistant to the antibiotic.

Selenite : Selenite - The clear, colorless variety of gypsum, occurring (especially in clays) in distinct, transparent crystals or in large crystalline masses that easily break into broad, thin layers.

Selfmulching : A structural condition of soils where there is a high degree of pedality. The peds naturally fall apart as the soil dries to form a loose surface mulch. Some Vertosols have self mulching surface soils.

SelfMulching Soils : A soil with a naturally formed well aggregated surface which does not crust and seal under the impact of raindrops.

Self-Regulation : The ability of some systems to maintain a steady state equilibrium through positive and negative feedbacks.

Self-Supplied Industrial Water Use : Self-Supplied Industrial Water Use - A water supply that is developed by a factory or industry for its own use.

Semiaquic : Soils with short term saturation in the B Horizon. This term is used as a definition for the Podosol Order in the Australian Soil Classification (Isbell, 1996).

Semi-arid : Climate of 250 - 500 mm annual rainfall.

Semi-Diurnal Tide : Tides that have two high and two low waters per tidal period.

Semipermeable : A medium that allows one substance to pass through, but rejects other substances. An R.O. system has a semipermeable membrane.

Sensible Heat : Heat that can be measured by a thermometer and thus sensed by humans.

Sensible heat flux : Process where excess heat energy is transferred into the atmosphere. The process first involves the movement of heat energy from the earth's surface to the atmosphere by conduction and convection. The heat energy then can move horizontally advection (atmospheric circulation).

Separation : The isolation of the various compounds in a mixture.

Septage : The biodegradable waste from septic tanks and similar treatment works. Septage includes the sediments, water, grease and scum pumped from a septic tank.

Septic : A condition produced by anaerobic bacteria. If severe, the wastewater turns black, gives off foul odors, contains little or no dissolved oxygen and creates a high oxygen demand.

Septic Tank : Untreated liquid household wastes (sewage) will quickly clog your absorption field if not properly treated. The septic tank is a holding tank in which this treatment can take place. When sewage enters the septic tank, the heavy solids settle to the bottom of the tank; the lighter solids, fats and greases partially decompose and rise to the surface and form a layer of scum. The solids that have settled to the bottom are attacked by bacteria and form sludge.

Septicity : Septicity is the condition in which organic matter decomposes to form foul-smelling products associated with the absence of free oxygen. If severe, the wastewater turns black, gives off foul-odors, contains little or no dissolved oxygen and creates a heavy oxygen demand.

Septum (plural, septa) : Crosswall (partition) dividing a parent cell into two daughter cells during binary fission or occurring between adjacent cells in hyphae.

Sequum. : A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Serial dilution : Series of stepwise dilutions (usually in sterile water) performed to reduce the populations of microorganisms in a sample to manageable numbers.

Series, soil : the soil series is a group of soils having horizons similar in differentiating characteristics and arrangement in the soil profile, except for texture of the surface, slope, gravel, stones, and erosion.

Serology : Study of antigen-antibody reactions *in vitro*.

Sesquic : A sesquic B Horizon (or Bs Horizon) is where iron compounds are strongly dominant or codominant with aluminium and there is little evidence of organic matter. This term is used as a Great Group definition for the Podsol Order in the Australian Soil Classification (Isbell, 1996).

Sesquioxide : Oxides of aluminium and iron.

Sesquioxide(metal oxides) : An oxide containing 3 atoms of oxygen with 2 atoms of some other substance e.g. Al_2O_3 . OR a term for minerals containing 1.5 atoms of oxygen per atom of the metal, particularly Al_2O_3 and Fe_2O_3 . Often TiO_2 is included, although it does not strictly fit the meaning of sesqui (= 1.5 times).

Sessile : Sessile - Pertaining to a plant or animal attached to a base and not free to move.

Settleable solids : Those solids in suspension which will pass through a 2000 micron sieve and settle in one hour under the influence of gravity.

Settling : The process of sinking of a substance sinking in water. This occurs when the substance does not dissolve in water and its density is larger than that of water.

Sewage : Waste fluid in a sewer system. OR The introduction of untreated sewage into a water body.

Sewage Sludge : A solid, semi-solid or liquid residue generated during the treatment of domestic sewage in a treatment works.

Sewer System : (Also known as a wastewater collection system) the system of pipes and pump stations that transports wastewater (sewer) from homes and businesses to the wastewater treatment plant.

Sexual Reproduction : Any process of reproduction that does involve the fusion of gametes.

Shale : Fine grained sedimentary rock composed of lithified clay particles.

Sharp boundary : Boundary <5 mm wide

Shear stress : Stress caused by forces operating parallel to each other but in opposite directions.

Shear Wave : A seismic wave that creates wave-like motion perpendicular to the direction of seismic energy propagation. Also called S-wave.

Sheath : Tubular structure formed around a chain of cells or around a bundle of filaments.

Sheep ked : Wingless fly that is a problem in sheep. Moves about through contact.

Sheet Erosion : The gradual and uniform removal of the surface soil by water without forming any rills or gullies. OR The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Sheet erosion : The removal of the upper layers of soil by raindrop splash and/or runoff.

Sheet Flow : See overland flow.

Sheeting : A form of physical weathering of rock where surface sheets of material fracture and exfoliate because of pressure release. Also see exfoliation dome.

Sheetwash : The removal of loose surface materials by overland flow. Process of erosion.

Shepparton formation : Quaternary alluvial sediments usually associated with the Riverine Plain in northern Victoria. These deposits consist of sands, gravels and clays that were deposited by a series of 'prior streams'. The Shepparton Formation usually consists of a number of buried soil profiles - associated with this prior streamactivity.

Shield : A large stable area of exposed very old (more than 600 million years) igneous and metamorphic rock found on continents. This rock forms the nucleus of the continents.

Shield volcano : volcano created from alternate layers of lava flows. Shield volcanoes are slightly sloping having a gradient between 6 and 12°. Their height can be as high as 9000 meters. The chemistry of the magma of these volcanoes is basaltic.

Shield volcano : Broad, gently sloping surface consisting of overlapping basalt flows.

Shoal : A natural, subaqueous ridge, bank, or bar consisting of, or covered by, sand or other unconsolidated material, rising above the general subaqueous estuarine floor to near the surface. Compare - Dredge-deposit Shoal, Reef. (modified from Jackson, 1997). OR Shoal - A shallow place in a stream.

Shock Chlorination : Shock Chlorination - The addition of chlorine for disinfecting a water supply system including the well, and all distribution pipelines. It is recommended when coliform bacteria are detected, or after system repairs. Treated water, with a concentration of 200 ppm, is pumped throughout the distribution system and allowed to set for at least 24 hours before flushing with untreated water.

Shock load : The arrival at a plant of a waste which is toxic to organisms in sufficient quantity or strength to cause operating problems. Possible problems include odors and sloughing off of the growth or slime on a trickling-filter media. Organic or hydraulic overloads also can cause a shock load.

Shore : The narrow strip of land immediately bordering any body of water, esp. the sea or a large lake; specifically the zone over which the ground is alternately exposed and covered by tides or waves, or the zone between high water and low water. (Jackson, 1997).

Shore complex : Generally a narrow, transverse area that parallels a coastline, commonly cutting across diverse inland landforms, and dominated by landforms derived from active coastal processes which give rise to beach ridges, washover fans, beaches, dunes, wave-cut platforms, barrier islands (Schoeneberger and Wysocki, 2002).

Shoreline : The line that separates a land surface from a water body. Also see coastline.

Shoreline angle . : The line formed by the intersection of the wave-cut platform and the sea cliff. It approximates the position of sea level at the time the platform was formed.

Short wave : A small wave in the polar jet stream and the westerlies that extends from the middle to the upper troposphere. Often associated with the formation of a mid-latitude cyclone at the ground surface. Contrasts with long waves.

Shortwave Radiation : Electromagnetic radiation with a wavelength between

0.1 and 0.7 micrometers (μm). Commonly used to describe the radiation emitted from the sun.

Shredder : Powered mechanical device used to break waste materials into smaller pieces.

Shrinkswell : The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub : A woody plant species that is smaller than a tree. Shrubs usually do not have a trunk.

Sial Layer : The part of the crust that forms the continents and is composed of relatively light, granitic rocks.

Siberian high : high pressure system that develops in winter over northern central asia.

SideDressing : The process of applying supplemental nutrients to soil by spreading fertilizer or compost on the soil above the plant's root area.

Sidereal Day : Time it takes to complete one Earth rotation relative to the position of a fixed star. This measurement takes 23 hours, 56 minutes, and 4.09 seconds. Compare with mean solar day.

Siderochromes : Compounds produced by microorganisms that are involved with the uptake of iron by those microorganisms (see siderochromes)

Siderophore : Nonporphyrin metabolite secreted by certain microorganisms that forms a highly stable coordination compound (chelate) with iron; a highaffinity ironbinding compound. There are two major types: catecholates and hydroxamates.

Silage : (Animal science) a crop that has been preserved in a moist, succulent condition by partial fermentation in a tight container (silo) above or below ground. The chief crops stored in this way are corn (the whole plant), sorghum, and various legumes and grasses. The main use of silage is in cattle feed.

Silcretes : Sedimentary rock created by the chemical precipitation of silica.

Silica : Mineral that is composed of silicon dioxide, SiO_2 .

Silica Gel : Silica Gel - A liquid suspension of colloidal sized particles of silica (SiO_2).

Silica : A combination of silicon and oxygen. The mineral form is called quartz.

Silicassequioxide ratio : The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in

the tropics, generally have a low ratio.

Silicate : Group of minerals that have crystal structures based on a silica tetrahedron (SiO₄).

Silicate Magma : Magma that is felsic in composition.

Silicates : Rock forming minerals that contain silicon.

Siliceous sands : These are a broad group varying in colour but are characterised by their uniform sand to clayey sand texture, deep profiles, massive single-grain structure and the absence of any distinct horizons except for a minimal accumulation of organic matter in the A₁ horizon, making it slightly darker. This horizon can be absent when there is no vegetation to hold it in place

Siliceous sands : GSG classification—Deep profile of sands to clayey sands, with no horizon differentiation except for a darker A₁ horizon.

Sill : Horizontal planes of igneous rock that run parallel to the grain of the original rock deposits. They form when magma enters and cools in bedding planes found within the crust. Also see intrusive igneous rock.

Silt : Soil particle with a diameter between 0.002 and 0.05 mm.

Siltstone : Siltstone - A sedimentary rock in which silt (1/256 to 1/16 millimeter in diameter) predominates over clay (< 1/256 millimeter in diameter).

Siltstone : Fine grained sedimentary rock composed of lithified silt particles.

Silurian : Geologic period that occurred roughly 408 to 438 million years ago. During this period, the first plant and insect species appear.

SILURIAN : Geological time period within the Palaeozoic Era that spanned from approximately 436 million years ago to 405 million years before present (mybp). In the late Silurian, upright plants began to appear on land. During the Silurian much of southern Victoria was covered by shallow and deep seas (referred to as Melbourne Trough, Grampians Basin and Buchan Basin) and significant marine sediments were deposited

Silurian : Geological period 440 – 395 million years ago.

Sima Layer : The part of the crust that forms the ocean basins and lower layers in the crust and is composed of relatively heavy, basaltic rocks.

Similar soils : Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Single-grained : The soil occurs as a loose, incoherent mass of individual particles (as in sands).

Sink : (1) Site of the storage of some material.

(2) Another name for sinkhole.

Sinkhole : A pit like hole in found in areas of karst. These features are caused by the weathering of limestone or dolomite by subsurface drainage. Also called a sink or doline.

Sinkhole. : A depression in the landscape where limestone has been dissolved.

Sinusoidal Equal-Area Projection : Map projection that represents areas in their true form on a two-dimensional map. Distances are only correct along parallels and central meridian. Shapes become more distorted away from the central meridian and close to the poles.

Sire : (Animal science) the male parent. To father or become the sire of.

Site : (i) In ecology, area described or defined by its biotic, climatic, and soil conditions as related to its capacity to produce vegetation. (ii) Area sufficiently uniform in biotic, climatic, and soil conditions to produce a particular climax vegetation.

Site index. : A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Sitedirected mutagenesis : Insertion of a different nucleotide at a specific site in a molecule using recombinant DNA methodology.

Size Reduction : Generic term for breaking up solid waste or other materials into small pieces through crushing, chipping, shredding, grinding, etc.; the process makes wastes easier to separate and increases surface area for composting.

Skeletal soils : Thin soils.

Slake test : A measure of disintegration of soil aggregates when exposed to rapid wetting.

Slaking : The break down of soil aggregates when immersed in water into smaller sized micro-aggregates. These aggregates may subsequently disperse.

Slaking : The partial breakdown of soil aggregates in water due to the swelling of clay and the expulsion of air from pore spaces.

Slate : A fine grained metamorphic rock with well developed bedding planes derived from the slight recrystallization of shale.

Slick spot. : A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slickenside :

Slickensides : Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slickspot : Small areas of surface soil that are slick when wet because of alkalinity or high exchangeable sodium. OR The polished surface that forms when two pedes rub against each other when some soils expand in response to wetting.

Slime layer : Diffuse layer of polysaccharide exterior to the cell wall in some bacteria..

Slime mold : Nonphototrophic eukaryotic microorganism lacking cell walls, which aggregate to form fruiting structures (cellular slime molds) or simply masses of protoplasm (acellular slime molds).

Sling psychrometer : psychrometer that uses a rotating handle and a whirling motion to ventilate its wet-bulb thermometer.

Slip rate. : The rate at which the geologic materials on the two sides of a fault move past each other over geologic time. The slip rate is expressed in mm/yr, and the applicable duration is stated. Faults having slip rates less than 0.01 mm/yr are generally considered inactive, while faults with Holocene slip rates greater than 0.1 mm/yr generally display tectonic geomorphology.

Slip-face : The lee side of a dune where material accumulates and slides or rolls downslope.

Slippage : Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope : The inclination of the land surface from the horizontal . Percentage of slope is the vertical distance divided by the horizontal distance, then multiplied by 100. Thus, a slope of 30 percent is a drop of 30 feet in 100 feet of horizontal distance.

Slope : Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slope aspect : Main compass direction (north, north east, east, south east, south, south west, west, and north west) that a slope faces.

Slope Failure : The downslope movement of soil and sediment by processes of mass movement.

Slope. : The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal

distance.

Sloughed till. : Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Sloughings : Trickling-filter slimes that have been washed off the filter media. They are generally quite high in BOD and will lower effluent quality unless removed.

Slow intake : The slow movement of water into the soil.

Slow refill : The slow filling of ponds, resulting from restricted permeability in the soil.

Sludge : Solid residue of the wastewater purification process, a product of screening, sedimentation, filtering, pressing, bacterial digestion, chemical precipitation and oxidation; primary sludge is produced by sedimentation process and secondary sludge is the product of microbial digestion.

Sludge : The settleable solids separated from liquids during processing; the deposits of foreign materials on the bottoms of streams or other bodies of water.

Sludge age : A measure of the length of time a particle of suspended solids has been retained in the activated sludge process.

Sludge lagoon : An earthen basin that receives only sludge that has been removed from a wastewater treatment facility. It does not include a wastewater treatment lagoon or sludge treatment units that are a part of a mechanical treatment.

Slugs : Intermittent releases or discharges of industrial wastes.

Slump : See rotational slip.

Slurry : Slurry - A fluid mixture of cement or bentonite or other solids and water; may be synonymous with grout.

Small Circle : A circle on the globe's surface that does not bisect the center of the Earth. Parallels of latitude are examples of small circles.

Small stones : Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Smectite. : A fine, platy, aluminosilicate clay mineral that expands and contracts with the absorption and loss of water. It has a high cation-exchange capacity and is plastic and sticky when moist.

Smog : Generic term used to describe mixtures of pollutants in the atmosphere. Also see industrial smog and photochemical smog.

Smoothped (S) : Peds are evident and more than 50% of them are dense and

smooth faced, although the degree of lustre varies.

Smooth-ped fabric : Peds are evident. Characteristically, more than 50% of the peds are glossy or smooth-faced.

Snow : A type of solid precipitation that forms in clouds with an air temperature below freezing. Snow forms when water vapor deposits directly as a solid on a deposition nuclei. Snowflakes begin their life as very tiny crystals developing on a six-sided hexagonal deposition nuclei. The developing snowflake, then grows fastest at the six points of the nuclei as these surfaces are more exposed to atmosphere's water vapor. Snowfall is most common with the frontal lifting associated with mid-latitude cyclones during fall, winter, and spring months when air temperatures are below freezing.

Snow line : Altitudinal or latitudinal limit separating zones where snow does not melt during the summer season from areas in which it does. Similar to the concept of firm limit except that it is not limited to glaciers.

Snow Melt : Conversion of snow into runoff and groundwater flow with the onset of warmer temperatures.

Snow pellets : A form of precipitation also known as graupel. Snow pellets are white, spherical bits of ice with a maximum diameter of 5 millimeters. Snow pellets develop when supercooled droplets freeze on snowflakes. Snow pellets often fall for a brief time period when precipitation transforms from ice pellets to snow. Snow pellets can be easily distinguished from packed snowflakes as they tend to bounce when they strike the ground. Packed snowflakes are not dense enough to cause them to bounce.

Snowfield : An area of permanent snow accumulation. Usually at high altitudes or latitudes.

Sodic soil : Soil with excess of sodium, pH is higher than 7, usually in the range 8 - 10, exchangeable sodium percentage, ESP > 15 and very poor soil structure. These soils need special management and are not used for agriculture; non-sodic soils are without excess of sodium.

Sodicity : Is a measure of exchangeable sodium in relation to other exchangeable cations. It is expressed as the Exchangeable Sodium Percentage (ESP). A sodic soil contains sufficient exchangeable sodium to interfere with the growth of plants, including crops. A soil with an ESP greater than 6 is generally regarded as being a sodic soil in Australia (Northcote and Skene, 1972). ESP levels are further classified in the Australian Soil Classification (Isbell, 1996). See Sodic Soils on the VRO website for more information.

Sodicity : A measure of exchangeable sodium in the soil. High levels adversely affect soil stability, plant growth and/or land use.

Sodicity index : There are three ratings for soil sodicity and they are as follows

0-5	Non-sodic
5-15	Sodic
15 +	Strongly Sodic

Sodium adsorption ratio (sar) : The proportion of sodium in the adsorbed layer, which is held in the pore fluid of the clay. This identity is calculated from the soluble cations present in the supernatant liquid and is expressed as

$$\frac{\text{Sodium}}{[\text{calcium} + \text{magnesium}]^{1/2}}$$

The SAR of a soil extract is generally preferred as a sodicity index rather than Exchangeable Sodium Percentage (ESP) because it is more easily determined (Mitchell, 1976). Also, ESP values can vary depending on whether Cation Exchange Capacity (CEC) or the sum of the major cations is used as the divisor. OR A value representing the relative hazard of irrigation water because of a high sodium content relative to its calcium plus magnesium content.

Sodosol : A Soil Order of the Australian Soil Classification (Isbell, 1996). These soils have a clear or abrupt textural change between the A Horizons and B Horizons. The top 20 cm of the B2 horizon is sodic and is not strongly acid. Soils with a subplastic B2 horizon are excluded.

Sodosols : ASC Soil Order classification—Soils with strong texture contrast between A horizons and sodic B horizons which are not strongly acid.

Softening : The removal of calcium and magnesium from water to reduce hardness.

Soil : (1) A dynamic natural body composed of mineral and organic materials and living forms in which plants grow. (2) The collection of natural bodies occupying parts of the earth's surface that support plants and that have properties due to the integrated effect of climate and living matter acting upon parent material, as conditioned by relief, over periods of time.

Soil : i) Unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. (ii) Unconsolidated mineral and organic matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of: parent material, climate (including water and temperature effects), macroorganisms and microorganisms, and topography, all acting over a period of time and producing a productsoil that differs from the material from which it is derived in many physical, chemical, biological, and morphological properties, and characteristics.

Soil acidity : The intensity of hydrogen ion concentration in soils. The total acidity is the sum of active acidity and reserve acidity.

Soil aggregate : Unit of soil structure generally < 10 mm in diameter and formed by natural forces and substances derived from root exudates and microbial products which cement smaller particles into larger units.

Soil air : The gaseous phase of soil; the volume of soil not occupied by solid or water.

Soil amendment : Matter than, when added to the land, will make the soil healthier by such means as balancing and adding nutrients, balancing the pH, and encouraging the presence of microorganisms. From a legal standpoint, this is different than "fertilizer" and is not governed by the laws which regulate fertilizers. OR A material added to soils to change their chemical or physical properties.

Soil Amendment/Soil Conditioner : Soil additive which stabilizes the soil, improves resistance to erosion, increases permeability to air and water, improves texture and resistance of the surface to crusting, eases cultivation or otherwise improves soil quality.

Soil atmosphere : Gases occupying the pore space in soil. Generally characterized as having a greater percentage of carbon dioxide and a lesser percentage of oxygen than the overlying air.

Soil Auger : A tool used for boring into the soil and withdrawing small samples for field or laboratory examination.

Soil biochemistry : Branch of soil science concerned with enzymes and the reactions, activities, and products of soil microorganisms.

Soil biology : A scientific discipline dealing with living components of soils, which are represented mainly by bacteria, fungi, protozoa, nematodes, arthropods and earthworms as well as by mammals.

Soil change : Temporal variation in soil at various time scales at a specific location.

Soil chemical properties : Characteristics of soil that are defined by chemistry, such as the composition and reaction of soil constituents. Soil ph and nutrient supply are chemical properties contributing to soil fertility.

Soil chemistry : A scientific discipline dealing with chemical properties of soils and studies on the influence of fertilizers, pesticides and the other chemical substances applied on or into the soil on soil behaviour and fertility.

Soil classification : Also termed soil taxonomy, is the scientific discipline dealing with grouping of soils into soil morphological units or soil types, according to similar or comparable soil forming properties. Many countries in the world have

national soil classification systems but those of FAO, WRB and USDA are used internationally. For transnational comparisons, an international soil classification system, into which the majority of national systems can be translated, is needed. In future, this will be the WRB.

Soil colloids : Very small organic and inorganic particles found in a soil. Inorganic colloids are often clay particles. Soil colloids carry a negative electrical charge and are the primary sites for cation exchange. Soil colloids hold large quantities of elements and compounds which are used by plants for nutrition.

Soil colour : soil colour is one of the indicators of soil status and depends on many factors, mainly on the amount and state of organic matter and iron oxide, as well as amount of air and water in soil pores; In general, dark soils have high organic matter content, grey soils are waterlogged or anaerobic, brown soils are well-drained and aerated soils. Soil colour is measured using Munsell Soil Color charts.

Soil compaction : changing the nature of the soil such that there is a decrease in the volume of voids between soil particles or aggregates; it is manifest as an increase in bulk density and a severely compacted soil can become effectively impermeable. Some soils are naturally compacted, e.g. very heavy textured soils (fine textured). Man-made compaction is caused by the passage of heavy machinery and very intensive soil exploitation.

Soil consistence : How easy or hard it is for a soil ped to break apart when it is squeezed.

Soil cracks : Openings in horizontal (mm or several cm) and vertical (cm or several m) orientation, mainly affecting soil hydraulic properties, arising from swelling and Shrinking processes. Heavy clay soils are more susceptible to cracks formation than loamy soils whereas in sandy soils cracks do not form or they are very small and unstable. Soil cultivation destroys crack system, mainly by tillage.

Soil Creep : Slow mass movement of soil downslope. Occurs where the stresses on the slope material are too small to create a rapid failure.

Soil crust : A soilsurface layer that is either denser, structurally different or more cemented than the material immediately beneath it.

Soil degradation : Negative process often accelerated by human activities (improper soil use and cultivation practices, building areas) that leads to deterioration of soil properties and functions or destruction of soil as a whole, e.g. compaction, erosion, salinisation.

Soil depth : depth of soil profile from the top to parent material or bedrock or to the layer of obstacles for roots. It differs significantly for different soil types. It is one of basic criterions used in soil classification. Soils can be very shallow (less than 25 cm), shallow (25 cm-50 cm), moderately deep (50 cm-90 cm), deep (90cm-

150 cm) and very deep (more than 150 cm).

Soil drainage. : The percolation of water through a soil. A well-drained soil is free of saturation and has considerable pore space filled with air.

Soil ecology : The study of interrelations among soil organisms and between organisms and the soil environment.

Soil Erratics : 1. Fragments of horizons or other soil features transported and incorporated in superficial deposits in which a soil may have formed or is forming. 2. Part of a previously existing horizon preserved within a subsequently formed horizon.

Soil extract : Solution separated from a soil suspension or from a soil by filtration, centrifugation, suction or pressure.

Soil Fabric : The arrangement, size, shape and frequency of the individual soil constituents, excluding pores.

Soil fertility : A measure of the ability of soil to provide plants with sufficient amount of nutrients and water, and a suitable medium for root development to assure proper plant growth and maturity. OR The ability of a soil to provide nutrients for plant growth.

Soil function : Any service, role, or task that soil performs, especially: 1) sustaining biological activity, diversity, and productivity; 2) regulating and partitioning water and solute flow; 3) filtering, buffering, degrading, and detoxifying potential pollutants; 4) storing and cycling nutrients; and 5) providing support for buildings and other structures and to protect archaeological treasures. (Compare to function, functional capacity.)

Soil genesis : formation of the soil with special reference to the processes or soil-forming factors responsible for the development of the solum or true soil from the unconsolidated parent material. Synonyms: **pedogenesis, soil formation.**

Soil geography : Scientific discipline dealing with distribution of soil types in landscapes, describing this distribution according to geographical rules.

Soil health : See **soil quality.**

Soil horizon : Layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics such as color, structure, texture, consistency, kinds and number of organisms present, and degree of acidity or alkalinity.

Soil Horizon : See **horizon.**

Soil horizon : A layer of soil that is nearly parallel to the land surface and is different from layers above and below.

Soil horizon : A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics, such as color, structure, texture, consistency, amount of organic matter, and degree of acidity or alkalinity. OR A layer of soil that is nearly parallel to the land surface and is different from layers above and below.

Soil mechanics : The application of the principles of mechanics and hydraulics to engineering problems dealing with the behavior and nature of soils, sediments, and other unconsolidated accumulations; the study of the physical properties and utilization of soils, especially in relation to highway and foundation engineering. Agi

Soil microbiology : Branch of soil science concerned with soilinhabiting microorganisms and their functions and activities.

Soil micro-organisms : Represented by protozoa, viruses, bacteria, fungi and algae. The most prevalent are bacteria and fungi, and depending on conditions (water and nutrients content, temperature, etc.) they can be in an active or non-active state. According to nutrient (and oxygen) demand, micro-organisms are divided to autotropic and heterotrophic, (aerobic and anaerobic) groups. Micro-organisms are a good indicator of soil status and quality.

Soil Mineral : That portion of the soil that is inorganic and neither air nor water.

Soil Moisture Recharge : The process of water filling the pore space found in a soil (storage).

Soil monitoring : Repeated observation and measurement of selected soil properties and functions, mainly for studying changes in soil conditions.

Soil Monolith : A vertical section through the soil preserved with resin and mounted for display.

Soil morphology : Form and arrangement of pedological features. Soil organic matter: The organic fraction of the soil exclusively comprising undecayed plant and animal residues. See also humus.

Soil Order. : The highest level of soil classification. There are presently 12 soil orders, including 1) Entisols, 2) Inceptisols, 3) Spodosols, 4) Ultisols, 5) Alfisols, 6) Vertisols, 7) Oxisols, 8) Histosols, 9) Andisols, 10) Aridosols, 11) Mollisols, and 12) Gelisols.

Soil organic matter. : The carbon-containing constituents derived from formerly living organisms. Humus is a dark-colored, stable form of soil organic matter.

Soil Permeability : The rate at which water and air move vertically through a soil.

Soil pH : An index of the acidity or alkalinity of a suspension of soil in a liquid such as distilled water or dilute salt solution. The index is the logarithmic expression of the activity of H-ions in the liquid surrounding the soil particles. A pH >7.0 is alkaline and <7.0 is acid. A soil pH is not a measure of total acidity in a soil. It is a measure of the acidity or alkalinity of the soil.

Soil physical properties. : Characteristics of soil that are defined by matter and energy. Physical properties include such characteristics as tilth, structure, drainage, water-holding capacity, aeration, and bulk density, which contribute to soil fertility.

Soil physics : Scientific discipline dealing with physical properties of soil (density, porosity, water retention and permeability, hydraulic conductivity etc.).

Soil population : (i) All the organisms living in the soil, including plants and animals. (ii) Members of the same taxa.

Soil pore : That part of the bulk volume of soil not occupied by soil particles. Soil pores have also been referred to as interstices or voids.

Soil Porosity : The volume of water that can be held in a soil. Also refers to the ratio of the volume of voids to the total volume of the soil.

Soil Profile : A section of two dimensions extending vertically from the earth's surface so as to expose all the soil horizons and a part of the relatively unaltered underlying material.

Soil quality : Continued capacity of soil to function as a vital living system to sustain biological productivity, maintain the quality of the environment, and promote plant, animal, and human health.

Soil quality or soil health : The capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation. In short, the capacity of the soil to function. There are two aspects of the definition: inherent soil quality and dynamic soil quality. (Compare to functional capacity.)

Soil quality, dynamic : That aspect of soil quality relating to soil properties that change as a result of soil use and management or over the human time scale.

Soil quality, inherent : That aspect of soil quality relating to a soil's natural composition and properties as influenced by the factors and processes of soil formation, in the absence of human impacts.

Soil quality : Soil fertility.

Soil resilience : The capacity of a soil to recover its functional capacity after a disturbance.

Soil respiration : The amount of carbon dioxide given off by living organisms and roots in the soil.

Soil respiration, basal : The level of carbon dioxide given off by a soil sample. Basal respiration is a measure of the total biological activity of microorganisms, macroorganisms, and roots.

Soil respiration, substrate-induced : A measure of the carbon dioxide given off by a soil sample after adding sugar or other food. It is used to estimate microbial biomass in the sample.

Soil salinity : Amount of soluble salts in a soil. The conventional measure of soil salinity is the electrical conductivity of a saturation extract.

Soil saturation : The water content of a soil beyond which no more water is absorbed.

Soil science : Science dealing with soils as a natural resource on the surface of the earth including soil formation, classification and mapping, and physical, chemical, biological, and fertility properties of soils per se; and these properties in relation to their use and management.

Soil seismologist . : Soil scientist who studies the effects of earthquakes on soils.

Soil separate . : The sand, silt, and clay of soil, particles which will pass through a 2-mm sieve. Also called soil separates. Gravel, cobbles, flagstones, and other constituents larger than 2-mm in diameter are not soil separates but are used as modifiers in names determining soil texture.

Soil separates . : Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

Separate	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Soil series : Lowest category of U.S. system of soil taxonomy; a conceptualized class of soil bodies (polypedons) that have limits and ranges more restrictive than all higher taxa. The soil series serve as a major vehicle to transfer soil information and research knowledge from one soil area to another.

Soil Solution : Aqueous liquid found within a soil. This liquid normally contains ions released from mineral particles, organic matter or plant roots and leaves. OR The aqueous liquid portion and its solutes in soil.

Soil sorption : Selective process, which occurs on soil particles smaller than 0.002mm (<2 μ m); these small particles have colloidal properties, are able to hold and exchange ions, water or gases.

Soil Strength (penetration resistance, cone index) : The hardness, or resistance to a physical force, of a soil layer, zone, or specific point in the soil. Soil strength is often defined in terms of a measurement of resistance to penetration with an instrument such as a cone penetrometer. Measurements may be difficult to interpret, because they are strongly affected by differences in soil water content. Penetration resistance is also determined by soil texture and many properties related to soil aggregation and structure. Soil zones with very high soil strength, such as clay pans, plow pans, and other types of hardpans, restrict root growth, water movement, and air exchange.

Soil structure : Combination or arrangement of primary soil particles into secondary particles, units, or peds. The secondary units are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades, respectively.

Soil Suborder . : The 2nd highest taxonomic order of the U.S. soil classification system.

Soil surface area . : The total surface area of the sand, silt, and clay particles in soil.

Soil Survey : The systematic examination and mapping of soil.

Soil Taxonomy : The systematic arrangement of soils into groups or categories on the basis of their characteristics.

Soil tectonics . : The study of the interactions between soil formation and tectonism.

Soil test : a chemical, physical, or microbiological operations that estimates a property of a soil.

Soil testing . : An analytical process applied to assess the capacity of soils to supply plant nutrients. Often a rapid, semiquantitative quick test to assess the availability of plant nutrients.

Soil Textural Triangle : A 3-phase scale used to define soil into a soil textural group.

Soil texture : Relative proportions of the various soil separates in a soil. The major textural classes are sand, silt, and clay.

Soil tilth. : The physical (structural) properties of soils in relation to crop growth.

Soil tongue. : That portion of a soil horizon extending into a lower horizon.

Soil Water : The water found occupying the pore spaces between soil particles.

Soil water potential(total) : Amount of work that must be done per unit quantity of pure water in order to transport reversibly and isothermally an infinitesimal quantity of water from a pool of pure water, at a specified elevation and at atmospheric pressure, to the soil water (at the point under consideration). Informally, the amount of energy that must be expended to extract water from soil. The total potential (of soil water) consists of the following: gravitational potential, matric potential, and osmotic potential.

Soil waterholding capacity : The water that is held in the fine pores and around the soil particles after water has drained from the large pores. Field capacity is a term for water-holding capacity in a soil, once saturated with water and drained for 2 or 3 days. The wilting percentage is the soil moisture content at which plants in soil permanently wilt.

Soil-heat flux : The rate of flow of heat energy into, from, or through the soil.

Solar altitude : Height of the sun above the horizon from either true north or true south.

Solar Constant : A term used to describe the average quantity of solar insolation received by a horizontal surface at the edge of the Earth's atmosphere. This value is approximately 1370 Watts per square meter.

Solar Day : Time required for the Earth to complete one rotation relative to the sun.

Solar energy : See insolation.

Solar noon : Point of time during the day when the sun is aligned with true north and true south.

Solar Radiation : Electromagnetic radiation that originates from the sun. Most of the sun's radiation is emitted at wavelengths between 1.0 and 0.1 microns (μm). Also see insolation, direct solar radiation, and diffused solar radiation.

Solar system : The collection of celestial bodies that orbit around the sun.

Solar Wind : Mass of ionized gas emitted to space by the sun. Plays a role in the formation of auroras.

Solar Year : The time it takes the Earth to make one orbit around the sun. This is approximately 365.2422 days.

Solarization : Method to control pathogens and weeds where moistened soil in hot climates is covered with transparent polyethylene plastic sheets, thereby

trapping incoming radiation.

Solid : A state of matter where molecules where the mass of the substance does not have the property of flow.

Solid Socket : Forks and spade that are hand-forged from a single piece of steel and are weld-free. The handle is driven close to the blade (see photo above) making the tool strong enough to cope with heavy stress, unlike common tools that are of two-piece tang-and-ferrule construction or welded.

Solid waste : Garbage, refuse, and other discarded solid material

Solifluction : Form of mass movement in environments that experience freeze-thaw action. It is characterized by the slow movement of soil material downslope and the formation of lobe-shaped features. Also see gelifluction.

Solodic soil : A Great Soil Group, (Stace *et al.*, 1968) classification. These soils have a strong contrast between the texture of the A and B horizons and a bleached A₂ horizon (which may contain a few sesquioxidic nodules). The A Horizons are usually acidic and the B Horizons are alkaline grading to strongly alkaline at depth. The B horizon has medium to coarse blocky peds (which may be arranged in a coarse columnar fashion). These soils are typical in semi-arid and subhumid climatic zones and tend to be very dense soils with low permeability. The difference between solodic soils and solodized solonetz soils occurs in the structure of the B horizon solodics have a medium to coarse blocky structure whereas solodized solonetz soils have a coarse columnar structure with clearly defined domes on the tops of the columns.

Solodic soils : GSG classification—See Solodised Solonetz and Solodic Soils.

Solodised solonetz : A Great Soil Group (Stace *et al.*, 1968) classification. These soils are identical to solodic soils except for the structure of the B Horizon. Solodics have a medium to coarse blocky structure where as solodized solonetz have a coarse columnar structure with clearly defined domes on the tops of the columns.

Solodised Solonetz and Solodic Soils : GSG classification—Soils with strong texture contrast, well-developed bleached A₂ horizon over an alkaline medium to coarse angular blocky structure of typically strong consistency.

Solonchaks : GSG classification—Soils dominated by salt accumulation and which show one or more of the following; salty encrustations; surface flaking; polygonal cracking of the surface; powdery structure; lack of normal plant growth except salt tolerant species.

Solonetz : A Great Soil Group (Stace *et al.*, 1968) classification. Typically, there is weak differentiation between the A Horizons. The A₂ horizon may be sporadically bleached just above the clay subsoil. There is an abrupt boundary and a strong texture contrast between the A and B Horizons. Surface soils are typically neutral

to alkaline with a strongly alkaline subsoil. The subsoil clays are high in sodium and magnesium ions and usually have a prismatic structure.

Solonetz soils : GSG classification—Soils with prominent texture differentiation between neutral to slightly alkaline, loamy topsoils and strongly alkaline, clay subsoils.

Solonetzic soil : soil order (type) of the canadian system of soil classification. This soil type is associated with grassland habitats where high levels of evapotranspiration cause the accumulation of salts at or near the soil surface. These soils are common in the dry regions of the prairies where evapotranspiration greatly exceeds precipitation input.

Solonised brown soils : GSG classification—Soils characterised by large amounts of calcareous material in the profile both in the fine earth fraction and as soft and hard segregations consisting of calcium and magnesium carbonates, but usually the calcium is predominant.

Solonized brown soils : A Great Soil Group (Stace *et al.*, 1968) classification. These soils have large amounts of calcium and magnesium carbonate in the profile. Soil properties show a gradual change down the profile. The most evident is the increase in carbonates with depth. Texture also becomes finer with depth and the ph changes from a neutral/slightly alkaline surface horizon to an alkaline subsoil. The soluble salt content of the subsoil also increases significantly. Dark manganiferous nodules can also occur in the subsoil.

Soloth : A Great Soil Group, (Stace *et al.*, 1968) classification. Similar to a solodic soil but acidic throughout the profile. Tends to be a more typical soil of the humid regions where the exchangeable cations in the B Horizon of the solodised soils have been leached out.

Soloths : GSG classification—Acid soils with strong texture contrast between pale topsoil and clay subsoil with coarse blocky or columnar structure.

Solstice : Dates when the declination of the sun is at 23.5° North or South of the equator. For the Northern Hemisphere this date falls on June 21 or 22 (Summer Solstice). In the Southern Hemisphere the date is December 21 or 22 (Winter Solstice).

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Solubility : Amount of a substance that will dissolve in a given amount of another substance, typically water.

Soluble : Matter or compounds capable of dissolving into a solution.

Soluble BOD : Soluble BOD is the BOD of water that has been filtered in the standard suspended solids test.

Soluble salts : Soluble salts concentration is the concentration of soluble ions in a solution, measured by electrical conductivity; conductivity varies by the number and type of ions contained in the solution; each end user group of compost products will have its own salinity standards for growing specific plants or crops. Too high salts can result in phytotoxicity.

Solum : The part of the soil above the relatively unaltered material. OR Part of the soil that is capable of supporting life.

Solum : The upper part of the soil profile, above the C horizon, in which the process of soil formation are active. The solum in soil consists of the A, E, B and BC horizons. The living root and plant and animal activities are largely confined to the solum.

Solum : The upper part of a soil profile above the parent material in which current processes of soil formation are active. This is where the living roots and other plant and animal life characteristics are exhibited.

Solum. : Combined A and B horizons. Also called the true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

Solum. : The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Solute : Matter dissolved in a liquid, such as water.

Solute potential : the amount of work an infinitesimal quantity of water will do in moving from a pool of free water the same composition as the soil water to a pool of pure water at the same location. The effect of dissolved substances. Usually very small. Solvent , Specific heat , Strain, Stress

Solution : (1) Form of chemical weathering where rocks and minerals are dissolved by water. Materials entering the mixture can alter the chemical nature of the solution and can increase the strength of this weathering agent. For example, the mixing of carbon dioxide and water can form carbonic acid.

(2) The dissolving of a substance into a liquid.

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(2) The dissolving of a substance into a liquid.

Solution : A liquid mixture of dissolved substances, displaying no phase separation.

Solvent : Substance (usually liquid) capable of dissolving one or more other substances.

Sorghum : (Crop science) a cereal grass used mainly for feedgrain or silage.

Source control : A practice, method, or technology used to reduce pollution from a source such as best management practices or end-of-pipe treatment.

Source Control : Action to prevent pollution at its origin.

Source Region : Area where air masses originate and come to possess their moisture and temperature characteristics.

Source separation : In homes or commercial operations, waste is separated into categories for recycling, composting, or landfilling. This is a fancy name for separating your newspapers, glass, yard wastes, plastic bottles, etc. into separate containers or piles for waste processing.

Source water : : untreated water that is supplied to some use such as water treatment.

South Magnetic Pole : Location in the Southern Hemisphere where the lines of force from Earth's magnetic field are vertical. This point on the Earth gradual changes its position with time.

South pole : Surface location defined by the intersection of the polar axis with earth's surface in the southern hemisphere. This location has a latitude of 90° south.

Southeast Trade Winds : See trade winds.

Southern blot : Hybridization of singlestranded nucleic acid (DNA or RNA) to DNA fragments immobilized on a filter.

Southern Oscillation : Reversal of atmospheric circulation in tropical Pacific Ocean that triggers the development of an El Nino.

Sow : (animal science) A sexually mature female hog, after having her first litter.

Soybeans : (Crop science) a legume crop, native to the orient, used mainly in the united states for high protein feed and oil.

Space : (1) A distance, area, or volume.

(2) An infinite three-dimensional area in which objects have relative coordinates to each other.

(3) The region beyond the outer limits of the Earth's atmosphere.

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- (1) A distance, area, or volume.
- (2) An infinite three-dimensional area in which objects have relative coordinates to each other.
- (3) The region beyond the outer limits of the Earth's atmosphere.

Spatial Analysis : The examination of the spatial pattern of natural and human-made phenomena using numerical analysis and statistics.

Spatial Isolation : Reproductive isolation of two or more populations of a species by distance or physical barriers. Over long periods of time geographic isolation leads to speciation through divergent evolution because of environmental heterogeneity. Also called geographic isolation.

Spatial Tradition : Academic tradition in modern Geography that investigates geographic phenomena from a strictly spatial perspective.

Spatial variability : Variation in soil properties (i) laterally across the landscape, at a given depth, or with a given horizon, or (ii) vertically downward through the soil.

Spec. Sheet : Specification Sheet. Detailed information of a product including, tests, color, odor, specific gravity, bacterial strains, other major ingredients, etc.

Special Order by Consent (SOC) : An administrative order entered by the Environmental Management Commission and an NPDES discharger which in some way modifies limitations of an NPDES permit by consent of both parties and provides interim limitations and conditions.

Specialist : A species that consumes only one or a few types of food sources or forms associations with a narrow range of hosts. For example, certain collembola (tiny insects called springtails) specialize in eating specific species of fungi. (See generalist)

Specialist species : Species that have a relatively narrow ecological niche. These species may be able to live in only one type of habitat, tolerate only specific environmental conditions, or use only a few types of food.

Specialist Species : Species that have a relatively narrow ecological niche. These species may be able to live in only one type of habitat, tolerate only specific environmental conditions, or use only a few types of food.

Speciation : The process by which new species originate through mutations, natural selection, and evolution.

Species : In microbiology, a collection of closely related strains sufficiently different from all other strains to be recognized as a distinct unit.

Species : (1) The different kinds of organisms found on the Earth as defined by taxonomic and/or phylogenetic classification.

(2) A group of interbreeding organisms that do not ordinarily breed with members of other groups.

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(1) The different kinds of organisms found on the Earth as defined by taxonomic and/or phylogenetic classification.

(2) A group of interbreeding organisms that do not ordinarily breed with members of other groups.

Species Association : A particular grouping of species in an area.

Species Diversity : Number of different species in a given region.

Specific activity : Amount of enzyme activity units per mass of protein. Often expressed as micromoles of product formed per unit time per milligram of protein. Also used in radiochemistry to express the radioactivity per mass of material (radioactive and nonradioactive).

Specific Capacity : Specific Capacity - Expresses the productivity of a well. Specific capacity is obtained by dividing the well discharge rate by the well drawdown while pumping.

Specific conductance : Method to estimate the dissolved solid content of a water supply by testing its conductivity.

Specific epithet : Designation of a particular organism in the binomial nomenclature system. For example, *coli* is the specific epithet of *Escherichia coli*.

Specific Gravity : The ratio of the mass of a body to the mass of an identical volume of water at a specific temperature.

Specific Heat : Is the heat capacity of a unit mass of a substance or heat needed to raise the temperature of 1 gram (g) of a substance 1 degree Celsius.

Specific Humidity : Measurement of atmospheric humidity. Specific humidity is the mass of water vapor in a given mass of air. Normally expressed in grams of water vapor per kilogram of air at a specific temperature.

Specific Yield : Specific Yield - A ratio of the volume of water that a unit volume of subsurface material will yield by gravity, divided by that unit volume; a measurement associated with unconfined aquifers.

Spectrum : Is a graph that describes the quantity of radiation that is emitted from a body at particular wavelengths.

Speed of Light : Velocity of light in a vacuum. This velocity is approximately 3 x 10⁸ meters per second. It takes light from the sun 8 minutes and 20 seconds to

reach the Earth.

Spermosphere : Area of increased microbial activity around a germinating seed.

Sphericity : Relates to the overall shape of a feature irrespective of the sharpness of its edges and is a measure of the degree of its conformity to a sphere.

Spheroidal weathering : A type of below ground chemical weathering where the corners of jointed rocks become rounded over time. Rock changes from a rectangular to more round shape.

Spherulitic Crystallization : Spherulitic Crystallization - Crystallization that results in tightly packed crystal groups that radiate from a common center.

Spicule : Spicule - A microscopic skeletal element of a sponge, typically in the form of a needle or fused cluster of needles.

Spirillum (plural, spirilli) : (i) Bacterium with a spiral shape which is relatively rigid. (ii) Bacterium in the genus *Spirillum*.

Spirorbid : Spirorbid - A kind of worm with a spiral, snail-like shell.

Spit : A long and narrow accumulation of sand and/or gravel that projects into a body of ocean water. These features form as the result of the deposition of sediments by longshore drift.

Spodic horizon. : A subsurface soil horizon characterized by an accumulation of aluminum, (also potentially iron) and organic matter. This is the diagnostic horizon for the soil order Spodosol.

Spodosol : A soil order characterized by the presence of a spodic horizon.

Spodosols : Other soils that do not have a plaggen epipedon or an argillic or kandic horizon above a spodic horizon, and have one or more of the following:

A spodic horizon, an albic horizon in 50 percent or more of each pedon, and a cryic soil temperature regime; or

An Ap horizon containing 85 percent or more spodic materials; or

A spodic horizon with all of the following characteristics:

One or more of the following:

A thickness of 10 cm or more; or

An overlying Ap horizon; or

Cementation in 50 percent or more of each pedon; or

A coarse-loamy, loamy-skeletal, or finer particle-size class and a frigid temperature regime in the soil; or

A cryic temperature regime in the soil; and

An upper boundary within the following depths from the mineral soil surface: either

Less than 50 cm; or

Less than 200 cm if the soil has a sandy particle-size class in at least some part between the mineral soil surface and the spodic horizon; and

A lower boundary as follows:

Either at a depth of 25 cm or more below the mineral soil surface or at the top of a duripan or fragipan or at a densic, lithic, paralithic, or petroferric contact, whichever is shallowest; or

At any depth,

If the spodic horizon has a coarse-loamy, loamy-skeletal, or finer particle-size class and the soil has a frigid temperature regime; or

If the soil has a cryic temperature regime; and

Either:

A directly overlying albic horizon in 50 percent or more of each pedon; or

No andic soil properties in 60 percent or more of the thickness either:

Within 60 cm either of the mineral soil surface or of the top of an organic layer with andic soil properties, whichever is shallower, if there is no densic, lithic, or paralithic contact, duripan, or petrocalcic horizon within that depth; or

Between either the mineral soil surface or the top of an organic layer with andic soil properties, whichever is shallower, and a densic, lithic, or paralithic contact, a duripan, or a petrocalcic horizon.

Spodosols : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. A spodosol soil has pronounced layers of illuviation characterized by accumulations of iron and aluminum oxides in the B horizon. These soils form in moist, cool climates.

Sporadic Permafrost : Form of permafrost that exists as small islands of frozen ground in otherwise unfrozen soil and sediments.

Sporangiospore : Spore formed within a sporangium by fungi in the phylum Zygomycota.

Sporangium : Fungal structure which converts its cytoplasm into a variable number of sporangiospores; formed by fungi in the phylum Zygomycota.

Spores : Specialized reproductive cell. Asexual spores germinate without uniting with other cells, whereas sexual spores of opposite mating types unite to form a zygote before germination occurs.

SPOT (Centre National d'Etudes Spatiales) : Series of satellites developed by the French Space Agency, with the cooperation with Belgium and Sweden for the purpose of remotely monitoring resources on the Earth. The first SPOT satellite was launched in 1986. See the following website for more information - SPOT Image.

Spread plate : Method for performing a plate count of microorganisms. A known amount of a serial dilution is spread over the surface of an agar plate. After growth the number of colonyforming units is counted.

Spring : (1) Season between winter and summer. Astronomically it is the period from the vernal equinox to the summer solstice in the Northern Hemisphere.

(2) A natural flow of water from the sub-surface to the surface. Usually occurs when the water table intersects the Earth's surface. OR Spring - The point of natural groundwater discharge to a soil surface, river or lake.

Spring Tide : Tide that occurs every 14 to 15 days and coincides with the new and full moon. This tide has a large tidal range because the gravitational forces of the moon and sun are complementary to each other. Contrasts with neap tide.

Springtails : Very small insects that live in the surface soil and feed on organic matter.

Squall Line : A band of thunderstorm development found ahead of a cold front.

Squash bug : Problem in pumpkin and other vegetables.

SS : Suspended solids - Solids in suspension in water which can be filtered out on a lab filter.

Stability : State or condition in which the composted material can be stored without giving rise to nuisances or can be applied to the soil without causing problems there; the desired degree of stability for finished compost is one in which the readily decomposed compounds are broken down and only the decomposition of the more resistant biologically decomposable compounds remains to be accomplished.

Stabilization : This is the process used to reduce harmful bacteria and odors in biosolids. Typically, stabilization is accomplished through aerobic (with oxygen) or anaerobic (without oxygen) digestion. Digestion refers to the breakdown of complex organic substances through the action of bacteria and other microorganisms.

Stabilize : To convert to a form that resists change. Organic material is stabilized

by bacteria which convert the material to gases and other relatively inert substances. Stabilized organic material generally will not give off obnoxious odors.

Stable atmosphere : Condition in the atmosphere where isolated air parcels have a tendency to sink. The parcels of air tend to be cooler than the air that surrounds them.

Stable Equilibrium : In a stable equilibrium the system displays tendencies to return to the same equilibrium after disturbance.

Stable fly : A two-winged fly that bites severely. Problem in the state's dairies.

Stadial moraine : See recessional moraine.

Stage : The elevation of the water surface in a stream channel.

Stalk aggregates : Stalk aggregates - Vertically oriented features in which the growth took place in a direction opposite to the direction of flow; that is, upward.

Stallion : (Animal science) an unaltered (uncastrated) male horse.

Stand : A recognizable area of plants that is relatively homogeneous and can be managed as a single unit.

Standard atmospheric pressure : A pressure of 101.32 kilopascals or 1013.2 millibars.

Standard Deviation : A statistical measure of the dispersion of observation values in a data set. Calculated by determining the square root of the variance.

Star : A large and very massive, self-luminous celestial body of gas that illuminates via the radiation derived from its internal source of energy.

Starch : Complex carbohydrate composed of thousands of glucose units. Main compound that plants use to store their food energy.

Stasis : Stagnation or inactivity of the life processes within organisms.

State of Matter : Form of matter. Matter can exist in three different forms gas, liquid, and solid.

Static Equilibrium : Static equilibrium occurs where force and reaction are balanced and the properties of the system remain unchanged over time.

Static Water Level : Static Water Level - The water level in a well located in an unconfined aquifer when the pump is not operating. The static water level is the surface of the water-bearing formation and typically is synonymous with the water table.

Stationary Front : A transition zone in the atmosphere where there is little movement of opposing air masses and winds blow towards the front from opposite directions.

Stationary phase : Period during the growth cycle of a population in which growth rate equals the death rate.

Steady State Equilibrium : In this type of equilibrium the average condition of the system remains unchanged over time.

Steam Fog : See evaporation fog.

Steer : (Animal science) a male bovine castrated early in life, usually as a calf.

Steinkern : Steinkern - A fossil formed when a sediment or mud enters a hollow natural object (such as a bivalve shell), is consolidated, and remains as a cast after the object dissolves.

Stemflow : Is the process that directs precipitation down plant branches and stems. The redirection of water by this process causes the ground area around the plant's stem to receive additional moisture. The amount of stemflow is determined by leaf shape and stem and branch architecture. In general, deciduous trees have more stemflow than coniferous vegetation.

Stephan boltzmann law : This radiation law suggests the amount of radiation given off by a body is proportional to the 4th power of its temperature as measured in kelvin units. This law can be expressed by the following simple equation:

$$E^* = \sigma t^4$$

Where e^* is the amount of radiation emitted by the body in watts per square meter,

σ is a constant equal to 0.000000567,

And t is the temperature of the body in kelvins. OR This radiation law suggests the amount of radiation given off by a body is proportional to the 4th power of its temperature as measured in Kelvin units. This law can be expressed by the following simple equation:

Stephanian : Stephanian - A European geologic stage that corresponds approximately to the upper Carboniferous (Pennsylvanian).

Steppe : Russian term for mid-latitude grasslands.

Sterilization : The removal or destruction of all living microorganisms, including pathogenic and other bacteria, vegetative forms and spores.

Stockers (or stocker cattle) : (Animal science) heifers and/or steers that are being grown on pasture or other forage for later sale as feedlot replacements.

Stoma : Mouth opening of predacious and bacteriovorous nematodes.

Stoma (pl. Stomata) : Small opening on the surface of a plant that is used for gas exchange.

Stone line. : A thin, buried, planar layer of stones, cobbles, or bedrock fragments. Stone lines of geological origin may have been deposited upon a former land surface. The fragments are more often pebbles or cobbles than stones. A stone line generally overlies material that was subject to weathering, soil formation, and erosion before deposition of the overlying material. Many stone lines seem to be buried erosion pavements, originally formed by running water on the land surface and concurrently covered by surficial sediment. ORA layer of gravel within a soil profile.

Stone line : A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones : Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stoniness : It is the relative proportion (vol %) of coarse particles (larger than 2 mm diameter) in the soil or on soil surface; 15% stones is a high value and can hinder cultivation and reduce water holding capacity.

Stony. : Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Storage polysaccharide : Energy reserve deposited in the cell when there is an excess of carbon available. These are usually deposited as large granules in the cell. The most common example of a storage polysaccharide in plants is starch. Its counterpart in animal cells is glycogen.

Storm drain : A pipe that travels from the catch basin to the creeks and ocean.

Storm Drain Catch Basin : (Also drop inlet, drain inlet) grated or unguarded opening in or at the side of the curb or gutter into which runoff flows.

Storm Drain System : A system which includes grates, gutters, underground pipes, creeks or open channels designed to transport rain from developed areas to a receiving body of water.

Storm sewer : A separate pipe, conduit or open channel (sewer) that carries runoff from storms, surface drainage and street wash, but does not include domestic and industrial wastes. Storm sewers are often the recipients of hazardous or toxic substances due to the illegal dumping or hazardous wastes or spills created by accidents involving vehicles and trains transporting these substances.

Storm surge : Relatively rapid rise in the height of the ocean along a coastline. Often caused by the storm winds pushing water towards land.

Storm Track : The path taken by a storm (thunderstorm, mid-latitude cyclone or hurricane) or the average path taken by storms.

Storm Water : Runoff in the storm drain system. OR That portion of rainfall that does not infiltrate into the soil.

Stoss : Side of a slope that faces the direction of flow of ice, wind, or water. Opposite of lee.

STP : Standard Temperature (25 C) and Pressure (300 mm Mercury).

STP test : Laboratory test for nitrifiers. For CF1100, 7110 & 1400 to be within specifications, this test must show a positive color change result (from fuschia to yellow) within 7 days. When testing the 50X concentrate of these three products, a positive color change is expected within 24 hours.

Strain : Population of cells all descended from a single pure isolate.

Strath terrace. : A gently sloping terrace surface bearing little evidence of aggradation.

Stratification : The practice of exposing moistened seeds to cool temperatures, generally below 40* F, for 2 weeks to 2 months so they will break dormancy and germinate.

Stratified : Formed, arranged, or laid down in layers. The term refers to geologic deposits.

Stratified Drift : A type of glacial drift that has been partially sorted by glaciofluvial meltwater.

Stratify : Stratify - To deposit in layers or strata.

Stratigraphy : Subdiscipline of geology that studies sequence, spacing, composition, and spatial distribution of sedimentary deposits and rocks.

Stratocumulus clouds : Low altitude gray colored cloud composed of water droplets that has a patchy appearance. Each cloud patch consists of a rounded mass. This cloud has a somewhat uniform base and normally covers the entire sky. Between the patches blue sky can be seen. Found in an altitude range from the surface to 3,000 meters.

Stratopause : The stratopause is a relatively thin atmospheric transition layer found between the stratosphere and the mesosphere. The height of this layer is about 50 kilometers above the Earth's surface. OR The stratopause is a relatively thin atmospheric transition layer found between the stratosphere and the mesosphere. The height of this layer is about 50 kilometers above the Earth's surface.

Stratosphere : Atmospheric layer found at an average altitude of 11 to 50 kilometers above the Earth's surface. Within the stratosphere exists the ozone layer. Ozone's absorption of ultraviolet sunlight causes air temperature within the stratosphere to increase with altitude.

Stratovolcano : See composite volcano.

Stratum/singular / strata (plural) : Stratum /singular / strata (plural) - A tabular or sheet-like body or layer of sedimentary rock, visually separated from layers above and below; a bed; defined as a stratigraphic unit that may be composed of a number of beds, as a layer greater than 1 centimeter thick making up a part of a bed, and as a general term that includes both "bed" and "lamination" usually used in its plural form, strata.

Stratus clouds : Low altitude gray colored cloud composed of water droplets. This cloud has a uniform base and normally covers the entire sky. It is also quite thick and can obscure the sun. Light precipitation is often found falling from it. Found in an altitude range from the surface to 3,000 meters.

Stream : A long narrow channel of water that flows as a function of gravity and elevation across the Earth's surface. Many streams empty into lakes, seas or oceans. OR (Also arroyo, barranca, creek) small natural waterway originating from underground springs, snow melt, runoff, or other natural sources which drains to lakes, rivers, channels or oceans.)

Stream Bank : Sides of the stream channel.

Stream Bed : Bottom of the stream channel.

Stream Channel : Long trough-like depression that is normally occupied by the water in a stream.

Stream Discharge : A river or stream's rate of flow over a particular period of time. Usually measured by a current meter and expressed in cubic meters per second. Stream discharge depends on the volume and velocity of the flow.

Stream Flow : The flow of water in a river or stream channel.

Stream Gradient : The change in elevation from a stream's headwaters to its mouth expressed in degrees, percentage, or as a distance ratio (rise/run).

Stream load : Refers to the material or sediment carried by a stream. It normally consists of three components: bed load (pebbles and sand which move along the stream bed without being permanently suspended in the flowing water), suspended load (silts and clays in suspension) and dissolved load (material in solution). OR Refers to the material or sediment carried by a stream. It normally consists of three components: bed load (pebbles and sand which move along the stream bed without being permanently suspended in the flowing water), suspended load (silts and clays in suspension) and dissolved load (material in solution).

Stream Long Profile : Vertical and horizontal profile of the stream. Most streams have a profile that is concave shaped.

Stream Order : The relative position, or rank, of a stream channel segment in a drainage network.

Stream terrace : One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream, and representing the dissected remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of erosion or deposition.

Stress : In a solid, the force per unit area, acting on any surface within it, and variously expressed as pounds or tons per square inch, or dynes or kilograms per square centimeter; also, by extension, the external pressure which creates the internal force. Agi

Striations : Grooves or scratches found in surface rock that are the result of glacial abrasion.

Strike : One of the directional properties of a geologic structure such as a fold or a fault. Strike is the horizontal directional taken by an imaginary line drawn on the plane of the formation. Also see dip.

Strike-slip fault : fault that primarily displays horizontal displacement.

Strip Cropping : The practice of growing crops in strips along the contour in an attempt to reduce runoff, thereby preventing runoff or conserving moisture.

Stronggleying(g) : This symbol indicates either that iron has been reduced and removed during soil formation or that saturation with stagnant water has preserved it in a reduced state. Most of the affected layers have chroma of 2 or less, and many have redox concentrations. The low chroma can represent either the color of reduced iron or the color of uncoated sand and silt particles from which iron has been removed. The symbol g is not used for materials of low chroma that have no history of wetness, such as some shales or E horizons. If g is used with B, pedogenic change in addition to gleying is implied. If no other pedogenic change besides gleying has taken place, the horizon is designated Cg.

Strongly Anaerobic (poorly drained) : Soil that remains very wet or waterlogged for long periods of the year and as a result develops a mottled pattern of grays and browns.

Strongly coherent B horizon : These are Podsol B horizons in which the consistence strength ranges from very firm to strong throughout, or they contain sub-horizons with these properties. Included are pan-like materials that have been variously described as orstein, coffee rock or sandrock.

Strophomenid : Strophomenid - Any brachiopod belonging to the order Strophomenida, characterized by flattened valves with long hinge lines. They probably remained immobile in the bottom muds.

Structural BMPs : Bmps that require the construction or use of a structure such as a terrace, lagoon, or waste storage facility.

Structural Landform : Is a landform created by massive Earth movements due to

plate tectonics. This includes landforms with some of the following geomorphic features: fold mountains, rift valleys, and volcanoes.

Structural polysaccharide : Polysaccharide that serves primarily as a structural element in cell walls and coats and intercellular spaces, and connective tissue where they give shape, elasticity, or rigidity to plant or animal tissues and protection and support to unicellular organisms. Cellulose is the predominant structural polysaccharide in plant cell walls and chitin is abundant in fungal cell walls and insect exoskeletons.

Structure : Is concerned with the arrangement of all soil particles and refers to the distinctness, size, shape and condition of the peds. The degree of structural distinctness is referred to as grade of pedality. Descriptive terms used are:

Single-grained—The soil occurs as a loose, incoherent mass of individual particles (as in sands);

Massive—The soil occurs as a coherent mass with no distinct arrangement of soil particles;

Weak pedality—The soil contains peds which are barely observable;

Moderate pedality—The soil contains peds which can be identified but are not distinct;

Strong pedality—The soil contains peds which are clearly observable.

Structure, soil : The arrangement of primary soil particles into compound particles or aggregates. There are roughly 6 structure classes in soil. OR

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are;

- **Platy (laminated)**, **prismatic** (vertical axis of aggregates longer than horizontal), **columnar** (prisms with rounded tops), **blocky** (angular or subangular), and **granular**.
- **Structureless soils** are either **single grained** (each grain by itself, as in dune sand) or **massive** (the particles adhering without any regular cleavage, as in many hardpans).

Sturzstroms : German for “fall stream”. A huge mass of rapidly moving rock debris and dust, derived from the collapse of a cliff or mountainside, flowing down steep slopes and across low ground, often for several kilometers at speeds of more than 100 km/hr. Sturzstroms are the most catastrophic of all forms of mass movement.

Stylet : Small, spearlike mouth structure used by some nematodes to pierce cells to feed on protoplasm; usually associated with herbivorous or fungivorous nematodes.

Subaerial : Subaerial - In open air or immediately adjacent to the land surface.

Subaerial : (adjective) Said of conditions and processes, such as erosion, that exist or operate in the open air on or immediately adjacent to the land surface; or of features and materials, such as eolian deposits, that are formed or situated on the land surface. Compare - Subaqueous. (modified from Jackson, 1997).

Subangular blocky structure : Similar to angular blocky except the pedes are bound by six faces intersecting with round edges (i.e. Like a rounded cube) (mcdonald *et al.*, 1990)

Subaqueous : (adjective) Said of conditions and processes, features, or deposits that exist or operate in or under water. Compare - Subaerial. (modified from Jackson, 1997).

Subaqueous landscapes : Permanently submerged areas that are fundamentally the same as subaerial (terrestrial) systems in that they have a discernable topography composed of mappable, subaqueous landforms.

Subaqueous soils : Soils that form in sediment found in shallow permanently flooded environments. Excluded from the definition of these soils are any areas "permanently covered by water too deep (typically greater than 2.5 m) for the growth of rooted plants.

Subatomic particles : Extremely small particles that make up the internal structure of atoms.

Subbasins : One of several basins that form a watershed.

Subduction (Tectonic) : Process of plate tectonics where one lithospheric plate is pushed below another into the asthenosphere.

Subduction zone : Linear area where tectonic subduction takes place.

Subhedral : Minerals with partly developed crystallographic form.

Sub-humid : Climate of 500 - 1500 mm annual rainfall.

Subirrigation : Utilization of subsurface drainage to irrigate crops through the use of capillary rise of water from the full drainage tiles upward through the soil into the rooting zone.

Sublimation : Process where ice changes into water vapor without first becoming liquid. This process requires approximately 680 calories of heat energy for each gram of water converted.

Sublimation : The transitions of water directly from the solid state to the gaseous state, without passing through the liquid state. OR Process where ice changes into water vapor without first becoming liquid. This process requires approximately 680 calories of heat energy for each gram of water converted.

Submarine and subaqueous landslide : Deposits that occur from landslide processes under water. Submarine landslides can be for example, block slides, flow slides, mud slides. Large underwater landslides can displace water, sometimes rapidly, and cause tsunamis. Garrison and sangrey, usgs, 1990.

Submarine Canyon : V-shaped canyons cut into the continental slope to a deep of up to 1200 meters. These features are normally associated with major rivers.

Submarine Deposit : Submarine Deposit - A sedimentary deposit formed under marine water.

Submerged back-barrier beach : A permanently submerged extension of the back-barrier beach that generally parallels the boundary between estuary and the barrier island. Compare - Submerged Mainland Beach, Barrier Beach.

Submerged mainland beach : A permanently submerged extension of the mainland beach that generally parallels the boundary between an estuary or lagoon and the mainland. Compare - Submerged Back-Barrier Beach, Barrier Beach.

Submerged point bar : The submerged extension of an exposed (subaerial) point bar.

Submerged wave-built terrace : A subaqueous, relict depositional landform originally constructed by river or longshore sediments deposits along the outer edge of a wave-cut platform and later submerged by rising sea level or subsiding land surface. (modified from Jackson, 1997). Compare Wave - Built Terrace and Wave-Cut Platform.

Submerged wave-cut platform : A subaqueous, relict erosional landform that originally formed as a wave-cut bench and abrasion platform from coastal wave erosion and later submerged by rising sea level or subsiding land surface. (modified from Jackson, 1997). Compare - Wave-Built Terrace, Wave-Cut Platform.

Submerged-upland Tidal Marsh : An extensive, nearly level, intertidal landform composed of unconsolidated sediments (clays, silts and/or sand and organic materials), a resistant root mat, and vegetated dominantly by hydrophytic plants. The mineral sediments largely retain pedogenic horizonation and morphology (e.g. argillic horizons) developed under subaerial conditions prior to submergence due to sea level rise; a type of tidal marsh. Compare - Tidal Marsh.

Subnatric : In these soils a major part of the top 0.2 m of the B2 Horizon has an ESP between 6 and less than 15. These soils are considered to be sodic. Used as a Great Group definition for Sodosols in the Australian Soil Classification (Isbell 1996).

Subplastic : These soils have a consistence or textural property (after kneading for 1-2 minutes) that suggests less clay sized particles than the soil actually contains. A subplastic soil increases in field texture after 10 minutes of kneading i.e. The

soil texture becomes more clayey and harder to work. It is a feature of relatively deep subsoils and much energy is required to break down the soil aggregates. Also, these soils do not shrink/swell greatly when wet (mcdonald *et al.*, 1990).

Sub-plastic : A soil which appears to become more clayey with prolonged kneading. They are usually red, well structured and well-drained.

Subpolar Glacier : Glacier in which the ice found from the its surface to base has a temperature as cold as -30° Celsius throughout the year. This is well below the pressure melting point. However, melting does occur in the accumulation zone in the summer. One of the three types of glaciers: cold glacier; temperate glacier; and subpolar glacier.

Subpolar lows : Surface zone of atmospheric low pressure located at about 60° north and south latitude. These low pressure systems are produced by the frontal lifting of subtropical air masses over polar air.

Subsea Permafrost : Form of permafrost that exists beneath the sea in ocean sediments.

Subsidence : Decline in soil volume due to oxidation of organic matter. OR Lowering or sinking of the Earth's surface.

Subsidiary fault : A branch fault that extends a substantial distance from the main fault zone.

Subsoil : Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling : Breaking up a compact subsoil by pulling a special chisel through the soil.

Subsolar point : The location on the earth where the sun is directly overhead. Also see declination.

Substrate : (i) Substance, base, or nutrient on which an organism grows. (ii) Compounds or substances that are acted upon by enzymes or catalysts and changed to other compounds in the chemical reaction.

Substrate : The base on which an organism lives. The soil is the substrate of most seed plants where rocks, soil, water, or other tissues are substrates for other organisms.

Substrate observation types : P : Soil pit

E : Existing vertical exposure

C : Relatively undisturbed soil core

A : Auger boring

O : Outcrop

Substratelevel phosphorylation : Synthesis of highenergy phosphate bonds through reaction of inorganic phosphate with an activated (usually) organic substrate.

Substratum : The part f the soil below the solum.

Subsurface drainage : The use of tiles or plastic tubing that is buried 3 to 5 feet deep at a spacing of 50 to 200 feet to drain the soil.

Subsurface layer : Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Subtidal : (adjective) Continuous submergence of substrate in an estuarine or marine ecosystem; these areas are below the mean low tide. (modified from Cowardin et al., 1979). Compare - Intertidal.

Subtidal wetlands : Permanently inundated areas within estuaries dominated by subaqueous soils and submerged aquatic vegetation.

Subtropical High Pressure Zone : Surface zone of atmospheric high pressure located at about 30° North and South latitude. These high pressure systems produced by vertically descending air currents from the Hadley cell.

Subtropical jet stream : Relatively fast uniform winds concentrated within the upper atmosphere in a narrow band. The subtropical jet stream exists in the subtropics at an altitude of approximately 13 kilometers. This jet stream flows from west to east and has a speed that is somewhat slower that the polar jet stream. Also see jet stream.

Subwatershed : A drainage area within a watershed.

Succession : Gradual process brought about by the change in the number of individuals of each species of a community and by the establishment of new species that gradually replace the original inhabitants.

Succulent vegetation : Group of plants that have the ability to survive in deserts and other dry climates by having no leaves. Instead their branches and stems that are photosynthetic. This adaptation reduces the surface area for evaporation thus reducing the loss of scarce water.

Sugar : Type of carbohydrate chemically based on carbon, oxygen, and hydrogen.

Sulfate Aerosol : Type of solid compound commonly found in the atmosphere. These particles play an important role in reflecting, absorbing, and scattering incoming insolation. The source of these compounds is both natural and human-made. Most of the human-made particles come from the combustion of fossil fuels.

Sulfates : The products of sulfur combining with oxygen.

Sulfides : The products of sulfur combining with hydrogen. In composting it represents the presence of an anaerobic environment.

Sulfidic materials : A subsoil, waterlogged, mineral or organic material than contains oxidisable sulfur compounds, usually iron disulfide (eg, pyrite, FeS_2) that has a field ph of 4 or more but which will become extremely acid when drained.

Sulfur cycle : Sequence of transformations undergone by sulfur where it is taken up by living organisms, transformed upon death and decomposition of the organism, and converted ultimately to its original state of oxidation.

Sulfur Dioxide : A gas produced from volcanic eruptions, ocean spray, organic decomposition and the burning of fossil fuels. Sulfur dioxide is a component in the creation of acid precipitation. This colorless gas has the chemical formula SO_2 .

Sulfuric acid : acid with the chemical formula H_2SO_4 .

Sulfuric materials : Soil material that has a ph less than 4 when measured in dry season conditions as a result of the oxidation of sulfidic materials.

Summer : Season between spring and fall. Astronomically it is the period from the summer solstice to the autumnal equinox in the Northern Hemisphere.

Summer fallow : The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summer Solstice : Date when the declination of the sun is at 23.5° North of the equator. This date is usually June 21 or 22.

Summit : The topographically highest hillslope position of a hillslope profile and exhibiting a nearly level surface.

Sun : Luminous star around which the Earth and other planets revolve around. The sun emits 63,000,000 Watts per square meter of electromagnetic radiation. The sun has an average distance from the Earth of about 150,000,000 kilometers. The Earth's orbit is not circular but elliptical.

Sunburst : Sunburst - Post-banding inclusions that superficially resemble either the solar corona or sun spots; ballistic aggregation.

Sunrise : Moment of time when the sun's edge first appears above the Earth's horizon.

Sunset : Moment of time when the sun's edge completely disappears below the Earth's horizon.

Sunspot : Dark colored region on the sun that represents an area of cooler temperatures and extremely high magnetic fields.

Supercooled water : Cooling of water below 0° celsius without freezing. Common in clouds where there is a deficiency of condensation nuclei.

Supercooled Water : Cooling of water below 0° Celsius without freezing. Common in clouds where there is a deficiency of condensation nuclei.

Supernatant : Liquid removed from a tank once the solids have settled. When hydrating Alken Clear-Flo formulas, the supernatant is the bran-free liquid which can then be applied by sprayer, without clogging the sprayer.

Supernatant commonly refers to the liquid between the sludge on the bottom and the scum on the surface of an anaerobic digester. This liquid is usually returned to the influent wet well or to the primary clarifier.

Super-Saturation : Atmospheric condition where saturation occurs at a relative humidity greater than 100 % because of a shortage of deposition or condensation nuclei.

Supplemental water classifications : (See also Classifications)

Supracalcic : Term use to classify soils using the Australian Soil Classification (Isbell 1996). Refers to soils with a calcareous horizon containing 20-50% of hard calcrete fragments and/or carbonate nodules or concretions and/or carbonate-coated gravel.

Supraglacial : Carried upon, deposited from, or pertaining to the top surface of a glacier or ice sheet.

Surface area : Area of the solid particles in a given quantity of soil or porous medium.

Surface condition : Describes the actual surface condition of the exposed soil surface:

Gravelly—Over 60% of surface cover consists of gravel (2 - 60 mm);

Hardsetting—Soil is compact and hard and appears to have apedal structure when the soil dries out;

Loose—Soil which is not cohesive;

Friable—Easily crumbled or cultivated;

Self-mulching—Loose surface mulch of very small peds forms when soil dries out;

Seasonal cracking—Shrinking clay soils which shrink when dry, expand when wet and exhibit wide cracks in the dry state.

Surface Creep : The sliding and rolling movement of soil particles on the Earth's surface because of wind. Eolian process of soil particle movement.

Surface crust : A massive or weakly structured often lamina layer that is lighter in texture than the underlying pedal clay. This soil condition should not be confused with self-mulching behaviour (mcdonald *et al.*, 1990).

Surface drainage : The use of open ditches that provide predominately surface drainage.

Surface heat flux : Process where heat energy is transferred into land and ocean surfaces on the earth. Much of this transfer takes place when solar radiation absorbed at the land or ocean surface is converted into heat energy. On land surfaces, surface heat is transferred down into the ground by conduction. Heat energy is transferred to greater depths in ocean surfaces because liquids have the ability mix by convection. Heat energy stored in ocean waters can also move quickly over large horizontal distances in a poleward direction through ocean currents.

Surface layer : The soil ordinarily moved in tillage, or it equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the plow layer, or the Ap horizon.

Surface runoff : The portion of rainfall, irrigation water or wastewater that does not infiltrate into the soil.

Surface soil : Uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils ranging in depth from 7 to 20 cm. Frequently designated as the surface layer, the Ap layer, or the Ap horizon. OR The layer of soil occurring on the surface, synonym topsoil. Swamp: Seasonally flooded low land. Similar to marsh, but with more woody plants and to bog but with better drainage.

Surface Tension : Tension of a liquid's surface. Due to the forces of attraction between molecules.

Surface water : All water naturally open to the atmosphere, concerning rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries and wetlands.

Surface Water : Water found on the surface of the land.

Surface wave : Type of seismic wave that travels across the earth's surface. These earthquake generated waves cause the earth's surface to roll or sway like waves on the ocean.

Surfactant : Surface-active agent. The active agent in detergents that possesses a high cleaning ability. Used in a spray solution to improve its sticking and wetting properties when applied to plants, algae, or petroleum. OR A substance that lowers the surface tension of a liquid.

Surficial : Refers to surface sediments, generally unconsolidated.

Surficial geology - : Geology of surficial deposits, including soils; the term is sometimes applied to the study of bedrock at or near the earth's surface. Agi

Surge : A large, destructive ocean wave caused by very low atmospheric pressure and strong winds. Hurricanes often cause a surge of the ocean surface.

Suspended load : Sediment that is transported by suspension in the water column of a stream or river.

Suspended solids : Solid organic or inorganic particles that are held in suspension in a solution.

Suspension : Erosional movement of sediment continually held in the transport medium of air, water or ice.

Sustainable Agriculture : Unlike industrial agriculture which views farming like a factory, sustainable agriculture views farming as a natural, integrated, holistic system. Furthermore, according to findings published in the scientific journal Nature, November 11, 1998, organic yields equal conventional after only four years and that soil quality improves, carbon dioxide emissions are reduced, and in periods of drought, organic fields can actually yield more than conventional plots.

Sustainable agriculture : An agricultural system which both produces crops profitably while progressively renewing or improving the soil's fertility from year to year. OR Forms of economic growth and other human activities that meet the requirements of the present without jeopardizing the ability of future generations of individuals to meet their own needs.

SV : Sludge volume - a settling test using a two liter settleometer to measure sludge quality expressed in percent and related to time, ie. 80% in five minutes or 30% in 30 minutes. Also used to determine the rate of settling.

SV30 : The value obtained in a 30 minute settleometer test.

SVI : Sludge volume index - a settling test used to measure sludge quality.

SVR : The volume of sludge blanket divided by the daily volume of sludge pumped from the thickener.

Sw swamp waters : Waters with low velocities and other natural characteristics that differ from other surface waters.

Swale : A slight, open depression which lacks a defined channel that can funnel overland or subsurface flow into a drainageway. OR A linear level-floored open depression excavated by wind or formed by the build-up of two adjacent ridges. Typically associated with the depression between two adjacent sand dunes.

Swamp : a wetland that features permanent inundation of large areas of land by shallow bodies of water, generally with a substantial number of hummocks, or dry-land protrusions. Swamps are usually regarded as including a large amount of woody vegetation

Swash : A thin sheet of water that moves up the beach face after a wave of water breaks on the shore.

S-Wave : A seismic wave that moves material it encounters perpendicular to its direction of travel. This type of seismic wave causes shear stress in the material it moves through. Also called a secondary wave or a shear wave.

Swell : A relatively smooth ocean wave that travels some distance from the area of its generation.

Swelling and shrinking : Two opposite processes of soil volume change. Swelling, increase of soil volume, shrinking, decrease of soil volume. These processes are influenced by actual water content and presence of clay minerals, which are able to take or to lose water in their interlayer spaces. Difference in volume can range from 5% to more than 100% depending on quality and quantity of clay minerals.

Swelling soils : Soils or soft bedrock which increase in volume as they get wet and shrink as they dry out. They are also commonly known as bentonite, expansive, or montmorillinitic soils.

Symbiosis : Living together in intimate association of two dissimilar organisms. The interactions between the organisms can be commensal or mutualistic.

Symbiotic : Mutual relationship between two organisms which is necessary for either to survive.

Symbiotic : Mutual relationship between two organisms which is necessary for either to survive.

Symbiotic Mutualism : Mutualistic interaction where the species interact physically and their relationship is biologically essential for survival.

Syn-banding : Syn-banding - Forming at the same time bands form.

Synchronization : Feedstocks decomposing with and against each other at similar rates of speed.

Syncline : Syncline - A fold in bedded rock in which the bed dips toward one another.

Syneresis : Syneresis - Spontaneous expulsion of a liquid from a gel or flocculated colloidal suspension during aging; hardening.

Synergism : Association between organisms that is mutually beneficial. Both populations, however, are capable of surviving in their natural environment on

their own. OR The simultaneous action of separate agencies which, together, create a greater total effect than the sum of their individual effects.

Synergistic : When two or more organisms coexist in a relationship that is strongly co-operative, so that their combined effect exceeds a simple sum of their individual effects.

Synoptic Scale : Scale of geographic coverage used on daily weather maps to describe large scale atmospheric phenomenon (for example, mid-latitude cyclone, air masses, fronts, and hurricanes).

Synthesis : Breaking down organic compounds and converting the degradation products into new cell growth. An energy using process.

Syntrophy : Interaction of two or more populations that supply each other's nutritional needs. OR Interaction of two or more populations that supply each other's nutritional needs.

System : A system is a set of interrelated components working together towards some kind of process.

System Attribute : A system attribute is the perceived characteristic of a system element. For example, number, size, color, volume, and temperature may be some of the perceived characteristics of clouds in the atmospheric system.

System Boundary : Outer edge of system. Zone between one system and another system.

System Element : System elements are the kinds of things or substances composing the system. They may be atoms or molecules, or larger bodies of matter-sand grains, rain drops, plants, or cows.

System Relationship : Is the association that exist between the elements and attributes of a system based on cause and effect.

System State : Current value of a system's elements, attributes, and/or relationships.

Systemic : Not localized in a particular place of the body; an infection disseminated widely through the body is said to be systemic.

T

Taiga : See Boreal Forest.

Taku : Name for a katabatic type of cold wind that occurs in Alaska.

Talik : An unfrozen section of ground found above, below, or within a layer of discontinuous permafrost. These layers can also be found beneath water bodies in a layer of continuous permafrost. A number of different types of talik have been distinguished: closed talik, open talik, and through talik.

Talus : Angular rock fragments that accumulate by gravity at the foot of steep slopes of cliffs. OR An accumulation of angular rock debris from rockfalls.

Talus slope : A slope that is composed of talus.

Targeting : The process of prioritizing pollutant sources for treatment with bmps or a specific BMP to maximize the water quality benefits of the implemented bmps.

Tarn : A small mountain lake that occurs inside a cirque basin.

Tarpon : Tarpon - A marine fish closely related to the ten-pounder. It is common in the Gulf of Mexico off the coast of Florida, has an elongated body with large, silver scales, and reaches about 6 feet and 200 pounds; a noted sport fish.

Taxadjuncts : Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Taxon : A classification category for a group of organisms. OR A group into which related organisms are classified.

Taxonomic classification : Classification of organisms based on structural and physiological connections between other species.

Taxonomy : Study of scientific classification and nomenclature.

TDS : Total Dissolved Solids. The weight per unit volume of water of suspended solids in a filter media after filtration or evaporation.

Tea (compost tea) : Water in which finished compost has been steeped to cultivate a liquid fertilizer for plants.

Tectonic : Rock structures produced by movements in the earth's crust.

Tectonic plate : An extensive layer of lithosphere that moves as a discrete unit on the surface of the earth's asthenosphere.

Tectonics : Tectonics - Geologic discipline dealing with the architecture of the Earth's crust, particularly the movement of continental and oceanic plates and the effects of their contact and collisions on the structure of the crust.

Tectoturbation. : Soil disturbance resulting from tectonic movement.

Teichoic acids : All wall, membrane, or capsular polymers containing glycerophosphate or ribitol phosphate residues.

Teleomorph : Sexual stage in reproduction in which cells are formed by the process of meiosis and genetic recombination.

Temperate deciduous forest : Forested biome found in the mid-latitudes and dominated by deciduous vegetation.

Temperate glacier : glacier in which the ice found below 10 to 20 meters from its surface is at the pressure melting point. One of the three types of glaciers: cold glacier; temperate glacier; and subpolar glacier.

Temperate rain forest : An ecosystem that is dominated by large and very tall evergreen trees. This biome occurs along the pacific northwest coast of north america where annual precipitation is high and temperatures are mild.

Temperate virus : Virus which upon infection of a host does not necessarily cause lysis but whose genome may replicate in synchrony with that of the host.

Temperature : Temperature is defined as the measure of the average speed of atoms and molecules. The higher the temperature the faster they move.

Temperature inversion : Situation where a layer of warmer air exists above the earth's surface in a normal atmosphere where air temperature decreases with altitude. In the warmer layer of air, temperature increases with altitude.

Tender Annual : An annual that is frost and cold sensitive and which should only be planted in warm soils after all danger of frost is past.

Tender Biennial/Perennial : A biennial or perennial that will not withstand freezing temperatures and typically thrives in tropical climates or indoors.

Tenic B horizon : A usually weakly developed B horizon of texture and/or colour and/or structure and/or presence of segregations of pedogenic origin (including carbonate). OR This horizon has a weakly developed B Horizon in comparison with the overlying A Horizon and other horizons below, in terms of texture, colour, structure and/or presence of segregations (including carbonate). This term is used in the Australian Soil Classification (Isbell, 1996).

Tenosols : Soil Order of the Australian Soil Classification (Isbell, 1996). These soils generally have weak pedological organisation throughout the profile apart from the A Horizon. Tenosols display more profile development than Rudosols and may include a weakly developed B Horizon with 15% clay or less. OR ASC Soil Order classification—Soils with generally only weak pedologic organisation apart from the A horizons.

Tensile stress : A normal stress that tends to pull apart the material on the opposite sides of the plane on which it acts. Agri

Tensiometer : instrument used for measuring the water potential (suction or negative pressure) of soil water.

Tephra : Fragmented rock material ejected by a volcanic explosion. Also called pyroclastic material. OR Lightweight unconsolidated volcanic material including ash.

Terminal electron acceptor : External oxidant (often oxygen) that accepts the electrons as they exit from the electron transport chain.

Terminal fall velocity : Velocity at which a particle being transported by wind or water falls out of the moving medium. This velocity is dependent on the size of the particle.

Terminal moraine : moraine that marks the maximum advance of a glacier.

Terminal velocity : Maximum speed that can be achieved by a body falling through a fluid like water or air.

Terminator Technology : The Terminator genetic engineering technique renders saved seed sterile. See Rural Advancement Foundation Int'l.

Terminus : End or snout of a glacier.

Terra rossa soils : GSG classification—Dominantly red soils formed on limestone or highly calcareous parent materials.

Terrace : A broad surface running along the contour. It can be a natural phenomenon or specially constructed to intercept runoff, thereby preventing erosion and conserving moisture. Sometimes they are built to provide adequate rooting depths for plants. OR An elevated surface above the existing level of a floodplain or shore that is created by stream or ocean wave erosion.

Terrace : Terrace - A former floodplain underlain by sediment deposited by a stream when the stream was flowing at a higher level; typically forming a relatively level bench along a valley side adjacent to a recent floodplain. OR An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Tertiary : Tertiary - The first period of the Cenozoic era (after the Cretaceous of the Mesozoic era and before the Quaternary), between 65 and 1.6 million years ago; divided into five epochs: the Paleocene, Eocene, Oligocene, Miocene and Pliocene. OR Period of geological time, 2 – 65 million years before present.

Tertiary consumer : Organisms that occupy the fourth trophic level in the grazing food chain. These organisms are carnivores. Also known as a secondary carnivore.

Tertiary Period : The period of time extending from 75,000,000-2,000,000 years BP.

Tertiary treatment : Advanced cleaning of wastewater that goes beyond the secondary or biological stage, removing nutrients such as phosphorus, nitrogen, and most BOD and suspended solids.

Test : Hard external covering or shell.

Tetrahedron : Silicon atom joined by four oxygen atoms (SiO_4). The atomic properties of this molecule cause it to develop a unique three dimensional crystal lattice that is pyramid shaped.

Texture : The relative quantities of the different types and sizes of mineral particles in a deposit of sediment. Also see the related soil texture. OR A measure of the behaviour of a small handful of soil when moistened and kneaded into a ball and then pressed out between the thumb and forefinger.

Texture Triangle : See SOIL TEXTURAL TRIANGLE

Texture, soil : The relative proportions of sand, silt, and clay particles in a mass of soil. There are about 13 textural classes and their analogs.

Texture, soil. : The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are; *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying ""coarse," ""fine," or ""very fine.""

TH : Total Hardness. The sum of calcium and magnesium hardness, expressed as a calcium carbonate equivalent.

Thallus : Vegetative body that is not differentiated into tissue systems or organs.

Thalweg : Line of deepest water in a stream channel as seen from above. Normally associated with the zone of greatest velocity in the stream.

Thematic map : Map that displays the geographical distribution of one phenomenon or the spatial associations that occur between a few phenomena. Compare with reference map.

Thematic mapper : remote sensing device found on landsat satellites that scans images in seven spectral bands from visible to thermal infrared.

Theory : Proposed explanation for the causal mechanisms responsible for a phenomenon or a set of facts. Also see hypothesis.

Thermal circulation : Atmospheric circulation caused by the heating and cooling of air.

Thermal equator : Continuous area on the globe that has the highest surface temperatures because of the presence of the intertropical convergence zone.

Thermal high : Area of low pressure in the atmosphere caused by surface temperatures.

Thermal infrared radiation : Form of electromagnetic radiation with a wavelength between 3 to 14 micrometers (μm).

Thermal low : Area of high pressure in the atmosphere caused by surface temperatures.

Thermal metamorphism : Is the metamorphic alteration of rock because of intense heat released from processes related to plate tectonics.

Thermal pollution : Discharge of heated water from industrial processes in receiving surface water, causing death or injury of aquatic organisms.

Thermocline : Boundary in a body of water where the greatest vertical change in temperature occurs. This boundary is usually the transition zone between the layer of warm water near the surface that is mixed and the cold deep water layer. OR In a lake is the point where there is a rapid temperature drop with depth

Thermodynamic equilibrium : This type of equilibrium describes a condition in a system where the distribution of mass and energy moves towards maximum entropy.

Thermodynamic laws : Laws that describe the physical processes, relationships, and phenomena associated with heat.

Thermokarst : Landscape dominated by depressions, pits, and caves that is created by the thawing of ground ice in high latitude locations. Resembles karst landscape but is not created by chemical weathering.

Thermometer : Device used to measure temperature.

Thermophile : Organism whose optimum temperature for growth is between 45 and 85°C.

Thermophilic bacteria : This group of bacteria species work to break down organic matter under "hot" conditions of 104 degrees up to 170 degrees. This type of bacteria can perform the greatest decomposition in the shortest amount of time.

Thermosphere : Atmospheric layer above the mesosphere (above 80 kilometers) characterized by air temperatures rising rapidly with height. The thermosphere

is the hottest layer in the atmosphere. In the thermosphere, gamma, X-ray, and specific wavelengths of ultraviolet radiation are absorbed by certain gases in the atmosphere. The absorbed radiation is then converted into heat energy. Temperatures in this layer can get as high as 1300-1800° Celsius.

Thin layer : Otherwise suitable soil material too thin for the specified use.

Third Law of Thermodynamics : This law states if all the thermal motion of molecules (kinetic energy) could be removed, a state called absolute zero would result and all energy would be randomly distributed.

Tholeitic Basalts : Tholeitic Basalts - Basalts containing mostly plagioclase feldspar, pyroxene (augite), no olivine, and having a somewhat glassy texture. Usually associated with rifts.

Thomsonite : Thomsonite - A complex zeolite mineral that is characterized by tightly packed, spherically arranged crystals that often are eye-like in appearance.

Thorn Forest : A deciduous forest of small thorny trees developed in a tropical semi arid climate.

Threatened species : Species that is still plentiful in its natural range but is likely to become endangered because of declining population numbers.

Threshold : The level of magnitude of a system process at which sudden or rapid change occurs.

Threshold velocity : velocity required to cause entrainment in the erosional agents of wind, water or ice. Threshold velocity is usually higher than the velocity required for transport because factors like particle cohesion. Also see critical entrainment velocity.

Through talik : Is a form of localized unfrozen ground (talik) in an area of permafrost. It is open to the ground surface and to an area of unfrozen ground beneath it. Permafrost encases it along the sides.

Throughfall : Describes the process of precipitation passing through the plant canopy. This process is controlled by factors like: plant leaf and stem density, type of the precipitation, intensity of the precipitation and duration of the precipitation event. The amount of precipitation passing through varies greatly with vegetation type.

Throughflow : The roughly horizontal flow of water through soil or regolith.

Thrust fault : A geologic fault where the hanging wall is forced over the foot wall.

Thunder : Sound created when lightning causes the rapid expansion of atmospheric gases along its strike path.

Thunder Egg : Thunder Egg - The first kind of agate to form in the complete

agatization cycle; characterized by having a star-shaped cavity surrounded by a matrix of devitrified volcanic ash.

Thunderstorm : A storm several kilometers in diameter created by the rapid lifting of moist warm air which creates a cumulonimbus cloud. Thunderstorms can have the following severe weather associated with them: strong winds; hail; lightning; tornadoes; thunder; and heavy rain.

Ti plasmid : Conjugative tumorinducing plasmid present in the bacterium *Agrobacterium tumefaciens* which can transfer genes into plants.

Tidal current : Regional scale ocean current that is created the tidal rise and fall of the ocean surface.

Tidal flat : An extensive, nearly horizontal, barren or sparsely vegetated tract of land that is alternately covered and uncovered by the tide, and consists of unconsolidated sediment (mostly clays, silts and/or sand, and organic materials). Compare - Tidal Marsh, Wind-Tidal Flat. (Jackson, 1997).

Tidal flats : Nearly flat areas, periodically covered by tidal (periodical) waters, not suitable for agricultural use.

Tidal inlet : Any inlet through which water alternately floods landward with the rising tide and ebbs seaward with the falling tide (Jackson, 1997). Compare - Inlet, Relict Tidal Inlet.

Tidal marsh : An extensive, nearly level marsh bordering a coast (as in a shallow lagoon, sheltered bay, or estuary) and regularly inundated by high tides; formed mostly of unconsolidated sediments (e.g. clays, silts, and/or sands and organic materials), and the resistant root mat of salt tolerant plants, a marshy tidal flat. Compare - Tidal Flat. (Schoeneberger and Wysocki, 2005; modified from Jackson, 1997).

Tidal period : Time it takes for one tidal cycle.

Tidal saltwater : Tidal waters that generally have a natural chloride ion content in excess of 500 parts per million; includes all waters assigned S classifications by the Environmental Management Commission (see Saltwater Classifications).

Tidal zone : Area along the coastline that is influence by the rise and fall of tides.

Tide : Cyclical rise and fall of the surface of the oceans. Caused by the gravitational attraction of the sun and moon on the Earth.

Tile Drain : Short lengths of concrete or pottery pipes placed end to end at a suitable depth and spacing in the soil to collect water from the soil and lead it to an outlet.

Till : An unstratified or crudely stratified glacial deposit consisting of a stiff matrix of fine rock fragments and old soil containing sub-angular stones of various

sizes and composition, many of which may be striated (scratched). It forms a mantle from less than 1 m to over 100 m in thickness covering areas which carried an ice sheet or glaciers during the Pleistocene and Holocene periods.

Till Plain : A level or undulation land surface covered by glacial till.

Till, ablation : A general term for loose, relatively permeable material deposited by the downwasting of nearly static glacier ice.

Till, basal : Unconsolidated material of mixed composition deposited at the base of a glacier. Types of basal till include: lodgement, meltout, and flow till.

Till, lodgement : A basal till commonly characterized by compact, fissile (platy) structure and containing rock fragments oriented with their long axes generally parallel to the direction of ice movement.

Till, melt-out : Till derived from slow melting of debris-rich stagnant ice buried beneath sufficient overburden to inhibit deformation under gravity, thus preserving structures derived from the parent ice.

Tillage : see **ploughing**.

Tillage or other disturbance(p) : This symbol indicates a disturbance of the surface layer by mechanical means, pasturing, or similar uses. A disturbed organic horizon is designated Op. A disturbed mineral horizon is designated Ap even though it is clearly a former E, B, or C horizon.

Tillite : Tillite - A sedimentary rock, formed when unconsolidated sediments are consolidated into solid rock under the influence of a glacier.

Tilth : The overall physical character of soil with regard to its suitability for crop production.

Tilth, soil. : The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Time : Measurable period in which cause and effect occurs and systems function.

Tipping fees : Fees received for accepting waste material from another source.

TIROS (Television and Infrared Observation Satellite) : Series of meteorological satellites launched by the United States starting in 1960. The main purpose behind these satellites was to use a variety of remote sensing devices for weather forecasting. TIROS program was very successful, providing the first accurate weather forecasts based on data gathered from space. TIROS began continuous monitoring of the Earth's weather in 1962.

Tissue : A group of similar cells that are organized into a structure with a specific purpose.

Tissue testing : An analytical process for assessing the nutritional status of plants

by analysis of their tissues. Often a quick test for rapid, on-site assessment and recommendation for needs of fertilization.

Titration : An analytical technique to determine how much of a substance is present in a water sample by adding another substance and measuring how much of that substance must be added to produce a reaction.

tlhIngan tera' tej. : A Klingon soil scientist.

TOD : Total organic carbon - a measure of the amount of organic carbon in water.

Toe slope. : The outermost inclined surface at the base of a hill; part of a foot slope.

Toeslope : The hillslope position that forms the gently inclined surface at the base of a hillslope.

Tolerance Model of Succession : This model of succession suggests that the change in plant species dominance over time is caused by competition for resources. Later species are able to tolerate lower resource levels due to competition and can grow to maturity in the presence of early species, eventually out competing them.

Tolerance range : Limits of tolerance a species has to an abiotic factor or condition in the environment.

Tombolo : A coastal feature that forms when a belt sand and/or gravel is deposited between an island and the mainland. This feature is above sea-level for most of the time.

Tonalite : A quartz-diorite igneous rock intermediate in quartz content between a diorite and a granodiorite.

Top soil : The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress road banks, lawns, and land affected by mining.

Topographic map : map that displays topography through the use of elevation contour lines. Base elevation on these maps is usually sea-level.

Topographic profile : A two-dimensional diagram that describes the landscape in vertical cross-section.

Topography : The relative position and elevations of the natural or manmade features of an area that describe the configuration of its surface. OR The relief exhibited by a surface.

Toposequence : A sequence of soils whose properties are determined by their particular topographic situation.

Topset bed : Horizontal deltaic deposit composed of coarse alluvial sediment.

Represents current or past surface of the delta.

Topsoil : A part of the soil profile, typically the A₁ horizon, containing material which is usually darker, more fertile and better structured than the underlying layers.

Topsoil (surface soil, plow layer, Ap horizon) : (i) Layer of soil moved in cultivation. (ii) The A horizon. (iii) Presumably fertile soil material used to topdress roadbanks, gardens, and lawns.

Tornado : A vortex of rapidly moving air associated with some severe thunderstorms. Winds within the tornado funnel may exceed 500 kilometers per hour.

Tornado alley : Region in north america which receives a extraordinary high number of tornadoes. This region stretches from central texas to illinois and indiana.

Tornado warning : A warning issued to the public that a tornado has been observed by an individual in a specified region. This warning can also be issued if meteorological information indicates a high probability that a tornado will develop in a specified region.

Tornado watch : A forecast issued to the public that a tornado may occur in a specified region.

Total column ozone : A measurement of ozone concentration in the atmosphere.

Total Dissolved Solids (TDS) : Total Dissolved Solids (TDS) - A water quality parameter defining the concentration of dissolved organic and inorganic chemicals in water. After suspended solids are filtered from water and water is evaporated, dissolved solids are the remaining residue.

Total Kjeldahl nitrogen (TKN) : An oxidative procedure that converts organic nitrogen forms to ammonia by digestion with an acid, catalyst, and heat.

Total maximum daily load (tmdl) : The total waste (pollutant) loading from point and non-point sources that a water body can assimilate while still maintaining its water quality classification and standards.

Total mixed ration : (Animal science, dairy science) a diet where all the feed ingredients are blended together to ensure every bit is nutritionally balanced.

Total solids : All the solids in wastewater or sewage water, including suspended solids and filterable solids.

Total soluble salts (tss) : A measure of the soluble salts in the soil (mainly sodium chloride, sulphate and carbonate). It is a calculated value derived using the Electrical Conductivity (EC) reading where Total Soluble Salts % = Electrical

Conductivity (ds/m) x 0.33. TSS needs to be considered relative to profile water movement.

Total suspended solids (TSS) : The weight of particles that are suspended in water. Suspended solids in water reduce light penetration in the water column, can clog the gills of fish and invertebrates, and are often associated with toxic contaminants because organics and metals tend to bind to particles. Total suspended solids are differentiated from total dissolved solids by a standardized filtration process, the dissolved portion passing through the filter. Concentration of all substances suspended in water (solids remaining after filtering of a water sample).

Toxic : Another method of measuring organic matter in wastewater involves the oxidation of the sample to stable end products in a platinum-catalyzed combustion chamber at 900 degrees C. Total oxygen demand is determined by measuring the oxygen content of the inert carrier gas, nitrogen. TOD measurements are becoming more popular because of their quickness in determining what is entering the plant and how the plant is responding. Analysis time is approximately 5 minutes. The results obtained generally will be equivalent to those obtained in the COD test.

Toxic Substance : A substance that is present in the soil or the above ground atmosphere that inhibits the growth of plants and ultimately may cause deficiency symptoms or their death.

Toxic water pollutants : Compounds that are not naturally found in water at the given concentrations and that cause death, disease, or birth defects in organisms that ingest or absorb them.

Toxicity : Adverse biological effect due to toxins and other compounds.

Toxin : Unstable poison-like compound of biological origin which may cause a reduction of viability or functionality in living organisms. See Toxic Substance.

Trout waters : Freshwaters protected for natural trout propagation and survival of stocked trout.

Trace elements : Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Trace gas : Gas other than nitrogen and oxygen in the atmosphere, particularly those gases that are active in the chemistry or radiation balance of the atmosphere.

Trace Metals : Trace elements regulated because of their potential for human, plant, or animal toxicity, including cadmium (Cd), copper (Cu), chromium (Cr), mercury (Hg), nickel (Ni), lead (Pb) and Zinc (Zn).

Traction : Erosional movement of particles by rolling, sliding and shuffling along the eroded surface. Occurs in all erosional mediums (air, water, and ice).

Trade winds : Surface winds that generally dominate air flow in the tropics. These winds blow from about 30° north and south latitude (subtropical high pressure zone) to the equator (intertropical convergence zone). Trade winds in the northern hemisphere have northeast to southwest direction and are referred to as the northeast trades. Southern hemisphere trade winds have southeast to northwest direction but are called the southeast trades.

Traditional/Native : Open-pollinated varieties that have evolved through centuries of growing by native/indigenous peoples of the world. They are often drought and pest resistant, hardy and nutritious and are still cultivated around the world.

Traffic pan : Compacted soil horizon created by the action of machinery, such as trucks, tractors or logging skidders, over the soil.

Transcription : Synthesis of an RNA molecule complementary to one of the two strands of a DNA doublestranded molecule.

transect : In any field (outdoor) study, a transect consists of a line of study, often divided into intervals where observations or samples are collected.

Transfer RNA (trna) : Type of RNA that carries amino acids to the ribosome during translation.

Transferral : Deep deposits of mostly eroded parent materials washed from areas directly upslope.

Transform fault : Massive strike-slip fault continental in size. Examples of such faults occur along tectonic plate boundaries and at the mid-oceanic ridge.

Transformation : Transfer of genetic information into living cells as free DNA.

Transgenic : Describes genetically modified plants or animals containing foreign genes inserted by means of recombinant DNA techniques.

Transgression : Transgression - The encroachment of the sea upon a continent.

Translation : Synthesis of proteins using the genetic information in mrna as a template.

Translocation : The physical movement of soil particles, particularly fine clay, from one soil horizon to another under the influence of gravity.

Transmission lines : Pipelines that transport raw water from its source to a water treatment plant.

Transmissivity : Transmissivity - A measure of the ability of an aquifer to transmit water.

Transparency : The ability of a medium to allow light to pass through it.

Transpiration : Water in plants escapes or transpires into the atmosphere as the leaf stomates open to exchange carbon for oxygen.

Transpiration : The process by which water vapor is released into the atmosphere after transpiring of living plants.

Transport : The movement of a soil particle, nutrient, or pesticide from its original position. This movement may occur in water or air currents. Nutrients and pesticides can be transported to soil particles or dissolved in water.

Transposable element : Genetic element that can move (transpose) from one site on a chromosome to another.

Transposition : Movement of a piece of DNA around the chromosome, usually through the function of a transposable element. OR Transposable element of which, in addition to genes involved in transposition, carries other genes; often confers selectable phenotypes such as antibiotic resistance.

Transposon mutagenesis : Insertion of a transposon into a gene; this inactivates the host gene leading to a mutant phenotype and also confers the phenotype associated with the transposon gene.

Transverse Dispersion : Transverse Dispersion - Dispersion of a contaminant perpendicular to the direction of flow.

Traverse dune : A very asymmetric sand dune elongated perpendicular to the prevailing wind direction, having a gentle windward slope and a steep leeward slope standing at or near the angle of repose of sand.

Travertine : Calcium carbonate precipitated from groundwater.

Tread : The flat or gently sloping surface of natural step-like landforms, commonly one of a series, such as successive stream terraces.

Tree : A large woody plant that has a trunk which supports branches and leaves.

Tree of life : A diagrammatic representation of the phylogenetic relationships among organisms.

Tremie Pipe or Line : Tremie Pipe or Line - A device, usually a small-diameter pipe or hose that carries grouting materials to the bottom of the hole and allows pressure grouting from the bottom up without introduction of appreciable air pockets.

Triassic : A period of geological time extending from 190,000,000-150,000,000 years BP. OR Geologic period that occurred roughly 208 to 245 million years ago. During this period, the first dinosaurs appeared.

Triassic : Period of geological time, 180 – 230 million years before present.

Tributary : A smaller branching stream channel that flows into a main stream channel. Opposite of distributary. OR A stream or river that flows into a larger stream or river.

Tricarboxylic acid cycle (TCA cycle, citric acid cycle, Krebs cycle) : Series of metabolic reactions by which pyruvate is oxidized completely to carbon dioxide, also forming NADH, which allows ATP production.

Trichome : Row of cells which have remained attached to one another following successive cell divisions. Trichomes are formed by many cyanobacteria and by species of *Beggiatoa*.

Trickling filter : A wastewater treatment unit that contains medium material with bacteria. The stream of wastewater is trickled over the medium and the bacteria break down the organic wastes. Bacteria are collected on the filter medium. OR The process by which water vapor is released to the atmosphere by living plants, a process similar to people sweating.

Trilobite : Trilobite - Any marine arthropod belonging to the class Trilobita, characterized by a three-lobed, over-shaped or elliptical outer skeleton consisting of a head, thorax, and pygidium, of which the first is covered by a continuous shield.

Triplet : Triplet - A gem of three layers; a desirable piece of material cemented between a more durable back-up stone and a layer of clear quartz.

Trophic level : A group of organisms with the same feeding habit in the food chain, ranging from the primary nutrient assimilating autotrophs to predatory carnivorous animals. OR Level of organization in the grazing food chain.

Trophic pyramid : A graphic model describing the distribution of energy, biomass, or some other measurable quantity between the different trophic levels found in an ecosystem.

Trophic state index : A water quality index developed by R. E. Carlson in 1977 that uses three parameters (total phosphorus, chlorophyll a, and transparency) to characterize nutrient levels of waterbodies on a scale from 1 to 100. The index is widely used because data collection for it is easy and economical, there is a relatively large existing database, and it takes into account both algae growth and suspended solids.

Tropic of Cancer : Latitude of 23.5° North. Northern limit of the sun's declination.

Tropic of Capricorn : Latitude of 23.5° South. Southern limit of the sun's declination.

Tropical cyclone : Another name for hurricane.

Tropical depression : An organized group of thunderstorms often found over a tropical ocean that generates a cyclonic flow of between 37 and 63 kilometers per hour. Can develop into a hurricane.

Tropical disturbance : An organized group of thunderstorms often found over a tropical ocean that generates a slight cyclonic flow of less than 37 kilometers per

hour. Can develop into a hurricane.

Tropical Rain Forest : See equatorial forest

Tropical rainforest : Forested biome found near the equator and dominated by evergreen vegetation.

Tropical savanna : See savanna.

Tropical storm : An organized group of thunderstorms often found over a tropical ocean that generates a cyclonic flow of between 64 and 118 kilometers per hour. Often develops into a hurricane.

Tropopause : The tropopause is a relatively thin atmospheric transition layer found between the troposphere and the stratosphere. The height of this layer varies from 8 to 16 kilometers above the Earth's surface.

Troposphere : Layer in the atmosphere found from the surface to a height of between 8 to 16 kilometers of altitude (average height 11 kilometers). The troposphere is thinnest at poles and gradually increases in thickness as one approaches the equator. This atmospheric layer contains about 80 % of the total mass of the atmosphere. It is also the layer where the majority of our planet's weather occurs. Maximum air temperature occurs near the Earth's surface in this layer. With increasing altitude air temperature drops uniformly with increasing height at an average rate of 6.5° Celsius per 1000 meters (commonly called the Environmental Lapse Rate), until an average temperature of -56.5° Celsius is reached at the top of the troposphere.

Trough : An elongated area of low pressure in the atmosphere.

True north : Direction of the north pole from an observer on the earth.

TSS : Total suspended solids.

Tsunami : Tsunami - A wave produced by any brief, large-scale disturbance of the ocean floor, principally by a shallow earthquake or earth movement, subsidence, or volcanic eruption; characterized by great speeds (up to 950 kilometers/hour), long wavelengths (up to 200 kilometers), long periods (generally 10-60 minutes); and low observable amplitude on the open sea, although it may rise to heights of 30 meters or more and cause much damage on an exposed coast.

Tuff : Volcanic rock of compacted medium to fine-grained pyroclastic material. OR A compacted deposit that is 50 percent or more volcanic ash and dust.

Tumbleweed (Russian thistle) : Annual plant that breaks away from its roots in the fall and is driven by the wind, releasing seeds. Approximately 200,000 seeds per plant.

Tundra : High latitude biome dominated by a few species of dwarf shrubs, a few grasses, sedges, lichens, and mosses. Productivity is low in this biome because of

the extremes of climate.

Turbidity : Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. OR A cloudy condition in water caused by suspended silt or organic matter.

Turbulent flow : Movement of water within a stream that occurs as discrete eddies and vortices. Turbulent flow is caused by channel topography and friction.

Two-tailed statistical test : Is an inferential statistical test where the values for which one can reject the null hypothesis are located either side of the center of the probability distribution.

Type Section : Type Section - A reference section from which a stratigraphic unit derives its name.

Typhoon : Another name for hurricane.

U

Ud : udic moisture regime.

Ultisol. : A soil order characterized by higher clay in the B-horizon than the A-horizon and an acid subsoil.

Ultisols : Other soils that have either:

An argillic or kandic horizon, but no fragipan, and a base saturation (by sum of cations) of less than 35 percent at one of the following depths:

If the epipedon has a sandy or sandy-skeletal particle-size class throughout, either:

125 cm below the upper boundary of the argillic horizon (but no deeper than 200 cm below the mineral soil surface) or 180 cm below the mineral soil surface, whichever is deeper; or

At a densic, lithic, paralithic, or petroferric contact if shallower; or

The shallowest of the following depths:

125 cm below the upper boundary of the argillic or kandic horizon; or

180 cm below the mineral soil surface; or

At a densic, lithic, paralithic, or petroferric contact; or

A fragipan and both of the following:

Either an argillic or a kandic horizon above, within, or below it or clay films 1 mm or more thick in one or more of its subhorizons; and

A base saturation (by sum of cations) of less than 35 percent at the shallowest of the following depths:

75 cm below the upper boundary of the fragipan; or

200 cm below the mineral soil surface; or

At a densic, lithic, paralithic, or petroferric contact.

Ultisols : Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. Tropical or subtropical soil that is in an advanced state of development. These soils have pronounced eluviation, clay accumulation in a subsurface layer, and are often poor in base cations.

Ultramafic : Rock that is rich in magnesium and iron content.

Ultramicropores : Pores <5mm in diameter.

Ultra-violet oxidation : A process using extremely short wave-length light that can kill micro-organisms (disinfection) or cleave organic molecules (photo oxidation) rendering them polarized or ionized and thus more easily removed from the water.

Ultraviolet radiation : electromagnetic radiation with a wavelength between 0.1 and 0.4 micrometers (μm).

Umbric horizon : a dark-colored, high-organic matter, diagnostic epipedon similar to mollic but more acidic.

Unavailable Nutrients : Plant nutrients that are present in the soil but cannot be taken up by the roots because they have not been released from the rock or minerals by weathering or from organic matter by decomposition.

Unavailable Water : Water that is present in the soil but can not be taken up by plant roots because it is strongly adsorbed onto the surface of particles.

Unconfined aquifer : aquifer that is not restricted by impervious layers of rock.

Unconfined Aquifer (or Water Table) : Unconfined Aquifer (or Water Table) - An aquifer in which the upper surface is the water table.

Unconfined groundwater : groundwater that is not restricted by impervious layers of rock.

Unconformity : Unconformity - A substantial break or gap in the geologic record in which a rock layer is not overlain by another that is in stratigraphic succession; that is, a surface of erosion or non-deposition. OR A break in the sequence of sedimentary strata. Often the unconformity surface is the result of erosion.

Unconsolidated : Sediments that are loose and not hardened.

Undercut bank : Steep bank found on the inside of stream meanders. Formed by the erosion that occurs when a stream channel moves horizontally.

Undercut, undercutting : Undercut, undercutting - An undesirable trait of some gems to sand (or polish) faster in some areas than others because of structural or mineralogical differences in the stone, producing a dull, rippled, or orange-peel surface.

Unicellular : Single celled organism, such as bacteria.

Unified soil classification system. : The particle size classification system used by the U.S. Army Corps of Engineers and the Bureau of Reclamation. Like the ASTM and AASHTO systems, the sand/silt boundary is at 80 μm instead of 50 μm used by the USDA and FAA. Unlike all other systems the gravel/sand boundary

is at 4 mm instead of 2 mm and the silt/clay boundary is determined by using Atterberg limits.

Uniform : This term is used in its traditional sense that some characteristic displays similar properties. Two related words are homogeneous (distributed evenly) and normal (distributed about a central mean value and described by a statistical equation).

Uniform profile form : A Primary Profile Form of the Northcote Factual Key Classification, (Northcote, 1979). These soil profiles have limited, if any texture change throughout the profile. There is generally no textural boundaries found within the uniform profile, except for possibly a surface crust. Uniform soils are given the notation "U".

Uniformitarianism : Is a theory that rejects the idea that catastrophic forces were responsible for the current conditions on the Earth. The theory suggested instead, that continuing uniformity of existing processes were responsible for the present and past conditions of this planet.

Unit : Unit - Loosely used term to denote any stratigraphic subdivision.

United states natural resources conservation service soil classification system : A hierarchical system that is used in united states to classify soils. This system has six levels: order, suborder, great group, subgroup, family, and series. At the order level, 12 types of soils are recognized: gelisols, oxisols, aridisols, mollisols, alfisols, ultisols, spodosols, entisols, inceptisols, vertisols, histosols, and andisols.

Universal time (ut) : The mean solar time of the meridian at the prime meridian. Universal time replaced the time standard known as greenwich mean time in 1928. Universal time is commonly used to denote solar time.

Universal transverse mercator (utm) grid system : rectangular coordinate system used to find location of points on the earth's surface. Based on the universal transverse mercator projection system.

Universe : All of the observable phenomena in the celestial cosmos.

Unloading : The releasing of downward pressure on rocks because of removal of overlying material by erosion. Unloading can cause the development of horizontal bedding in once solid rock.

Unsaturated Flow : The movement of water in the soil that is not completely filled with water. OR The movement of water in a soil that is not filled to capacity with water. Water moves because of water-potential differences toward areas of lower water potentials (drier soil).

Unsaturated Formation (vadose zone) : Unsaturated Formation (vadose zone) - The soil or other geologic material usually located between the land surface and a saturated formation where the voids, spaces or cracks are filled with a

combination of air and water.

Unstable atmosphere : Condition in the atmosphere where isolated air parcels have a tendency to rise. The parcels of air tend to be warmer than the air that surrounds them.

Unstable fill : Risk of caving or sloughing on banks of fill material.

Untreated : Seeds that have not been coated with fungicides, herbicides, fertilizers or growth hormones. All Seeds of Change seeds are untreated.

Updraft : Upward movement of air.

Upland : A general term for the higher ground of a region, in contrast with valley, plain, or other lower lying adjacent land.

Upland (geology) . : Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Upland . : An area where soils are generally relatively well drained such that the water table is significantly below the soil surface most of the year.

Uplift : Uplift - Mountain-building episodes; also a mountain range, such as the Black Hills Uplift.

Upper air westerlies : Consistent winds that exist in the upper troposphere that flow east to west from about 20° of latitude to the poles.

Upper mantle : Layer of the earth's interior extending from the base of the crust to 670 kilometers below the surface. Part of the earth's mantle layer. The upper mantle is composed of peridotite, an ultramafic magma primarily made up of the minerals olivine and pyroxene. The top layer of the upper mantle, 100-350 km below surface, is called the asthenosphere.

Upset : An upset digester does not decompose organic matter properly. The digester is characterized by low gas production, high volatile acid/alkalinity relationship, and poor liquid-solids separation. A digester in an upset condition is sometimes called a "sour" or "stuck" digester.

Upslope fog : fog produced by air flowing over topographic barriers. As the air is forced to rise, it is cooled by adiabatic expansion. Upslope fog is most common on the windward slopes of hills or mountains.

Upwelling : The movement of nutrient-rich deep seawater to the ocean's surface.

Urban area : Geographic area with a high density of people over a limited area. Homes and other types of buildings tend to be close together. Urban systems also tend to differentiate themselves spatially into particular types of human activities.

Urban heat island : Observed condition that urban areas tend to be warmer than

surrounding rural areas.

Urbanization : Expansion of cities into rural regions because of population growth. In most cases, population growth is primarily due to the movement of rural based people to urban areas. This is especially true in Less Developed Countries.

Urea : The commercial synthetic acid amide of carbonic acid containing not less than 45% nitrogen. It can fast start the nitrogen side of a compost windrow, but quickly disappears.

Uronic acid : Class of acidic compounds of the general formula $\text{HOOC}(\text{CHOH})_n\text{CHO}$ that contain both carboxylic and aldehydic groups, are oxidation products of sugars, and occur in many polysaccharides; especially in the hemicelluloses.

Use-dependant or management-dependent properties : Soil properties that show change and respond to use and management of the soil, such as soil organic matter levels and aggregate stability. This is a narrower term than dynamic soil properties which encompasses all changes on the human time scale including those induced by natural disturbances or cycles.

Use-invariant properties : Soil properties that show little change over time and are not affected by use and management of the soil, such as mineralogy and particle size distribution.

Ust : ustic moisture regime.

Vacuum : (1) Space devoid of atoms or molecules.

(2) Emptying of air.

V

Vadose water : Water in the vadose zone.

Vadose zone : Unsaturated zone of soil above the groundwater, extending from the bottom of the capillary fringe all the way to the soil surface. OR The aerated region of soil above the permanent water table.

Valley : A linear depression in the landscape that slopes down to a stream, lake or the ocean. Formed by water and/or ice erosion.

Valley breeze : Local thermal circulation pattern found in areas of topographic relief. In this circulation system, surface winds blow from the valley bottom to areas of higher elevation during the daytime.

Valley fill : In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Valley fog : fog formed by the movement of cooler, more dense air from higher elevations to the warm valley bottom.

Valley train : A linear accumulation of glaciofluvial outwash sediments found in a once glaciated valley. OR A long narrow body of outwash confined within a valley beyond a glacier.

Valley wall : The side slope of a stream or glacial valley.

Value : The relative lightness or intensity of color, one of the three color variables.

Value, color : the relative lightness or darkness of color.

Vapor : The gaseous phase of substances such as water.

Vapor pressure : pressure exerted by water vapor molecules in a given quantity of atmosphere. OR measurement of the ability of water to drive liquid water into the gaseous state in a system.

Vaporize : Conversion of a liquid into vapor.

Variance : A statistical measure of the dispersion of observation values in a data set. The variance of a sample is the sum of the square of each value in the data set subtracted from the mean divided by one less than the total number of observations in the data set.

Variant, soil. Variegation : A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a

limited geographic area that creation of a new series is not justified.

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Variety : A distinct plant strain that can be distinguished from all other similar strains within the same species with regards to morphological, physiological, genetic, chemical, and other characteristics. In actuality, variation from plant to plant can occur within any open-pollinated variety.

Varnish (Desert) : A dark shiny coating on stones in deserts

Varve : A thin yearly deposit of sediment found on the bottom of a lake. Within each yearly varve, there are variations in the color and the texture of the material deposited. The thickness of the varve and its associated layers can be used to reconstruct past environmental conditions influencing the lake. OR A layer representing the annual deposit of sediment.

Varved shales : Shales deposited from melted ice in a lake in which the depositional layers appear in pairs; each pair represents a seasonal deposit.

Vascular plant : plant that has vascular tissues to transport water, nutrients, and other metabolic products.

Vector : (i) Plasmid or virus used in genetic engineering to insert genes into a cell.
(ii) Agent, usually an insect or other animal, able to carry pathogens from one host to another.

Vegetative : Actually growing state.

Vegetative cell : Growing or feeding form of a microbial cell, as opposed to a resting form such as a spore.

Vegetative filter strips : A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater.

Vein Agate : Vein Agate - Agate that forms in more-or-less unbounded fracture systems in bedrock.

Velocity : The speed of movement of an object in one direction.

Ventifact : A loose piece of rock that has been polished smooth by wind transported particles. Common in arid environments.

Venturi : An increase in the velocity of a fluid or gas due to the constriction of flow.

Vermicomposting : The biological degradation of organic matter contained in agricultural. OR Using redworms to compost food scraps, newspapers, and cardboard, yielding nutrient-rich castings.

Vermiculite : 1. a clay similar to hydrous mica and having 2:1 layers of 2 tetrahedral sheets to 1 octahedral sheet. Vermiculite has the layers held together by hydrated cations and has less swelling than montmorillonite. 2. a mica-like silicate mineral that expands into an accordion-like structure when heated to high temperature; it is a high water-holding capacity **within the expanding particles** and yet good aeration **between the large particles**.

Vernal equinox : One of the two periods when the declination of the sun is at the equator. The vernal equinox occurs on march 20 or 21.

Vertebrate : Animal that does have a backbone. Also see invertebrate.

Vertic properties : This term is used to describe a subsoil with a field texture of 35% or more clay that experiences significant shrinking and swelling, resulting from drying and wetting. This often results in the development of features such as surface cracking and gilgai formation. Evidence of vertic properties include the presence of slickensides and/or lenticular peds in the subsoil. The amount of swelling is dependent on the type of clay present. These features are of significant importance for engineering purposes such as road construction. This term is used as a Subgroup definition for a number of Soil Orders in the Australian Soil Classification (Isbell, 1996). OR Soil material with a clayey field texture or 35% or more clay which cracks strongly when dry and has slickensides and/or lenticular peds.

Vertical aerial photograph : Photograph taken from a overhead or near overhead angle from a platform in the atmosphere.

Vertisols : (1) Soil order (type) of the United States Natural Resources Conservation Service Soil Classification System. Tropical or sub-tropical soil that has a high clay and base cation status.

(2) Soil order (type) of the Canadian System of Soil Classification. This soil has a high clay content and exhibits the effects of extreme contraction-expansion due to temporal changes in soil water content. OR ASC Soil Order classification— Clay soils with shrink-swell properties that exhibit strong cracking when dry and at depth have slickensides and/or lenticular structural aggregates. Although many soils exhibit gilgai microrelief, this feature is not used in their definition.

Very Poorly Drained : A soil that remains wet and waterlogged for most of the year so that most of the horizons are blue, olive or gray due to the reducing conditions.

Vesicles : Spherical structures, formed intracellularly, by some arbuscular mycorrhizal fungi.

Vesicles : Vesicles - Hollow, bounded, small cavities in a larger body of rock.

Vesiculararbuscular mycorrhiza : See **arbuscular mycorrhiza**.

Viable : Alive; able to reproduce.

Viable but nonculturable : Organisms that are alive but cannot be cultured on laboratory media.

Viable count : Measurement of the concentration of live cells in a microbial population.

Vibrio : (i) Curved, rodshaped bacterial cell. (ii) Bacterium of the genus *Vibrio*. OR Virus particle; the virus nucleic acid surrounded by protein coat and in some cases other material.

Virulence : Degree of pathogenicity of a parasite.

Virus : Any of a large group of submicroscopic infective agents that typically contain a protein coat surrounding a nucleic acid core and are capable of growth only in a living cell.

Viscosity : The amount of the resistance to flow in a fluid due to intermolecular friction.

VOC : Volatile Organic Compound. Synthetic organic compounds which easily vaporize and are often carcinogenic.

Volatile : A volatile substance is one that is capable of being evaporated or changed to a vapor at a relatively low temperature. Volatile substances also can be partially removed by air stripping.

Volatile Organic Compounds (voc) : Organic molecules that are mainly composed of carbon and hydrogen atoms (hydrocarbons). The most common volatile organic compound release into the atmosphere is methane. Involved in the formation of photochemical smog.

Volatilization : Gaseous loss of a substance to the atmosphere .OR The process where a solid or liquid substance is converted into a gas.

Volcanic Ash (Volcanic Dust) : Fine particles of lava ejected during a volcanic eruption. Sometimes the particles are shot high into the atmosphere and carried long distances by the wind. OR Small sized particles ejected from explosive volcanoes.

Volcanic neck : See volcanic pipe.

Volcanic pipe : A dyke reaches the surface of the earth. Also called volcanic neck.

Volcanic vent : An opening on a volcano through which lava is released and rock fragments and ash are ejected.

Volcano : An elevated area of land created from the release of lava and ejection of ash and rock fragments from and volcanic vent.

Volume : The occupation of space in three dimensions. Measured in cubic units.

Vortex : A rapid spiraling motion of air or liquid around a center of rotation.

VS/L : Measure of volatile solids, usually expressed as g VS/L/day = grams volatile solids per liter per day.

Vug : Vug - A cavity in rock that may or may not contain minerals.

Vulnerability assessment - : The susceptibility or exposure to injury or loss from a hazard.

W

Warm desert : desert found in the subtropics or interiors of continents at the middle latitudes where precipitation is low and surface air temperatures are high.

Warm front : A transition zone in the atmosphere where an advancing warm air mass displaces a cold air mass.

WAS : Waste activated sludge, mg/L. The excess growth of microorganisms which must be removed from the process to keep the biological system in balance.

Wash : (1) Coarse alluvial sediments.

(2) The downslope movement of small particles of soil by overland flow. Also called sheetwash.

(3) A term used in the United States for a shallow intermittent stream channel found in arid and semi-arid regions.

Washover fan : A fan-like landform of sand washed over a barrier island or spit during a storm and deposited on the inland-side. Washover fans can be small to medium sized and completely subaerial, or they can be quite large and include subaqueous margins in adjacent lagoons or estuaries". Large fans can be subdivided into sequential parts: ephemeral washover channel (microfeature) cut through dunes or beach ridge, back-barrier flats, (subaqueous) washover-fan flat, (subaqueous) washover-fan slope. Subaerial portions can range from barren to completely vegetated.

Washover-fan flat : A gently sloping, fan-like subaqueous landform created by overwash from storm surges that transports sediment from the seaward side to the landward side of a barrier island (Jackson, 1997). Sediment is carried through temporary overwash channels that cut through the dune complex on the barrier spit (Fisher and Simpson, 1979; Boothroyd et al., 1985; Davis, 1994) and spill out onto the lagoon-side platform where they coalesce to form a broad belt. Also called Storm-surge Platform Flat (Boothroyd et al., 1979) and Washover Fan Apron (Jackson, 1997). Compare - Washover Fan Slope.

Washover-fan slope : A subaqueous extension of the washover-fan flat that slopes toward deeper water of a lagoon or estuary and away from the washover-fan flat. Compare - Washover-Fan Flat.

Wastewater : The used water and solids from a community that flow to a treatment plant. Storm water, surface water, and groundwater infiltration also may be

included in the wastewater that enters a wastewater treatment plant. The term "sewage" usually refers to household wastes, but this word is being replaced by the term "wastewater".

Wastewater treatment plant (wwtp) : Facility that uses a combination of physical, chemical, and biological processes to treat wastewater (and sometimes runoff) from domestic and/or industrial sources.

Water (hydrologic) Cycle : The fate of water from the time it leaves the atmosphere as precipitation until the water has been returned to the atmosphere by evaporation or plant transpiration. Soil plays a very important role in the water cycle, because a substantial portion of the precipitation reaching the earth falls on soil. The condition or quality of the soil determines such things as how much water runs off to rivers or lakes, how much enters the soil and can be taken up by plants or evaporated, and the rate and the amount of water that moves through the soil to groundwater.

Water consumption : The complete removal of water from some type of source, like groundwater, for some use by humans. This water is not returned to the source. Compare with water withdrawal.

Water content : Water contained in a material expressed as the mass of water per unit mass of oven-dry material.

Water holding capacity : The amount of water that can be held in soil against the pull of gravity.

Water management : The practice of limiting the amount of water used in activities such as animal waste flushing systems or milking operations in order to reduce the amount of runoff and, therefore, decrease the probability of polluting nearby surface water.

Water potential : See soil water potential.

Water quality : Refers to the physical, biological and chemical characteristics of water. These attributes affect the ability of a water body to sustain aquatic life and safely support recreational and other uses by humans.

Water quality criteria : Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, fish production, or industrial uses.

Water quality standards : Established limits of certain chemical, physical, and biological parameters in a water body; water quality standards are established for the different designated uses of a water body.

Water repellent : Soils that are fairly resistant to wetting (from a dry state). It is a condition usually associated with sandy surface horizons and is generally caused

by an organic coating on sand grains.

Water retention curve : a graph showing the soil-water content versus applied tension, suction, or water potential. Also called **water release characteristic curve**.

Water solubility :: The maximum possible concentration of a chemical compound dissolved in water.

Water Table : Water Table - The level at which the pore pressure equals atmospheric pressure and below which the pore spaces generally are saturated. A term generally associated with unconfined aquifers.

Water table management : Control of the shallow ground water table through a combination of surface drainage, controlled drainage, or subirrigation.

Water table management systems : The practices of surface drainage, controlled drainage, or subirrigation that are used in combination to control water table depth. Used in conjunction, these practices can increase yield and decrease nutrient pollution.

Water withdrawal : The removal of water from some type of source, like groundwater, for some use by humans. The water is subsequently returned some period of time later after its is used. The quality of the returned water may not be the same as when it was originally removed. Compare with water consumption.

Waterfall : (1) A location in the long profile of a stream where water flows vertically. A nickpoint.

(2) Verical drop in elevation that causes a stream's discharge to flow vertically.

Water Holding Capacity (field capacity) : The amount of water soil can hold against the downward force of gravity. Soil texture, structure, porosity, and organic-matter content determine soil water-holding capacity. Some soil water is held too tightly to be taken up by plant roots, either in thin films on particle surfaces or in very small soil pores. Plant-available water-holding capacity is the portion of the total amount of water a soil can hold that can be taken up by plant roots. Available water in a soil can vary by crop, because roots of some plants can absorb water at lower soil water contents (held more strongly by the soil) than other types of plants.

Waterlogged : Saturated with water.

Waterretention curve : Graph showing soil-water content as a function of increasingly negative soil water potential.

Watershed : An area of land that collects and discharges water into a single stream or other outlet. Also called a catchment or drainage basin. OR A land area from which water drains to a particular water body.

Watersheds : Watersheds - Regional basins drained by or contributing water to a particular point, stream, river, lake or ocean. Watersheds range in size from a few acres to large areas of the country. In Nebraska, Natural Resource Districts (NRDs) were established along watershed boundaries.

Waterspout : A vortex of rapidly moving air over water that is associated with some thunderstorms.

WaterTable (Ground) : The upper limit in the soil or underlying material permanently saturated with water.

Watt : A metric unit of measurement of the intensity of radiation in Watts over a square meter surface (W/m² or W m⁻²).

Wave crest : The curved tops or ridges of an oscillating wave.

Wave cyclone : See mid-latitude cyclone.

Wave height : Vertical distance between a wave's trough and crest.

Wave period : The time elapsed for a wave to travel the distance of one wavelength.

Wave refraction : The re-orientation of a wave so that it approaches a shoreline at a more perpendicular angle. This process is caused by the differential reduction of water depth as a linear wave approaches a curved shoreline. A reduction in water depth causes a wave to slow down causing the waves approaching a nonlinear shoreline to curve with the shore's shape.

Wave trough : Area in between wave crests.

Wave-built Terrace : A gently sloping coastal feature at the seaward or lakeward edge of a wave-cut platform, constructed by sediment brought by rivers or drifted along the shore or across the platform and deposited in the deeper water beyond (Jackson, 1997). Compare - Submerged Wave-Built Terrace, Beach Plain, Strand Plain.

Wave-cut notch : A rock recess at the foot of a sea cliff where the energy of water waves is concentrated.

Wave-cut Platform : A gently sloping surface produced by wave erosion, extending into the sea or lake from the base of the wave-cut cliff. This feature represents both the wave-cut bench and the abrasion platform (Jackson, 1997). Compare - Submerged Wave-Cut Platform.

Wave-cut platform. : The relatively smooth, slightly seaward-dipping surface formed along the coast by the action of waves generally accompanied by abrasive materials.

Wavelength : Distance between two successive wave crests or troughs.

Waxes : Naturally occurring compounds. The leaves of most plants are coated

with wax, which helps to prevent microorganisms from attacking them and also allows them to conserve water (Bettleheim and March, 1991)

Weakly Anaerobic : A horizon that is anaerobic for short periods and moist for long periods. The colors are less bright than aerobic horizons and they are usually marbled or weakly mottled.

Weather : Weather - To undergo change such as discoloration, softening, crumbling, or pitting of rock or mineral surfaces, brought about by exposure to the atmosphere and its agents. OR The state of the atmosphere at a specific time and place.

Weather map : map that displays the condition of the physical state of the atmosphere and its circulation at a specific time over a region of the earth.

Weathered or soft bedrock(r) : This symbol is used with C to indicate cemented layers (moderately cemented or less cemented). Examples are weathered igneous rock and partly consolidated sandstone, siltstone, or shale. The excavation difficulty is low to high. OR All physical and chemical changes produced in rock by atmospheric agents

Weathering : All the physical, chemical and biological processes that cause the disintegration of rocks at or near the surface. OR All physical and chemical changes produced in rock by atmospheric agents.

Weathering : The breakdown and changes in rocks and sediments at or near the Earth's surface produced by biological, chemical, and physical agents or combinations of them.

Weathering landform : Is a landform created by the physical or chemical decomposition of rock through weathering. Weathering produces landforms where rocks and sediments are decomposed and disintegrated. This includes landforms with some of the following geomorphic features: karst, patterned ground, and soil profiles.

Weathering. : All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Web blotch : Occurs in peanuts. Leaf disease that reduces yield and quality. Predictive computer models can help producers time fungicide applications to control the disease.

Weir : A spill over device used to measure or control water flows. OR A wall or plate placed in an open channel and used to measure the flow of water.

Welded Ash-flow Tuff : Welded Ash-flow Tuff - An acidic volcanic rock resulting from highly explosive eruptions and characterized by having numerous broken and flattened glass shards in a very finely crystalline to brittle, glassy matrix.

Welded Ash-flow Tuff : Welded Ash-flow Tuff - An acidic volcanic rock resulting from highly explosive eruptions and characterized by having numerous broken and flattened glass shards in a very finely crystalline to brittle, glassy matrix.

Well Drained : See aerobic.

Well graded : Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Well Log : Well Log - A detailed record obtained during well drilling, correlating with depth information such as changes in electrical resistivity, spontaneous potential, radioactivity, and rock type.

Well Screen : Well Screen - The intake section of a well that allows water to flow freely into the well from water-saturated materials and serves as a structural retainer to support the bore hole in unconsolidated material.

Westerlies : Dominant winds of the mid-latitudes. These winds move from the subtropical highs to the subpolar lows from west to east.

Wet bulb temperature : The lowest temperature that can be obtained by evaporating water into the air at constant pressure. The name comes from the technique of putting a wet cloth over the bulb of a mercury thermometer and then blowing air over the cloth until the water evaporates. Since evaporation takes up heat, the thermometer will cool to a lower temperature than a thermometer with a dry bulb at the same time and place. Wet bulb temperatures can be used along with the dry bulb temperature to calculate dew point or relative humidity.

Wet deposition : The transport of gases and minute liquid and solid particles from the atmosphere to the ground surface with the aid of precipitation or fog. Compare with dry deposition.

Wet Sand, Wet Sanding : Wet Sand, Wet Sanding - Sanding using a coolant.

Wet-bulb thermometer : thermometer on a psychrometer that has a moisten wick on its reservoir bulb. When ventilated this thermometer records a temperature that is modified by the cooling effects of evaporation. This measurement and the temperature reading from a dry-bulb thermometer are then used to determine the air's relative humidity or dew point from a psychrometric table. OR The value calculated by subtracting a wet-bulb thermometer reading from a dry-bulb thermometer reading. Used to determine the air's relative humidity or dew point from a psychrometric table.

Wether : (animal science) A castrated male sheep.

Wetland : General definition: Areas that under normal circumstances have hydric soils and hydrophytic vegetation. Legal and political definition: It should be noted

that the specific legal definition of wetland is often hotly debated and wetland experts are working hard to come up with a good legal definition.

Wetland : Land that is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. According to Minnesota law, a wetland is defined by the presence of: 1) soils with characteristics developed under wet conditions, 2) surface or subsurface water, and 3) vegetation that is growing where at least periodically deficient oxygen exists as a result of excessive water content.

Wetland construction : A subset of wetland creation; creation of wetlands specifically for water quality improvement purposes, typically involving controlled outflow and a design that maximizes selected treatment functions. Creation of an engineered system to simulate the water purification function of natural wetlands for human use and benefits.

Wetland creation : The bringing into existence of a wetland, whether by accident or intentionally, where none existed previously, for purposes including mitigation, habitat provision, and water quality improvement.

Wetland enhancement : Modification of a natural or created wetland to enhance one or more functions, typically to the detriment of other functions.

Wetland restoration : Rehabilitation of previously existing wetland functions, from a more impaired to a less impaired or unimpaired state of overall function.

Wetland soil : See HYDRIC SOIL.

Wetlands : Areas inundated or saturated by surface or groundwater at a frequency and duration to support and that, under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetting and Drying : Physical weathering process where rocks are mechanically disintegrated by the accumulation of successive layers of water molecules in between the mineral grains of a rock. Sometimes called slaking.

White grubs : The larval stage of may and june bugs. An annual problem in lawns and turf.

White rot fungus : Fungus that attacks lignin, along with cellulose, and hemicellulose, leading to a marked lightening of the infected wood.

Wien's law : This radiation law suggests that the wavelength of maximum emission of any body is inversely proportional to its absolute temperature. The following equation mathematically describes this law:

$$\lambda_{\max} = c/t$$

Where λ_{\max} is the body's maximum emitted wavelength of radiation in micrometers (μm),

C is a constant equal to 0.2897,

And t is the temperature of the body in kelvins.

Wiesenboden : GSG classification—Dark clay to clay loam soils with uniform to gradational texture profiles and varying development of gley features in the deeper subsoil due to intermittent partial saturation associated with seasonal seepage and perched water.

Wild type : Strain of microorganism isolated from nature. The usual or native form of a gene or organism. OR Strain of microorganism isolated from nature. The usual or native form of a gene or organism.

Wilting percentage (permanent wilting point) : The water content (dry mass basis) of a soil at which plants wilt and do not recover. It is the water that is held by soil and that plants cannot extract.

Wilting point : Point at which the rate of moisture loss from the leaf surface is greater than the uptake from plant roots. The wilting point differs in various soil types according to texture.

Wilting point (or permanent wilting point) : The percentage by weight of water remaining in the soil when the plant wilts permanently.

Wind : Air moving horizontally and/or vertically.

Wind ripples : Wind ripples are miniature sand dunes between 5 centimeters and 2 meters in length and 0.1 to 5 centimeters in height. They are created by saltation when the sand grains are of similar size and the wind has a constant speed. Also called sand ripples.

Wind vane : A mechanical device used to measure the direction of wind flow. Usually consists of a horizontal bar with a fin at one end and a aerodynamic pointer at the other end. The center of horizontal is attached to a vertical spindle which is connected to a mechanical device that records direction.

Windrow system : Rather than making a square or round compost pile, some people make a long row. This is especially true of commercial operations. The compost pile is about as tall as it is wide, but may be as long as space allows. This row of compost is called a windrow.

Wind-tidal Flat : A broad, low-lying, nearly-level sand flat that is alternately flooded by ponded rainwater or inundated by wind-driven marine and estuarine waters. Salinity fluctuations and prolonged periods of exposure preclude establishment of most types of vegetation except for mats of filamentous blue-green algae. Compare - Tidal Flat.

Windward : Upwind side or side directly influenced to the direction that the wind blows from. Opposite of leeward.

Winogradsky column : Glass column with an anaerobic lower zone and an aerobic upper zone, which allows growth of microorganisms under conditions similar to those found in nutrient-rich water and sediment.

Winter : Season between fall and spring. Astronomically it is the period from the winter solstice to the vernal equinox in the Northern Hemisphere.

Winter solstice : Date when the declination of the sun is at 23.5° south of the equator. This date is usually December 21 or 22.

Woodland : Vegetation structure dominated by trees where canopy foliage covers 10 – 30% of the ground area.

Woronin body : Spherical structure associated with the simple pore in the septa separating hyphal compartments of fungi in the phylum Ascomycota.

X

Xanthozems : GSG classification—Predominantly yellow, friable, strongly-structured clay soils with moderate horizon differentiation and gradational texture profiles.

X-axis : Horizontal axis on a graph.

Xenobiotic : Compound foreign to biological systems. Often refers to humanmade compounds that are resistant or recalcitrant to biodegradation and decomposition.

Xenolith : Rock fragments from a different type of rock that are imbedded in a granitic rock.

Xenophore : Group or structure built into a chemical that imparts xenobiotic character, which may hinder biodegradation of the chemical.

Xer : a xeric moisture regime.

Xerophile : Organism adapted to grow at low water potential, i.e., very dry habitats.

Xerophyte : Plant that have adaptations to survive prolonged periods of soil drought.

Xerophytes : Plants that grow in extremely dry areas.

X-ray radiation : Form of electromagnetic radiation with a wavelength between 0.03 to 30 nanometers.

Xylem : Conducting tissue in vascular plants through which water and mineral nutrients are transported.

Y

Yardang : Rock that has developed a streamline form because of wind erosion. The long axis of these features is aligned with the dominant wind direction.

Y-axis : Vertical axis on a graph.

Yazoo tributary : Small tributary channel that is prevented from joining the main stream channel by the presence of levees. Yazoo tributaries tend to flow on the floodplain parallel to the main stream channel.

Yeast : Fungus whose thallus consists of single cells that multiply by budding or fission.

Yellow earths : GSG classification—Yellow equivalent of Red Earths.

Yellow podzolic soils : GSG classification—Strongly differentiated duplex soils with light to medium textured A₁ horizon over a pale A₂ horizon over a yellowish, firm to friable B horizon with generally polyhedral structure.

Younger-dryas : A cold period during the generally mild holocene epoch that occurred from about 10,000 - 8,500 bc. Scientists speculate that this cooling may have been caused by the release of fresh water trapped behind ice on north america into the north atlantic ocean.

Z

Zeolites : Zeolites - A large family of hydrous aluminum, sodium, or calcium silicate that have many similarities in chemical composition and mode of occurrence; usually alteration products in igneous rocks.

Zonal : Movement of wind or ocean waters in a direction that is roughly parallel to the lines of latitude.

Zonation : A term used generally, even vaguely, for a region of latitudinal character more or less set off from surrounding regions by some distinctive characteristic; for example, the earth's torrid zone, two temperate zones, and two frigid zones. For hazards, zones are geographic regions or designations that are differentiated through a variety of different criteria; for example, residential zones, zones of low hazard, zones of high hazard. Agi

Zone of Ablation : Area of a glacier where losses of ice from melting, evaporation, and sublimation exceed additions of snow annually.

Zone of Accumulation : The layer in a soil into which soluble compounds are moved and deposited by water. OR Area of a glacier where additions of snow exceed losses of ice from melting, evaporation, and sublimation.

Zone of Aeration : Horizontal zone that extends from the top of the water table to the ground surface. Soil and rock pore spaces in this zone may and may not have water.

Zone of Decomposition : Surface layers in a soil in which organic matter decays.

Zone of Leaching : The layers in a soil from which soluble nutrients are removed by water.

Zone of Saturation : Zone of Saturation - Porous earth materials in which all pore spaces are filled with water.

Zoning : F

Zoogleal film : A complex population of organisms that form a "slime growth" on a trickling-filter media and break down the organic matter in wastewater.

Zoogleal mass : Jelly-like masses of bacteria found in both the trickling filter and activated sludge processes.

Zooplankton : Small heterotrophic organisms found inhabiting aquatic ecosystems. Also see plankton and phytoplankton.

Zoospore : An asexual spore formed by some fungi that usually can move in an aqueous environment via one or more flagella.

Zygospor : Thick-walled resting spore resulting from fusion of two gametangia of fungi in the phylum Zygomycota.

Zygote : In eukaryotes, the single diploid cell resulting from the union (fusion) of two haploid gametes.

Zymogenous flora : Refers to microorganisms, often transient or alien, that respond rapidly by enzyme production and growth when simple organic substrates become available. Also called *copiotrophs*.

Zymogenous organism : Refers to an often transient or alien microorganism that grows rapidly when high energycontaining nutrients become available. Also called copiotroph.