

VOCABULARY

GLOSSARY & INDEX

- Absolute Age, or Date (97, 101)** – dates in Earth's history arrived at by dating radioactive rocks and measured without reference to any other event.
- Absorption (118, 144)** – opposite of radiation; the concentration of a substance through (permeating) a surface.
- Absorption of Solar Energy (144)** – concentration of the electromagnetic radiation of the Sun through the Earth's atmosphere, including ultraviolet, infrared, visible wavelengths.
- Acid Rain (186-188)** – weak acid precipitation from industrial waste gases.
- Actual Evapotranspiration (146)** – see water budget; due to evaporation and transpiration, the actual amount of water lost from a given area over a specific amount of time, expressed in millimeters of water.
- Aerobic Bacteria (187)** – bacteria that use oxygen in energy production.
- Aerosols (144)** – the mixtures of small particles suspended in a liquid or gas; such as fog, smog, muddy water, etc.
- Air Mass (120)** – large area of air within the lower atmosphere having generally the same temperature and humidity at any given level.
- Air Masses (120)** – arctic (A), polar (P), tropical (T), maritime (m), continental (c).
- Air Pollution (188)** – harmful substances within the Earth's atmosphere.
- Air Pressure (114, 115)** – force exerted due to the weight of air; see weather.
- Alpine Glacier (75)** – glacier found in a mountain valley.
- Altitude (19)** – a celestial object's angular distance above the horizon; the vertical distance of one point above the Earth's surface at sea level.
- Anaerobic Bacteria (187)** – bacteria that do not use oxygen in their production of energy, but usually carry on a form of fermentation.
- Anemometer (114)** – instrument with rotating cups used to determine wind speed.
- Angle of Insolation (141, 142)** – angle that the rays of the Sun hit the surface of the Earth; decreases with an increase in latitude; increases as the angle approaches perpendicular; varies with the time of day and day of the year.
- Angular Diameter (163)** – not actual measured diameter, but the perceived diameter of a planet, changing according to the distance from observer.
- Annular Drainage (78)** – ring-shaped drainage pattern often found on eroded domes.
- Annular Eclipse (165)** – eclipse that occurs when the Moon is too far from the Earth for the umbra of its shadow to reach the Earth.
- Anticyclone (120, 121)** – HIGH, the opposite of a cyclone (LOW), having high pressure and clockwise winds in the northern hemisphere.
- Aphelion (161, 162)** – point on the Earth's orbit when the Earth is the farthest from the Sun (152 million kilometers); occurring on July 1st; point of Earth's slowest orbital speed.
- Apparent Daily Motion (159)** – perceived movement of celestial objects as seen from the Earth, circular, constant, daily, and cyclic.
- Apparent Solar Day (159)** – time (24+ hours) required for the Sun to cross a given meridian twice in succession.
- Arc (159, 163)** – portion of a circle through which the celestial objects rise in the east and set in west, from the observer's point of view on Earth's surface.
- Arête (75)** – sharp ridge formed between two Alpine or valley glaciers.
- Arid Climate (75, 146)** – dry (deficit moisture) area of land, having greater potential evapotranspiration than precipitation for a majority of months in a year.
- Asteroid Belt (167)** – numerous small celestial bodies that revolve around the Sun, with orbits lying chiefly between Mars and Jupiter and characteristic diameters between a few and several hundred kilometers.
- Asthenosphere (54)** – the plastic-like part of the mantle beneath the lithosphere where convection currents are thought to occur.
- Astronomical Unit (162)** – mean distance of the Earth from the Sun; approximately 150,000,000 kilometers.
- Atmosphere (20, 113)** – thin shell of gases surrounding the Earth, separated (stratified) into layers each having distinct characteristics; troposphere, stratosphere, mesosphere, and thermosphere.
- Atmosphere, Selected Properties of Earth's (212)** – *Reference Table*.
- Atmospheric Transparency (144)** – condition under which the Earth's atmosphere scatters, reflects, or absorbs the Sun's rays.
- Axis, Earth's (19, 142)** – center of Earth between the North and South Poles, about which the Earth rotates.



- Backwash (71)** – water from breaking waves that gravity pulls back from the beach into the ocean.
- Banding (35)** – pattern of layers caused by differences in the crystal alignments of various minerals in many metamorphic rocks; type of foliating.
- Barometer (114)** – instrument used to measure air pressure.
- Barycenter (163)** – point in a system of bodies, such as the Earth and Moon, at which the mass of the system may be considered to be concentrated and at which external forces may be considered to be applied.
- Base Flow (141)** – water moving from the local water table into streams.

Beach (71) – shoreline region of deposited particles; may contain sand, gravel, pebble, cobble and/or boulders.

Bedrock (77) – solid rock underneath soil or exposed rock at Earth's surface.

Bedrock, Generalized Geology in NYS (201) – *Reference Table*.

Bench Mark (48) – ground marker indicating the exact elevation of that location above sea level.

“Big Bang” (170) – theory that the universe began with a gigantic explosion.

Biocide (190) – substance harmful to plants and animals.

Biological Pollutant (187) – biologic organisms in concentrations that are harmful.

Breaker (71) – when the crest of a wave falls over onto the shore.



Calorie (118) – heat quantity unit; amount of energy required to raise the temperature of 1 gram of water through 1°C.; a large calorie (kilocalorie) is 1000 calories.

Capillarity (140) – upward movement of water against the force of gravity in a narrow space, such as a tube, plant vessel, or fine sand particles.

Capillary Water (141) – water that is found in the small spaces between fine grains of rock, sand, clay, or soil.

Carbon-14 Dating (101) – process for determining the absolute age of a fossil or other material containing the element Carbon-14 (a radioactive isotope of Carbon-12 with a half-life of 5,600 years).

Carbonate (32) a group made up of one or more metals combined with a carbon and three oxygen atoms (CO₃).

Carbonation (67) – the process of carbonic acid reaction with other materials.

Celestial Object (159) – “heavenly bodies,” any object observed in the area above the Earth’s atmosphere, including the Sun, Moon, stars, comets, planets, etc.

Celsius Scale (211) – a temperature scale that registers the freezing point of water as 0° and the boiling point as 100° under normal atmospheric pressure.

Cementation (34) – process in some sedimentary rocks, in which various sized sediments are cemented (glued) together by the action of precipitated minerals, resembles man-made concrete.

Cenozoic Era (99, 100) – most recent Earth history era representing 2 or 3% of the geologic time scale including modern plants, animals, and humans.

Center of Accumulation (75) – large area or center of accumulation for snow and ice of a continental glacier.

Centimeter Scale (199) – *Reference Table*.

Centrifugal Effect (20) – produced by Earth’s rotation, tends to maintain movement away from the center or axis of the Earth.

Change of Phase (118) – see phase change.

Chemical Composition of Earth’s Crust (209) – *Reference Table*.

Chemical Pollutants (186) – toxic materials such as phosphates and heavy metals that reach harmful levels in the environment.

Chemical Properties (31) – used for identification of minerals.

Chemical Sedimentary Rock (35) – sedimentary rock formed from dissolved mineral material which settles or precipitates out of water.

Chemical Weathering (67) – process that alters the chemical characteristics of rocks and minerals, such as oxidation and hydration.

Circumference of Earth (19) – formula; see Earth Dimensions.

Cirque (75) – bowl-shaped depression gouged out of the side of a mountain by a glacier.

Cirrus Clouds (117) – high-altitude cloud composed of narrow bands or patches of thin, generally white, fleecy parts.

Classification System (7) – organized data, based on observable properties.

Clastic (35) – see fragmented sedimentary rocks.

Clean Air Act (188) – 1970, standards for clean air.

Clean Water Act (188) – 1972, waste discharge regs.

Cleavage (32) – the tendency of a mineral to break along one or more smooth planes or surfaces.

Climate (68, 74, 145-148) – discounting local weather changes, the average or normal weather of a particular large Earth area.

Cloud (116, 117) – type of aerosol in the atmosphere composed of suspended small water droplets and/or ice crystals.

Cluster (169) – a group of galaxies.

Cold Front (121) – the interface, leading edge, of an air mass which has cooler temperatures than the preceding warmer air mass, usually associated with moisture and precipitation.

Colloid (34, 72) – small particles, from 10⁻⁴ to 10⁻⁶ millimeters across, which tend to remain in solution for long periods of time.

Color (31) – property used for the identification of minerals.

Comet (167) – celestial body, observed only in that part of its orbit that is relatively close to the Sun, having a head consisting of a solid nucleus surrounded by a nebulous coma up to 2.4 million kilometers (1.5 million miles) in diameter and an elongated, curved vapor tail arising from the coma when sufficiently close to the Sun.

Competent Rocks (77) – resistant to weathering and erosion.

Compression (34) – process involved in the production of some sedimentary and metamorphic rocks, in which the weight of deposited sediments, water, and/or Earth movements presses underlying sediments together.

Compressional Wave (Primary, *P-wave*) (48) – seismic wave (action is like the expansion and contraction of a spring) which travels at a speed of thousands of kilometers per hour, through solids, liquids, or gases.

Conclusion (7) – see inferences.


Condensation (115, 116, 118, 139) – change in state from vapor (gas) to liquid, the loss of water vapor from warmer air onto a cooler surface, such as the condensation (fog) on an ice water glass.

Condensation Surface, or Nucleus (116) – solid surface onto which water vapor may condense to form liquid droplets, in the formation of clouds – water condenses on dust or other particles, in the formation of early morning dew – water condenses on any solid and cooler surface.

- Conduction (119)** – transfer of energy, usually heat, by contact from one atom to another atom within a liquid, gas, or solid.
- Conglomerates (34)** – rock consisting of unsorted pebbles and gravel embedded in cement.
- Conservation (37)** – controlled use and systematic protection of natural resources, such as forests, soil, and water systems.
- Conservation of Natural Resources (191)** – controlled use and systematic protection of natural resources, such as forests, soil, and water systems.
- Constellation (159)** – a group of stars that make up a recognizable pattern in the sky.
- Constructional Forces (74)** – see Uplifting (forces).
- Contact Metamorphism (35, 36, 98)** – the process of rock changing due to contact with hot magma or lava.
- Continental Climate (147)** – average weather of a land mass, little affected by large bodies of water, characterized by extremes in temperature.
- Continental Crust (50, 51)** – thick, low density upper part of the lithosphere that makes up the blocks (land mass) of a continent.
- Continental Drift (51)** – theory, backed by continual evidences, that continents (Earth plates) are now, as well as in the past, shifting positions.
- Continental Glacier (75)** – a massive ice sheet covering a large area such as the Antarctic ice sheet.
- Continental Margin (53)** – the area along the edge of the continents made of the continental shelf, continental slope and continental rise.
- Continental Polar Air Mass (120)** – cP, usually a cold air mass originating in the land polar regions, such as in the northern most regions of Canada.
- Continental Tropical Air Mass (120)** – cT, warm air mass originating over warm land regions.
- Contour Interval (23)** – the difference in elevation between two consecutive contour lines.
- Contour Line (23)** – type of isoline on a topographic (contour) map, represents equal elevation points.
- Contour Map (23, 24)** – a topographic map, used as a model indicating elevations of the Earth's surface with the use of contour lines and symbols.
- Convection (119)** – transfer of energy, due to differences in substances' densities, in gases and liquids.
- Convection Cell (current) (54, 119)** – circulatory motion in which heat energy is transferred from one place to another, due to density differences.
- Convergence (119)** – interfacing of air masses at the Earth's surface, in upper regions of the troposphere, making "air streams" or vertical currents.
- Convergent Plate Boundary (53)** – boundary between two colliding plates.
- Coordinate System (21)** – system or group of defined lines (may be imaginary lines) used for the determination or location of point(s) on a surface (such as graph, Longitude and Latitude).
- Coriolis Effect (116, 120, 160, 165)** – observed path of an object (or fluid) at the surface of the Earth undergoing a predictable horizontal deflection; rightward deflection in the northern hemisphere and leftward in the southern hemisphere.
- Correlation (99)** – match up of rock ages and geologic events.
- Crest (71)** – the top of a wave.
- Crossbedding (73)** – layers or beds of sediment deposited at different angles.
- Cross Section (24)** – view by cutting through an object, usually at right angles to an axis.
- Crust (36, 47, 50)** – layer of granite or basalt rock forming the outer part of the Earth's lithosphere.
- Crustal Plates (48)** – large pieces of the lithosphere that move in relation to each other.
- Crystal (32)** – Earth material having a repeating pattern of characteristic shapes, due to a material's internal atomic structure, such as a cube (halite) and a tetrahedron (silicate).
- Crystalline Structure (32)** – definite atomic pattern within a mineral (see Crystal).
- Crystallization (33, 37)** – formation of solid crystals into a rock, such as igneous rock, when the crystals separate from a magma solution.
- Cumulus Clouds (117, 119)** – dense, white, fluffy, flat-based cloud with a multiple rounded top and a well-defined outline, usually formed by the ascent of thermally unstable air masses.
- Cumuliform Clouds (117)** – having the shape of cumulus clouds; see Cumulus Clouds.
- Cumulonimbus Clouds (117)** – extremely dense, vertically developed cumulus with a relatively hazy outline and a glaciated top extending to great heights, usually producing heavy rains, thunderstorms, or hailstorms.
- Currents (147)** – movement or flow of "rivers" of water in a direction; see the specific type: warm, cold.
- Cycles (11)** – usually an orderly manner in which events in time and space repeat.
- Cyclic Change (10, 11)** – a predictable change that occurs in a repeating pattern.
- Cyclic Energy Transformation (163)** – alternating changes of energy from kinetic to potential and potential to kinetic; as seen in the Earth's changes of energy and orbital speed around the Sun.
- Cyclone (120)** – also called LOW; low pressure air mass with counterclockwise winds in the northern hemisphere, including violent weather, such as tornadoes and hurricanes.



- Daily Motion (159)** – apparent motion in an arc path across the Earth's sky from east to west during each 24 hour period.
- Daily Temperatures (143)** – see Temperature and Insolation.
- Decay, Radioactive (97)** – transformation or break down into a stable "daughter" element.
- Deficit (146)** – local condition when the actual evapotranspiration is not equal to the potential evapotranspiration, due to insufficient precipitation and water soil storage; see Drought.
- Degree Metamorphism (36)** – different metamorphic rocks formed from the same parent rock due to different pressure and temperature environments.
- Dendritic Drainage (78)** – random pattern of streams associated with plains and plateaus
- Density (8, 9, 32, 72)** – formula; mass of a material divided by the material's volume.
- Density Variables (32)** – characteristics such as temperature and pressure that causes changes in density and phase changes.
- Deposition (116)** – the process of water vapor changing directly into ice crystals.

- Deposition (72)** – settling out of solution of sediments and minerals in an erosional system.
- Destructional Forces (74)** – see **Leveling Forces**.
- Dew (116)** – condensation occurring on the Earth's surface.
- Dew Point Temperature (113)** – temperature at which water vapor present in the air saturates air and begins to condense; dew forms.
- Dew Point Temperatures (113, 210)** – *Reference Table*.
- Deviation (9)** – difference between one number in a set and the mean of the set.
- Diastrophism (74)** – process of deformation by which the major features of the Earth's crust, including continents, mountains, ocean beds, folds, and faults, are formed.
- Dimensional Quantities (8)** – time, length, or mass.
- Direct (Vertical) Rays (161)** – rays of solar energy hitting the surface of the Earth at an angle of 90°, also called perpendicular rays.
- Direct Relationship (10)** – when both variables change in the same direction; see **graphing**.
- Displaced Fossils (47)** – example: marine fossils found in layers of sedimentary rock in mountains.
- Displaced Sediments (34, 69)** – rock and mineral particles that are removed from their source and transported by water/wind to another place.
- Displaced Strata (47, 48)** – see **displaced sediments**.
- Distorted Structure (35, 36)** – resulting rock formations caused by Earth forces, such as heat and pressure, which bend, break, and fold rock layers.
- Divergence (120)** – following air mass convergence, ascending or descending, the spreading apart of air currents.
- Divergent Plate Boundary (53)** – boundary between two plates that are moving apart.
- Doppler Shift (170)** – apparent change in wavelength of light caused by relative motion of the source.
- Drainage Basin (141)** – area drained by a river system.
- Drainage Patterns (78)** – dendritic (random drainage over bedrock), trellised (parallel folds and faults), and radial (volcanic cones, young domes).
- Drought (146)** – a prolonged period of deficit weather conditions.
- Drumlin (76)** – glacial hill shaped like the back of a spoon.
- Dry-bulb Thermometer (113, 114)** – see **Psychrometer**.
- Duration of Insolation (142)** – length of time that the Sun's rays are received at a particular location on the Earth's surface; varies with latitude and season; Earth surface temperature is directly proportional to the duration of insolation.
- Dynamic Equilibrium (12, 70)** – a balance between two opposing processes going on at the same rate in a system, such as erosion and deposition and evaporation and condensation; refers to a landscape as well.
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- Earth (164-169)** – third planet from the Sun, having a sidereal period of revolution about the Sun of 365.26 days at a mean distance of approximately 149 million kilometers (92.96 million miles), an axial rotation period of 23 hours 56.07 minutes, an average radius of 6,374 kilometers (3,959 miles).
- Earth Axis (19)** – see **Axis**.
- Earth Dimensions (19)** – includes the Earth's circumference, radius, diameter, volume, and surface area.
- Earth Energy (141)** – primary source is solar radiation which drives the Earth's surface systems.
- Earth's Interior, Inferred Properties of (51, 208)** – *Reference Table*.
- Earth Positions (21)** see **Coordinate System**.
- Earth Shape (19)** – oblate spheroid with greater diameter at the equator than through the poles.
- Earth Spheres (20)** – atmosphere, hydrosphere, lithosphere.
- Earthquake (48)** – sudden trembling or shaking of the ground, usually caused by a shifting of rock layers along a fault or fissure under the Earth's surface.
- Earthquake P-wave and S-wave Travel Time (49, 209)** – *Reference Table*.
- Eccentricity of Ellipse (162)** – formula; degree of the “out of roundness” of the ellipse, as determined by the distance between the two foci divided by the length of the major axis of the ellipse.
- Eclipse (164)** – shadows on Earth caused by the position of the Sun or Moon.
- El Niño (147)** – warming of the ocean surface off the western coast of South America that occurs every 4 to 12 years when upwelling of cold, nutrient-rich water does not occur. It causes plankton and fish to die and affects weather over much of the Pacific Ocean, South, Central, and North America.
- Electromagnetic Energy (141)** – any energy radiated in transverse wave form, such as radio, sound, light, X-rays, etc.
- Electromagnetic Spectrum (141)** – wide range of wavelengths from lower frequencies such as radio waves short wave, AM, FM, TV, and radar to mid frequencies such as infrared rays, visible light, and ultraviolet, to high frequencies such as x-rays and gamma rays.
- Electromagnetic Spectrum (141, 212)** – *Reference Table*.
- Element (31)** substance composed of atoms having an identical number of protons in each nucleus; cannot be reduced to simpler substances by normal chemical means.
- Ellipse (162)** – flattened circular path, having two foci (fixed radii); typical of the orbits of most all celestial objects and the Earth.
- Energy (11)** – ability to do work; forms: kinetic and potential.
- Energy Flow (11)** – energy moving from one place in the environment to another.
- Environment (74, 185)** – the climatic and ecologic surroundings in which we live.
- Environmental Equilibrium, or Balance (185)** – general stable and balanced state of the environment, changeable easily on a small scale.
- Environmental Protection Laws (191)** – government legislation to help preserve the environment and prevent or clean-up pollution and toxic wastes.
- Eon (99)** – longest division of geologic time, containing two or more eras.
- Epicenter (48, 49)** – point on Earth's surface that is directly above the focus of an earthquake.
- Epicycle (165)** – smaller secondary orbit off a main orbit.
- Epoch (99)** – unit of geologic time that is a division of a period.
- Equations and Proportions (199)** – *Reference Table*.

Equator, Earth's (21, 161) – center circumference of Earth, equally dividing Northern and Southern Hemispheres, 0° latitude.

Equilibrium, State of (12) – the tendency to remain unchanged.

Equinox (142, 143, 161) – time at which the Sun's rays are directly perpendicular to the Earth's equator; equal day and night on the Earth; usually March 21st and September 23rd.

Era (99) – longest division of geologic time, made up of one or more periods.

Erosion (35, 69, 99) – altering of the Earth's surface by the removing of rock, soil, and mineral pieces from one location to another by the action of water (liquid or solid) or wind.

Erosional-Depositional System (69-72) – the system involving the opposing processes of erosion and deposition, involving energy relationships and dynamic equilibrium.

Erratic (75) – large boulder left by a glacier.

Error (8, 9) – difference between the actual and observed measurements.

Escarpment (787) – steep slope separating two gently sloping surfaces.

Esker (76) – long, narrow ridge of coarse gravel deposited by a stream flowing in or under a decaying glacial ice sheet.

Evaporation (34, 117, 139) – change of phase from liquid to vapor (gas) occurring at the surface of that liquid.

Evaporite (34) – form of sedimentary rock, caused by the precipitation of minerals from evaporating water, such as limestone, dolostone, gypsum, and salt.

Evapotranspiration (117) – combination of both processes evaporation and transpiration.

Event (10) – the occurrence of a change in the environment.

Extinct (102) – no longer existing or living: an extinct species; no longer burning or active: an extinct volcano.

Extrusion (33, 36, 98) – mass of hardened lava at the Earth's surface, a type of igneous rock formation.

Extrusive Igneous Rock (33) – igneous rock that forms by the hardening of magma (hot liquid rock beneath the Earth's surface) after reaching the surface of the Earth.

Eye of the Storm (124) – the central area of calm in a hurricane.



Fault Strata (47, 78, 98) – crack in the crust of the Earth along which rocks have moved.

Felsic (34) – Light-colored igneous rocks that are high in feldspar and quartz.

Fetch (71) – expanse of open water over which the wind blows.

Field (22) – region of space which contains a measurable quantity at every point.

Field Values (23, 122) – information shown on weather maps, such as temperature and pressure.

Finger Lake (76) – long narrow lake formed when glacial sediment dams up a river valley.

Fireball (167) – also called bolide; meteoric fireball, appearing to be as bright or brighter than the brightest planets.

Flood (140) – overflowing of water onto land that is normally dry.

Focus (earthquake) (48) – point of origin of an earthquake.

Focus (geometric definition) (162) (plural is foci) – fixed point from which a radius of 360° is a circle or sphere; two fixed points (foci) are required to produce an ellipse or oblate spheroid.

Folded Strata (47, 78, 98) – bend in the rock strata produced during the mountain-building process.

Foliation (35) – alignment of mineral flakes or bands in metamorphic rocks.

Fossil (35, 37, 98, 99, 101) – remains or traces of a once-living organism in sedimentary rock.

Fossil fuel (37, 188) – fuels such as coal, oil, and natural gas which formed from organic matter in the ancient past.

Foucault Pendulum (160, 165) – freely swinging pendulum, which when allowed to swing without interference appears to change direction in a predictable manner due to the Earth's rotation.

Fracture (32) – the way a mineral breaks if it does not have cleavage.

Fragmental Sedimentary Rock (35) – rocks formed by the compaction and cementation of sediments.

Freezing (118) – pass from the liquid to the solid state by loss of heat, as in water to ice.

Friction (71) – force found at the contact of two surfaces that offers resistance to motion, often producing heat or another form of energy.

Front (121) – the interface between two different air masses, such as the point of contact between warm and cold air masses.

Frost (116) – deposit of minute ice crystals formed when water vapor condenses at a temperature below freezing.



Galaxy (169) – a huge system of billions of stars.

Geocentric Model (165) – early attempt to explain the motions of celestial objects using the Earth as the stationary center for the orbiting celestial objects.

Geographic Poles (20, 21, 142, 143, 160, 161) – actual axis points on the Earth, north and south, on which the Earth rotates.

Geologic History of NYS (206-207) – *Reference Table*.

Geologic Time Scale (99, 100) – geological periods, a scale of time that serves as a reference for correlating various events in the history of the Earth, divided into three main groups: eras, periods, and epochs, based on the study of rock history.

Geometry of a Sphere, Principle of (19) – as a sphere is rotated, the angle of a fixed point outside of the sphere as compared to the surface of that sphere, is equal to the angle of the sphere's rotation.

Geometry of orbits (162) – mathematics of the properties, measurement, and relationships of points, lines, angles, and surfaces in the relationships of celestial bodies (orbits).

Glacier (71, 75) – huge mass of ice slowly flowing over a land mass, formed from compacted snow in an area where snow accumulation exceeds melting and sublimation.

Glacial Features (75) – see individual features.

Glacial Ice (75) – usually glacial snow that has accumulated, compacted, and recrystallized.

- Glacial Till (75) – unsorted sediment pushed, carried, or dragged by a glacier.
- Glacial Valley (76) – rounded, often a river valley with characteristic U-shape.
- Global Cooling (189) – brought about Earth's Ice Ages.
- Global Positioning System, or GPS (22) – modern navigation system capable of 3-D, precise latitude, longitude, and altitude with use of satellites.
- Global Warming (145, 188) – the theory that the atmosphere of the Earth is becoming warmer caused primarily by increasing amounts of carbon dioxide and other greenhouse gases in the air.
- Globe (19) – body with the shape of a sphere, especially a representation of the Earth in the form of a hollow ball.
- Graded Bedding (72) – layering of sediment in a fashion where heavier and/or larger particles are on the bottom and lighter and/or smaller particles are on top, in decreasing size.
- Gradient (23, 122) – formula; expression of the degree of change of a field quantity from place to place; may also be referred to as an average slope.
- Grams (8) – metric unit of mass equal to one thousandth (10^{-3}) of a kilogram.
- Graphing (10, 11) – types of graphs illustrated.
- Gravitation, Law of (20, 163) – gravitational force is proportional to the square of the distance between the two centers of attracted objects.
- Gravitational Force, or Gravity (20, 163) – attraction between any two objects in the universe.
- Gravity (20, 22, 69, 70, 163) – natural phenomenon of attraction between massive bodies.
- Greenhouse Effect (144, 145) – process which increases the atmospheric temperature of the Earth, due to the transmission of short wave radiation through the atmosphere, absorption and conversion to long wave radiation at the Earth's surface.
- Greenhouse Gases (145, 189) – gases associated with the greenhouse effect including CO_2 , CH_4 , N_2O , CFCs, and other trace elements and compounds.
- Greenwich Mean Time (22) – also Universal Time (UT); international reference time at Greenwich, England; the Prime Meridian with a longitude of 0° (neither East nor West).
- Grid (21) – coordinate or graphing structure.
- Ground Moraine (76) – unsorted glacial sediment covering the ground surface deposited directly by glacial ice.
- Groin (71) – wall built along a coastline to slow down or prevent the transport of sand away from that coastline area.
- Ground Water (139) – water that is found under the Earth's surface as the result of infiltration and storage.
- Gyre (147) – large, circular pattern of surface currents found in the ocean.
- Harmonic Law of Planetary Motion* (162) – by Kepler states that a planet's period is the length of time required for the planet to orbit (revolve) once around the Sun.
- Headland (71) – an area of high land jutting out into the ocean.
- Heat of Fusion (118) – amount of latent heat involved in melting or freezing.
- Heat of Vaporization (118) – amount of latent heat involved in evaporation or condensation.
- Heliocentric Model (165, 166) – a modern attempt to explain the motions of celestial objects using the Sun as the stationary center for the orbiting celestial objects and fixed star positions.
- Herbicide (187, 190) – chemical substance used to destroy or inhibit the growth of plants, especially weeds.
- HIGH (120, 123) – high pressure air mass, clockwise rotation in the northern hemisphere, more dense than a LOW; see Anticyclone.
- High Noon (161) – 12:00 (noon) point in time when the Sun is at its highest altitude (zenith) on the observer's meridian.
- Horizontal Displacement (48) – sideways shift of the Earth's surface along a transform fault or crack in the crust; see Faulting.
- Horizontal Layers (35) – sediments deposited through settling.
- Horizontal Sorting (72) – sorting of sediments in a stream by decreasing velocity, larger particles first laid down, followed by smaller and smaller particles down stream.
- Horn (75) – a pyramid-shaped mountain formed by glaciers; named after Matterhorn in Switzerland.
- Hot Spots (54) – high heat flows on Earth's surface.
- H-R Diagram* (168) – graph developed by Einar Hertzsprung and Henry Russell useful in comparing luminosity and temperature of the stars.
- Hubble, Edwin (170) – American astronomer who discovered (1929) that the velocities of nebulae increase with distance.
- Hubble Space Telescope, or HST (170) – launched in 1990, American satellite-based telescope for deep space study.
- Humidity (113) – dampness, especially of the air.
- Humid Climate (75, 146) – an area where the precipitation is greater than the potential evaporation for the majority of months in a year.
- Hurricane (124) – tropical cyclone with winds in excess of 119 km/hr [75mph].
- Hydration (118) – the chemical reaction of water with other materials.
- Hydrologic Cycle (139) – See Water Cycle
- Hydrosphere (21) – thin layer of water which covers a majority [71%] of the Earth's surface.
- Hypothesis (7) – tentative explanation that accounts for a set of facts and can be tested by further investigation.



- Hachure Marks (24) – short lines used on maps to shade or to indicate slopes and their degree and direction.
- Half-life (101) – time taken for half of a radioactive material to decay to its stable decay product; time for half of the atoms present to disintegrate.
- Hardness (31) – the resistance of a mineral to being scratched.



- Ice Age, the Great (75) – most recent glacial period, which occurred during the Pleistocene epoch.
- Igneous Rock (33, 53) – rock formed by the solidification and crystallization of magma or lava (hot molten rock).
- Igneous Rock Identification (33, 204) – *Reference Table*.

Incident Insolation (144) – point and time of solar radiation hitting the Earth's surface; see Angle of Insolation and Insolation.

Inclination (tilt) of Earth Axis (142) – see Earth's axis.

Incompetent Rocks (77) – poor resistant to weathering and erosion.

Index Contour Line (23, 24) – usually every 5th line on a contour map which is printed darker and interrupted to give elevation.

Index Fossil (99) – fossil that is characteristic of a certain geologic time, sometimes referred to as a guide fossil.

Inertia (163) – the tendency of an object in motion to remain in motion in a straight path unless acted upon by an outside force.

Inferences (7) – interpretations (conclusions) based on observations.

Infiltration (140) – seeping and absorption of water into ground storage.

Infrared Rays (141, 212) – range of invisible radiation wavelengths from about 750 nanometers, just longer than red in the visible spectrum, to 1 millimeter, on the border of the microwave region.

Inner Core (50) – iron/nickel solid inner sphere (zone) of the Earth's interior.

Inorganic pollution (187) – wastes that are not from organic life or the products of organic life.

Insolation (141, 143) – incoming solar radiation; Sun's energy that transmits through Earth's atmosphere and reaches Earth's surface.

Instruments (7) – tools used by the observer to improve on detail or extend the ability to obtain information and measurements.

Intensity of Insolation (142) – rate (amount and duration) of solar radiation reaching the Earth's surface.

Intensity Scale (49) – see Modified Mercalli Scale.

Interface (11) – boundary between materials at which a change in environmental equilibrium occurs involving a loss or gain in energy states.

Interglacial Period (76) – the time between periods of glaciation.

International Dateline (22) – imaginary line through the Pacific Ocean roughly corresponding to 180° longitude, to the east of which, by international agreement, the calendar date is one day earlier than to the west.

Interpretation (7) – see Inferences.

Interrelationships (185) – the mutual dependence between the Earth's living and nonliving systems.

Intrusion (33, 36, 98) – rock mass formed from liquid rock (magma) cooling below the Earth's surface, igneous rock.

Intrusive Igneous Rock (33) – igneous rock formed below the Earth's surface by the hardening of magma (hot liquid rock).

Inverse Relationship (10, 115) – when one variable increases as the other variable decreases; see Graphing.

Island Arc (53) – where two ocean plates converge, a chain of islands form along a trench.

Isobar (23, 114, 122) – type of isoline on a weather map used to indicate equal air pressure points.

Isoline (23, 122) – line representing equal values on a map or model (such as contours, isotherms, isobars) of field characteristics in two dimensions.

Isostasy (74) – condition of equilibrium in the Earth's crust in which masses of greatest density are lower than those of lesser density.

Isotherm (23, 122) – type of isoline on a weather map used to indicate equal temperature points.

Isotope (101) – a variety of an element that has the same atomic number, but a different atomic mass, due to a difference in the number of neutrons present in the nucleus, used for correlation studies when radioactive.

Iso-surface (23) – model representing field characteristics in 3 dimensions.



Jet Stream (123) – wavelike currents with high winds at upper levels which tend to control storm tracks.

Jetty (71) – rock barriers build on both sides of a harbor entrance to prevent the deposition of sediment from clogging the entrance.

Joint (78, 98) – crack in a rock mass or rock where unlike a fault, no vertical or horizontal displacement has occurred.

Jovian Planets (166) – Jupiter-like planets; large gaseous giant planets; includes Jupiter, Uranus, Saturn, and Neptune.



Kame (76) – cone-shaped hill formed at the ice front of a glacier.

Kepler's Harmonic Law (162) – explanation of planetary motion; relates a planet's period to its distance from the Sun.

Kettle Hole (76) – depression in glacial sediment formed when a large block of buried ice melts.

Kettle Lake (76) – kettle hole filled with water.

Kinetic Energy (118, 163) – energy of action, motion or at work.



La Niña (147) – generally, the opposite of El Niño, having cold water origins.

Land Breeze (116) – local wind blowing from the land toward the sea when the air pressure over the land is greater than the air pressure over the sea.

Landfill (186) – method of solid waste disposal in which refuse is buried between layers of dirt so as to fill in or reclaim low-lying ground.

Landscape (73) – topography of the land, including the characteristics of the Earth's surface.

Landscape Regions, NYS (200) – Reference Table.

Landscape Regions, US (73) – Reference Map.

Landslide (71) – downward sliding of a mass of earth and rock both under the ocean or on relatively dry hillsides or mountainsides.

Latent Heat (118) – formula; energy released or absorbed during a phase change, such as a liquid to a gas, but with no temperature change involved.

Latitude (19, 21, 22, 142, 146) – distance north or south of the equator measured in degrees (parallels) from 0° at the equator, to 90° at the geographic poles.

Lava (33) – magma that reaches the Earth's surface.

Length (8) – distance between the ends or sections of an object; usually measured in meters, centimeters, of millimeters.

Leveling Forces (Destructural) (74) – forces of weathering, erosion, transportation, deposition, and subsidence.

Light-year (169) – a unit of measurement equal to the distance light travels in one year; ten trillion kilometers.

Lithosphere (21, 31, 47, 51) – continuous outer solid rock shell of the Earth.

Local Water Budget (146) – system of accounting for an area's water yearly supply.

L-Waves (48) – long period waves (Rayleigh and Love waves) that travel along the Earth's surface.

Longitude (21, 22) – distance east or west of the Prime Meridian measured in degrees from 0° at the Prime Meridian (runs through Greenwich, England – Greenwich Mean Time) to 180° east or west (in the Pacific Ocean – International Date Line).

Longshore Current (71) – current moving sediment parallel to the coastline.

LOW (120, 123) – low pressure air mass, counterclockwise rotation in the northern hemisphere, less dense than a HIGH; see Cyclone.

Luminosity (168) – emitting self-generated light.

Luminosity of Stars (168, 213) – *Reference Table*.

Lunar Eclipse (164) – when the Moon passes into the shadow of the Earth.

Lunar Month (164) – average time between successive new or full moons, 29 days 12 hours 44 minutes.

Luster (32) – the appearance of light reflected from a mineral's surface.



Mafic (34) – dark-colored igneous rocks high in iron and magnesium.

Magma (33, 51) – molten rock material beneath the Earth's surface.

Magnetic Polarity (53) – see Mid-Oceanic Ridge and change due to ocean ridge movement.

Magnetism (22) – force exerted by a magnetic field.

Magnitude Scale (49) – see Richter Scale.

Major Axis (162) – the longest diameter of an ellipse.

Mantle (50) – layer of the Earth between the crust and the core.

Mantle Convection Cells (54) – the movement of heat and matter caused by differences in density within the Earth's mantle.

Map Legend (24) – explanatory table or list of the symbols appearing on a map or chart.

Map Scale (24) – the ratio between the distance on a map and the distance on the Earth's surface.

Marine Climate (147) – long term weather characteristics of an area near water bodies, such as large oceans characterized by small seasonal temperature ranges and abundant precipitation.

Maritime Polar Air Mass (120) – mP – a cool, moist air mass originating over a cold water surface.

Maritime Tropical Air Mass (120) – mT – usually a warm air mass originating over tropical waters, such as the Caribbean region.

Mars (166, 168) – fourth planet from the Sun, having a sidereal period of revolution about the Sun of 687 days at a mean distance of 227.8 million kilometers (141.6 million miles) and a mean diameter of approximately 6,726 kilometers (4,180 miles).

Mass (8) – amount (quantity) of matter which an object contains.

Meander (70) – curving pattern of a river due to erosion and deposition.

Measurement (8) – use of time, length, or mass as a basic dimensional quantity (numerical).

Melting (118) – changing from a solid to a liquid state by application of heat or pressure or both.

Meridians (21) – grid “lines” (imaginary great circles) running between the North Pole and the South Pole; used to measure longitude.

Mesosphere (21) – portion of the atmosphere from about 30 to 80 kilometers (20 to 50 miles) above the Earth's surface, characterized by temperatures that decrease from 10°C to -90°C (50°F to -130°F) with increasing altitude.

Mesozoic Era (99, 100) – third era of geologic time, includes Triassic Period, Jurassic Period, and Cretaceous Period; characterized by the development of flying reptiles, birds, and flowering plants and the appearance and extinction of dinosaurs.

Metamorphic Rock (35) – rocks formed by the effect of heat pressure and/or chemical action on other rocks, a recrystallization of pre-existing rocks.

Metamorphic Rock Identification (36, 205) – *Reference Table*.

Meteor (167) – bright trail or streak that appears in the sky when a meteoroid is heated to incandescence by friction with the Earth's atmosphere.

Meteorite (167) – stony or metallic mass of matter that has fallen to Earth's surface from outer space.

Meteorologist (123) – studies, reports, and forecasts weather conditions, as on television.

Meters (8) – international standard unit of length, approximately equivalent to 39.37 inches.

Metric System (8) – decimal system of units based on the meter as a unit length, the kilogram as a unit mass, and the second as a unit time.

Mid-Ocean Ridge (53) – mountain ridge in mid-ocean, such as the Mid-Atlantic Ridge, which extends for about 64,000 kilometers roughly parallel to continental margins.

Milky Way Galaxy (169) – a spiral assembly of stars; home to the Sun and solar system.

Millibar (114) – unit used to measure air pressure.

Millimeters (8) – unit of length equal to one thousandth (10^{-3}) of a meter

Mineral (31) – inorganic (nonliving) crystalline, solid substance with a definite chemical (atomic) shape and composition.

Model (22, 23) – description or representation of an idea or concept which helps to illustrate actions or information (for example, models can be used to illustrate the Earth's shape and size).

Modified Mercalli Scale (49) – earthquake intensity scale based upon damage.

Moho (50) – shortened form of Mohorovicic discontinuity which is the crust-mantle boundary.

Mohs' Scale (31) – list of ten minerals from softest (#1) to hardest (#10) used to determine relative hardness of other minerals.

Moisture (117) water in any form in the atmosphere and other places.

Moisture Capacity (146) – amount of water that can be held by an air mass, cold air generally hold less water than warm air; amount of moisture that can be held by soil, see Absolute Humidity.

Moisture Deficit (146) – see Drought.

Monomineralic Rock (31, 34) – rock composed of just one mineral type.

Monsoon (115) – wind system, most often with heavy rains that influences large climatic regions and reverses direction seasonally.
 Moon (163) – Earth’s natural satellite.
 Moraines (76) – features made of glacial till.
 Mountain (73, 148) – elevated landscape with distorted rock structure.



National Hurricane Center (124) – in Florida, tracks hurricanes and issues appropriate warnings.
 National Severe Storm Forecast Center (124) – in Kansas City predicts and tracks tornadoes.
 National Weather Service (123, 124) – uses satellites to track weather systems and issue appropriate warnings.
 Natural Pollutants (185) – materials produced by nature having a negative effect on people, plants, animals, or property; i.e. pollen or volcanic ash.
 Neap Tide (164) – tides of the smallest tidal range occurring at the quarter phases of the Moon.
 Nonrenewable Resources (37) – resources that are used much faster and in greater amounts than they can form.
 Noon (161) – point in time when the Sun is directly on observer’s meridian.
 North Pole (19, 22) – 90° north latitude.
 North Star (19, 159) – see Polaris.
 Nuclear fusion (168) – when the high energy of atomic nuclei cause light elements come together to form heavier ones.
 Nuclear Waste (187) – long-term harmful by-products of nuclear reactions.



Oblate Spheroid (19, 20) – slightly flattened sphere; shape of the Earth, flattened at the geographic poles and bulging at the equator.
 Observation (7) – use of senses in measuring and collecting data concerning environment.
 Occluded Front (121) – interface formed when a cold front overtakes a warm front.
 Ocean (70) – entire body of salt water that covers more than 70 percent of the Earth’s surface.
 Ocean Currents (147) – see the specific current.
 Ocean Currents, Surface (202) – *Reference Table*.
 Ocean Trenches (51, 53) – deep, sharp valleys under the ocean associated with colliding plates.
 Oceanic Crust (51) – thinner, more dense part of the Earth’s crust composed of basaltic material.
 Ocean-Floor Spreading (51) – theory supported by past and present evidence that the ocean floor is moving outwards from the mid-ocean ridge.
 Orbit (162) – path of a celestial object, satellite, and/or Earth about a center, usually an ellipse.
 Orbital Velocity (Speed) (162) – the speed of an object at any given time in its orbit; usually changing due to distances from its gravitational center.
 Organic Evolution (103) – theory of change, an explanation of how new species develop by punctuated (rapid) or gradual (slow) changes.
 Organic Sedimentary Rock (35) – rock formed from the remains of plant and/or animal material.
 Organic Sediments (35) – sediments formed from skeletal remains and shells of microscopic marine organisms.

Organic Substance (35) – material containing the element Carbon, usually associated with living or once living things.
 Organic Wastes (187) – produced from either organic life or the products of organic life.
 Orogeny (99, 100) – mountain building processes.
 Orographic Effect (116, 117, 148) – effect that mountains have on weather and climate; blockage of precipitation from the leeward side of mountains.
 Outgassing (97) – removing embedded gas [i.e., water vapor, carbon dioxide, nitrogen] from [a solid], as by heating or reducing the pressure.
 Outer Core (50) – liquid Earth zone between the inner core of the Earth and the mantle, like the inner core composed of iron and nickel.
 Outwash Plain (76) – horizontal layers of sorted glacial material deposited in front of the glacier by the meltwaters of the glacier.
 Oxidation (67) – the chemical reaction of oxygen with other materials.
 Oxide (32) – binary compound of an element or a radical with oxygen (O₂).
 Ozone (190) – a form of oxygen containing three atoms in the molecule (O₃).
 Ozone Depletion (190) – loss of ozone from the Earth’s Stratosphere.



P-waves (48) – see Primary Wave.
 Paleozoic Era (99, 100) – geologic time that includes the Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian periods and is characterized by the appearance of marine invertebrates, primitive fishes, land plants, and primitive reptiles.
 Parallelism of the Axis (142) – the Earth’s axis at any place in its orbit is parallel to the axis in any other place in the Earth’s orbit.
 Parallels (21) – grid lines on a map or globe; another term used to determine latitude.
 Parent Rock (35) – the original rock from which a metamorphic rock forms.
 Particle Size (Transported) to Water Velocity Relationship (70, 140, 204) – *Reference Table*.
 Penumbra (164) – partial shadow cast by the Earth, Moon, or Sun during an eclipse.
 Percent Error (8) – deviation formula, mathematical expression of a calculated error in percent (%).
 Perihelion (161, 162) – point on the Earth’s orbit when it is closest to the Sun; a distance of 147 million kilometers, usually occurring January 1st.
 Period (99) – unit of geological time, longer than an epoch and shorter than an era.
 Period of Revolution (162) – amount of time an object takes to make one complete orbit around its center, in the case of the Earth, 365+ days to orbit the Sun.
 Permeability (140) – rate at which moisture passes through a material.
 Permeability Rate (140) – speed at which water pass through a porous material; see Permeability and Porosity.
 Perpendicular Insolation (161) – vertical rays of the Sun; 90° radiation at Earth’s surface.
 Pesticides (187, 190) – chemical used to kill pests, especially insects.

- Phase Change (118)** – change of a material through states of solid, liquid, and gas.
- Phases (States) of Matter (9, 118)** – solid, liquid, and gas.
- Phases of the Moon (163)** – changes in the amount of the illuminated surface of the Moon as seen from the Earth, cyclic over a 29½ day period.
- Physical Constants (199)** – *Reference Table*.
- Physical Properties (31)** – used for identification of minerals.
- Physical Weathering (67)** – the process that alters the physical characteristics of rocks/minerals, generally leading to breaking into smaller pieces.
- Photosynthesis (97)** – process in green plants and certain other organisms by which carbohydrates are synthesized from carbon dioxide and water using light as an energy source.
- Plain (73)** – low elevation landscape, gentle slopes and relatively stable, often composed of horizontal layers of sedimentary rocks.
- Planets (166-167)** – Mercury, Venus, Earth, Mars, Jupiter, Uranus, Saturn, and Neptune; exception is Pluto.
- Planetary Motions (165, 166)** – the non uniform movement of planets.
- Planetary Period (162, 165)** – the time it takes a planet to make one revolution around the Sun.
- Planetary Wind and Moisture Belts in the Troposphere (212)** – *Reference Table*.
- Planetary Wind Belts (148)** – zones on the Earth where winds generally blow in one direction only, such as the prevailing southwest winds of the U.S.
- Plate Tectonic Theory (51)** – idea that there are six large crustal plates, and many smaller ones, moving on the surface of Earth in a way that can be calculated and predicted.
- Plate Boundaries (53, 54)** – areas adjoining pieces of the Earth's lithosphere.
- Plates (47, 51)** – solid pieces of the Earth's lithosphere.
- Plateau (73)** – high elevation landscape, relatively stable with little or no distortion of the rock layers.
- Pleistocene Epoch (76)** – time beginning two or three million years ago and ending about 10,000 years ago; called the Great Ice Age.
- Pointer Stars (159)** – outer two stars of Big Dipper which align with Polaris, the end star of the Little Dipper.
- Polaris (19, 159)** – North Star, used in navigation since it is almost directly over the north geographic pole of the Earth.
- Pollutants (185-187)** – solids, liquids, gases, biological organisms, forms of energy such as heat, sound and nuclear radiation (see Pollution).
- Pollution (185-187, 191)** – when the concentration of any substance or form of energy reaches a proportion that adversely affects man, his property, or the plant and animal life.
- Pollution of Water (186-187)** – examples: PCBs, oil spills.
- Polymineralic Rock (31)** – rock composed of more than one (several) mineral types.
- Population Density (191)** – areas affected by landscape pollution and the misuse of the landscape due to concentrated population.
- Population Growth in Humans (191)** – exponential increase in Earth's human population.
- Porosity (139)** – percent of open space in a volume of a certain material.
- Potential Energy (118, 144, 163)** – stored energy or energy at rest as the result of its state or position.
- Potential Evapotranspiration (146)** – estimated amount of water loss that can occur due to heat energy available.
- Precambrian Era (99, 100)** – oldest and largest division of geologic time, preceding the Cambrian Period, often subdivided into the Archeozoic and Proterozoic eras, and characterized by the appearance of primitive forms of life.
- Precipitation (rock formation definition) (34)** – type of sedimentation (deposition) involved in the production of evaporites, in which dissolved solids come out of solution.
- Precipitation (weather definition) (117, 146)** – generally from clouds, the falling of water as liquid (rain) or solid (ice, hail, and snow).
- Prediction (12)** – the use of natural evidence to predetermine the scope and direction of a future environmental change.
- Predominant Agent (70)** – main or primary agent (cause affect) of a specific action, such as in weathering and erosion on Earth the main agent is running water.
- Pressure (8)** – combination of gravitational force compared to surface area.
- Pressure Belt (119)** – band of high or low pressure in the atmosphere caused by regions of rising or settling air.
- Pressure Gradient (122)** – degree of difference over a specified distance of high and low pressures, the greater the pressure gradient difference, the greater the wind speeds.
- Pressure Scale (211)** – *Reference Table*.
- Primary Wave, or P-wave (48)** – compressional wave generated by an earthquake which travels through solids, liquids, and gases.
- Prime Meridian (21, 22)** – 0° longitude on the Earth, passing through Greenwich, England.
- Principle of Geometry of a Sphere (19)** – as a sphere is rotated, the angle of a fixed point outside of the sphere as compared to the surface of that sphere, is equal to the angle of the sphere's rotation.
- Principle of Superposition (97)** – idea that the oldest bed in a sequence of horizontal sedimentary rock layers is the one on the bottom.
- Principle of Uniformitarianism (100, 101)** – all geologic phenomena may be explained as the result of existing forces having operated uniformly from the origin of the Earth to the present time.
- Probability of Occurrence (122)** – chance that a specific event will occur, often used in the prediction of weather systems.
- Profile (24)** – vertical section of soil or rock showing the sequence of the various layers.
- Properties of Earth's Atmosphere (212)** – *Reference Tables*.
- Psychrometer (114)** – instrument consisting of a dry bulb and wet bulb thermometer used to determine the dew point temperature and the relative humidity.
- Purge (186)** – in bodies of water, materials churn up from the bottom.



Quiet Medium (72) – still water, ice, or air in which settling occurs, generally in a graded bedding, a process which is more complex than in a moving medium.



Radial Drainage (78) – streams radiate out like the spokes of a wheel from a central high elevation such as on a volcano.

Radiation (119, 144) – object's electromagnetic wave transmission.

Radiational Cooling (119) – decrease in temperature at the Earth's surface caused by energy radiating out into space.

Radiative Balance (145) – average energy levels on the Earth remain constant due to the Earth giving off as much energy as it receives; stable Earth temperature; gaining as much energy as the Earth gives off.

Radioactive Dating (97) – process of determining the age of rock by measuring the half-life of radioactive materials in the rock.

Radioactive Isotope (101) – materials that decay from more unstable forms into more stable forms; see Half-life.

Radioactive Waste (187) – see Nuclear Waste.

Radioactivity (Decay) (97, 101) – secondary source of energy for the Earth; spontaneous and natural nuclear breakdown from unstable to stable atomic forms, energy is released, the process has a constant and predictable rate, not affected by environmental changes.

Random Reflection (144) – reflection of insolation due to aerosols in the atmosphere; dust and water droplets increase the amount of random reflection, causing a decrease in the amount of insolation reaching the Earth's surface; see Scattering.

Rate of Decay (97, 101) see Half-life, Radioactive Dating.

Recharge (146) – replacement of water by infiltration into the soil storage area.

Recrystallization (35) – formation of new crystalline materials by the enlargement of preexisting crystals by the action of thermal metamorphism.

Recycle (37) – extract and reuse (useful substances found in waste)

Red Shift (170) – spectral lines move toward the red end of the spectrum from a celestial object moving away from the Earth; see Doppler Shift.

Reflection (144) – change in electromagnetic wave direction due to the non penetration of a wave into a surface; a smooth surface will reflect a wave at the same angle at which it strikes the surface.

Refraction (50) – change in direction when an electromagnetic wave goes from one material to another material with a different density.

Regional Metamorphism (36) – recrystallization of rocks over a large area caused by extreme pressure associated with mountain building.

Relative Age (Date) (97, 98) – dates in the Earth's history determined with reference to other events helpful in determining relationships in a time line.

Relative Humidity (113) – ratio of the mass of water vapor per unit volume of the air to the mass of water vapor per unit volume of saturated air at the same temperature.

Relative Humidity (114, 210) – *Reference Table*.

Residual Sediment (69) – sediment that remains at the site of weathering.

Resource Conservation (37) – see Conservation of Natural Resources.

Reversal of Magnetic Polarity (53) – reference to changing polarity as observed in rocks because of the Earth's magnetic poles reversing.

Revolution (142, 159, 162) – orbiting of one body around another body.

Richter Scale (49) – earthquake magnitude scale based upon energy released.

Rock (31-33) – relatively hard, naturally formed mineral or petrified matter; stone.

Rock Cycle (36, 37) – model to explain the changes in rocks and the formation of sedimentary and nonsedimentary rocks, igneous and metamorphic rocks.

Rock Cycle in Earth's Crust (36, 204) – *Reference Table*.

Rock Formation (31) – body or mass of rock with similar features and characteristics.

Rock Forming Minerals (31) – minerals, mostly silicates, that form 90% of the Earth's crust.

Rock Properties (37) – characteristics of various rocks.

Rock Resistance (77) – characteristic of rock types to resist the forces of change, including weathering and erosion.

Rotation (142, 159) – spinning of an object about its own axis.

Runoff (139, 140) – water that does not infiltrate the soil storage area and flows over the land surface to lakes, streams, and oceans.



S-wave (49, 50) – see Shear Wave and Secondary Wave.

Satellite (163) – any object which is held by another object's force of gravitation, around which it revolves (orbits); the Moon is the Earth's satellite; a man-made object which orbits the Earth.

Saturation Point (113) – point at which the air is completely filled with water vapor to the air's maximum capacity, after which water will condense.

Scattering (144) – wave movement in different directions due to reflection.

Sea Breeze (116) – local wind blowing from the sea toward the land when the air pressure is higher over the sea than over the land.

Sea-floor Spreading (53) – the process by which ocean plates move apart allowing new ocean crust to form between them.

Seasonal Lag (143) – the maximum surface temperature occurs after the time of maximum insolation and the minimum surface temperature occurs after the time of minimum insolation.

Seasons (142, 143, 161) – divisions of the year caused by climatic changes, angle of insolation, Earth tilt; generally, spring, summer, fall, and winter.

Secondary Wave, or S-wave (48) – transverse earthquake waves which only travel through solids and travel more slowly than P-waves.

Sediment (34, 67, 72) – rock particles that are produced and/or transported by erosion and weathering.

Sediment Laden Flow (72) – movement of an erosional transport agent containing some forms of sediment, such as a glacier, turbidity current.

- Sedimentary Rock (34, 77)** – rock formed from compaction and cementation of sediment.
- Sedimentary Rock Identification (34, 205)** – *Reference Table*.
- Sedimentation (72)** – settling out of solution of sediments, including minerals, in an erosional system; deposition; see **Deposition**.
- Seismic Wave (48)** – wave that radiates from the point of origin of an earthquake, moving in all directions through solid rock.
- Seismograph (48)** – very delicate instrument that detects and records passing earthquake waves.
- Sensory Perception (7)** use of senses of sight, hearing, touch, smell, taste.
- SEQR (191)** – New York State Environmental Quality Review Acts requiring an environmental impact study before approval is given for projects.
- Settling Rate (71, 72)** – time required for a certain sediment to settle out of water or air.
- Sewage (186)** – liquid and solid waste produced through human activities, carried off in sewers or drains.
- Shadow Zone (50)** – a band from 102° to 143° away from an earthquake in which neither *P-waves* nor *S-waves* are recorded on seismographs.
- Shear Wave (Secondary, *S-wave*) (48)** – wave that causes individual rock particles to vibrate at right angles to the direction that the wave is traveling; cannot pass through liquids.
- Sidereal Month (163)** – one complete revolution of the Moon around the Earth – 27 $\frac{1}{3}$ days.
- Silicates (31, 32)** – minerals containing silicon-oxygen tetrahedra.
- Silicon-Oxygen Tetrahedron (32)** – structural model of a silicate mineral.
- Sink (11)** – portion of an energy system with lower energy concentrations, into which energy usually flows.
- Snowfield (75)** – area where snow accumulates and recrystallizes into the ice that feeds glaciers.
- Soil (68)** – top layer of the Earth's surface, consisting of rock and mineral particles mixed with organic matter.
- Soil Association (69)** – unit of soil classification, including the characteristics of the soil, composition, porosity, permeability, structure, and the ability to support life.
- Soil Conservation (69)** – using the soil in ways to preserve and protect it.
- Soil Formation (68)** – production of soil, particles of rocks and minerals, and organic matter.
- Soil Layers (69)** – also horizons; layers of soil produced as a result of the weathering processes and biologic activity; examples: horizontal topsoil, horizontal subsoil.
- Soil Storage (140, 146)** – amount of water held below Earth's surface in the soil.
- Solar Eclipse (165)** – eclipse that occurs when the Moon's umbra reaches the Earth's surface.
- Solar Electromagnetic Spectrum (141, 143)** – full range of wavelengths emitted from the Sun with the maximum intensity occurring in the visible region.
- Solar Energy (141)** – any energy forms radiated from the Sun.
- Solar Radiation (141, 144)** – energy from the Sun.
- Solar System (165, 166)** – orbiting system of the Earth, planets, and moons with the Sun as the center of revolution.
- Solidification (33, 37)** – see **Crystallization**.
- Solstice (142)** – times when the Sun's rays are perpendicular (at zenith) to the 23 $\frac{1}{2}$ ° north latitude (about June 21st), summer solstice and 23 $\frac{1}{2}$ ° south latitude (about December 21st), winter solstice.
- Solution (71)** – dissolved minerals carried in water.
- Solvent (71)** – substance in which another substance is dissolved, forming a solution; substance, usually a liquid, capable of dissolving another substance.
- Solvent, Universal (71)** – water.
- Sorted and Unsorted Particles (139)** – selection of various materials, based on size, the more similar the particle sizes, the greater the sorting, the greater the difference in the particle sizes, the less the sorting.
- Sorting of Sediments (72)** – manner in which materials in suspension settle out of a transport medium in a definite pattern.
- Source (11)** – portion of an energy system with the highest energy concentrations, from which energy usually flows.
- Source Region (120)** – place on the Earth where an air mass forms.
- South Pole (22)** – 90° South latitude.
- Species (103)** – most specific part of the classification system, or two organisms of the same species are able to mate and produce fertile offspring.
- Specific Gravity (32)** – the ratio of the weight of a mineral to the weight of an equal volume of water.
- Specific Heat (118, 119)** – amount of heat necessary to raise the temperature of 1 gram of any substance 1°C, measured in calories; specific heat of water is 1; most other substances have specific heats of less than 1.
- Spectral Lines (169)** – lines corresponding to various wavelengths seen in an elements spectrum.
- Spectroscope (169)** – astronomical instrument used to study the light from celestial objects.
- Spectrum (169)** – see **Electromagnetic Spectrum**.
- Speed of Light (169)** – 300,000 kilometers per second.
- Spring Tides (164)** – tides of maximum tidal range occurring at New and Full Moon phases.
- Station Model (122)** – on a weather map, describes weather conditions at a reporting station.
- Station Model, Weather Maps (122, 211)** – *Reference Table*.
- Stationary Front (122)** – interface of two air masses that do not move.
- Storage of Water (146)** – amount of water stored in the top of the soil, the root zone.
- Storm Track (122)** – path taken by the center of a storm or low pressure system.
- Strata (47)** – layers of rock material, usually sedimentary rock.
- Stratiform Clouds (117)** – see **Stratus Clouds**.
- Stratosphere (21)** – region of the atmosphere above the troposphere and below the mesosphere.
- Stratus Clouds (117)** – low-altitude cloud formation consisting of a horizontal layer of gray clouds.
- Streak (32)** – the color of the powder of a mineral.
- Stream Bed (70)** – interface of the water and bottom of a stream, including the rock particles and bottom materials.

Stream Discharge (141) – measurement of amount of water passing a certain point in a stream in a certain amount of time; rate of flow in volume.

Stream Drainage Pattern (78) – pattern that forms due to the way water drains across the land in a stream or river system.

Stream Velocity (70) – graphs comparing with discharge, slope, and particle size carried.

Striations (75) – scratches in rock caused by glaciers dragging rocks over the surface.

Subduction Zones (52) – form from the collision of plates with the denser ocean plate diving down (subducting) into the mantle.

Sublimation (118) – phase change from a solid to a gas without a liquid phase, as in the sublimation of ice to water vapor without melting to a liquid form.

Subsidence (55) – act of sinking or settling of the Earth's surface.

Summer Solstice (142, 161) – in Northern Hemisphere occurs about June 21, when the Sun is in the zenith at the Tropic of Cancer.

Sun (165, 168) – star, center of solar system.

Sunspot (168) – relatively cool dark spot appearing periodically in groups on the surface of the Sun that are associated with strong magnetic fields.

Sun's Path (159) – see Apparent Motions.

Superposition, Principle of (97) – “youngest” rock layers appear on top of “oldest” rock layers.

Surf (71) – foaming water formed by breaking waves.

Surface Ocean Currents 147, (202) – *Reference Tables*.

Surplus Water (141, 146) – surface water that neither evaporates nor infiltrates, but is runoff.

Suspension (71) – particles transported in all levels of water in a stream held up by the motion of the stream.

Swash (71) – the water that surges forward onto the beach from the breaking waves.

Synodic Month (164) – see Lunar Month.

Synoptic Weather Map (122) – broad “bird's eye view” of the weather.



Technology (185, 186, 191) – application of modern science, especially to industrial or commercial objectives.

Technological Oversights (185) – types; human errors involving the environment.

Temperature (113, 143) – specific degree of hotness or coldness as indicated on or referred to a standard scale; see Celsius.

Terminal Moraine (76) – large ridge of glacial till marking the farthest advance of glacial ice.

Terrestrial (Earth-like) Planets (166) – having rocky cores; includes Mercury, Venus, Earth, and Mars.

Terrestrial Radiation (143, 145) – outgoing Earth radiation.

Tetrahedral Unit (32) – as seen in the bonds between oxygen and silicon; the basic building block of the silicates.

Texture (33) – appearance and feel of a surface; used in rock identification.

Thermal Metamorphism (35) – see contact metamorphism by heat.

Thermosphere (21) – outermost shell of the atmosphere, between the mesosphere and outer space, where temperatures increase steadily with altitude.

Thunderstorm (123) – transient, sometimes violent storm of thunder and lightning, often accompanied by rain and sometimes hail.

Tidal Range (164) – difference between high and low tide water levels.

Tidal Wave (50, 71) – see Tsunami.

Tides (164) – periodic variation in the surface level of the oceans and of bays, gulfs, inlets, and estuaries, caused by gravitational attraction of the Moon and Sun.

Till (75, 76) – unsorted glacial sediment.

Tilting (47) – Earth movement resulting in a change in the position of rock layers.

Time (8) – number, as of years, days, or minutes, representing such an interval separating two points on this continuum; a duration.

Time Marker (98, 99) – a known substance or a known geological event that helps in identifying a surrounding geological event.

Topographic Map (24) – see Contour Map.

Tornado (124) – small, violent storm with a characteristic funnel-shaped cloud.

Toxic Waste Dump (186) – location of disposal of environmentally harmful materials.

Toxins (186) – poisonous substance, especially a protein, that is produced by living cells or organisms and is capable of causing disease when introduced into the body tissues but is often also capable of inducing neutralizing antibodies or antitoxins.

Trade Winds (148) – prevailing tropical winds, blowing northeasterly in the Northern Hemisphere and southeasterly in the Southern Hemisphere.

Transform Plate Boundary (53, 54) – boundary between plates that are grinding past each other.

Transition Zones (36) – boundary between rock types.

Transpiration (117) – process which adds water to the atmosphere by transpiring, especially through the stomata of plant tissue or the pores of the skin.

Transported Sediments (69) – erosional product moved from the source of weathering to a different location.

Transporting Agents (34, 69) – actions that affect erosion and move sediments from one place to another.

Transporting Systems (70) – all agents involved in erosion and movement; e.g. erosion, the transporting agent, energy, and the material moved.

Trellis Drainage (78) – drainage pattern with parallel mainstreams and right-angled tributaries found in regions with parallel folds or faults.

Tropic of Cancer (161) – 23½° North latitude.

Tropic of Capricorn (161) – 23½° South latitude.

Tropopause (20) – boundary between the troposphere and the stratosphere varying in altitude from approximately 8 kilometers at the poles to approximately 18 kilometers at the equator.

Trough (71) – bottom part of a wave.

Tsunami (50, 71) – seismic sea wave commonly referred to as a tidal wave although it is not caused by tides.



U-shaped Valley (75) – round bottomed valleys carved as a result of glaciers.

Ultraviolet Rays (144, 190) – range of invisible radiation wavelengths from about 4 nanometers, on the border of the x-ray region, to about 380 nanometers, just beyond the violet in the visible spectrum.

Umbra (165) – completely dark portion of the shadow cast by the Earth, Moon, or the Sun during an eclipse.

Unconformity (98) – surface of erosion between rock layers of different ages indicating that deposition was not continuous.

Universal Time (22) – UT, see Greenwich Mean Time.

Universe (168-170) – all matter and energy, including Earth, the galaxies and all therein, and the contents of intergalactic space, regarded as a whole.

Uplifting (47, 74) – vertical displacement of the Earth's surface; faulting.



Vapor Pressure (118) – pressure exerted by water within the atmosphere.

Variable (10) – factors involved in change.

Vein (98) – mineral deposits that have filled a rock crack or permeable zone; regularly shaped and lengthy occurrence of an ore; a lode.

Venus (166, 167) – second planet from the Sun, having an average radius of 6,052 kilometers (3,760 miles), a mass 0.815 times that of Earth, and a sidereal period of revolution about the Sun of 224.7 days at a mean distance of approximately 108.1 million kilometers (67.2 million miles).

Vertical Displacement (48) – faulting in which a portion of the Earth's surface is either uplifted or subsides.

Vertical Sorting (72) – graded bedding; layering of sediment so that the largest, densest particles are on the bottom of the layer and the smallest, least dense particles are on the top.

Vesicles (33) – small cavity formed in volcanic rock by entrapment of a gas bubble during solidification.

Violet Shift (170) – on a darkline spectrum for an element, the pattern moves to the left indicating that the light source is moving toward the Earth; see Doppler Shift.

Visible Light (141) – wavelengths of the electromagnetic spectrum perceptible to the eye.

Volcanic Time Markers (98) – layers of ash from a volcano used in dating geological events.

Volcano (50) – opening in the Earth's crust through which molten lava, ash, and gases are ejected.

Volume (8) – amount of space occupied by a three-dimensional object or region of space, expressed in cubic units.

Vortex (124) – the center of a tornadoes funnel-shaped cloud.



Warm Front (121) – the interface, leading edge, of an air mass which has warmer temperatures than the preceding cooler air mass.

Wastes (187) – types of, including organic, inorganic, thermal and radioactive.

Water (9, 70) – hydrogen and oxygen (H₂O); universal solvent.

Water Budget (145) – system of accounting for an area's water yearly supply.

Water Cycle (139) – also, hydrologic cycle; Earth system in which water is continually moving from the atmosphere to the Earth and from the Earth to the atmosphere.

Water Pollution (186) – types.

Water Shed (141) – land from which water drains into a stream.

Water Table (140) – within the ground surface of the Earth, top of the zone of saturation.

Water Vapor (113) – gaseous state of water in air.

Wave (48) – movement in a cyclic pattern, evidenced in energy transfer, such as ocean or seismic waves

Wave Height (71) – vertical distance between the crest and trough of a wave.

Wave Refraction (71) – the bending of a line of waves as it approaches the shore.

Wave Velocity (70) – in water, speed of motion of an ocean wave.

Wavelength (71, 141, 144) – distance between two successive wave crests.

Weather (113) – state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity, and barometric pressure.

Weather Forecasting (122, 123)

Weather Map Information (122, 123)

Weather Map Symbols (122)

Weathering (35, 67, 68) – physical and chemical processes that change the surface of the Earth.

Wegener, Alfred (51, 53) – see Continental Drift.

Weight (8) – unit measure of gravitational force.

Wet-bulb Thermometer (113, 114) – see Psychrometer.

Wind (71, 73, 114, 115, 119, 148) – movement of air caused by Earth systems.

Wind Vane (114) – weather instrument used to determine the direction of the wind.

Winter Solstice (142, 161) – occurs about December 21, when the Sun is over the Tropic of Capricorn.



X-ray (141) – relatively high-energy photon with wavelength in the approximate range from 0.01 to 10 nanometers.



Yearly Temperatures (143) – Earth's annual surface temperature due to insolation.



Zenith (161) – point on the celestial sphere that is directly above the observer.

Zone of Aeration (139, 140) – portion of ground through which water passes until the water reaches the zone of saturation.

Zone of Convergence (120) – region of low pressure.

Zone of Divergence (120) – region of high pressure.

Zone of Saturation (140) – portion of ground with an upper boundary called the water table.