

**A-Z Glossary of Geologic Terms**  
(click on the letter to jump to that area of the glossary)

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

## A

- Ablation** - The loss of snow and ice from a glacier, caused primarily by melting.
- Abrasion** - a form of mechanical weathering that occurs when loose fragments or particles of rocks and minerals that are being transported, as by water or air, collide with each other or scrape the surfaces of stationary rocks
- Absolute dating** - the fixing of geological structure or event in time, as by counting tree rings
- Accretionary wedge** - a mass of sediment and oceanic lithosphere that is transferred from a subducting plate to the less dense, overriding plate with which it converges.
- Accumulation** - the increase in a glacier's volume, caused primarily by snowfall.
- Acid Rain** - rain that contains such acidic compounds as sulfuric acid and nitric acid, which are produced by the combination of atmospheric water with oxides released when hydrocarbons are burned. Acid rain is widely considered responsible for damaging forests, crops, and human-made structures, and for killing aquatic life.
- Aeration zone** - see zone of aeration
- Aftershock** - a ground tremor caused by the repositioning of rocks after an earthquake. Aftershocks may continue to occur for as long as two years after the initial earthquake. The intensity of an earth quake's aftershocks decreases over time.
- Aggradation**- the process by which a stream's gradient steepens due to increased deposition of sediment.
- Alloy** – a metal that is manufactured by combining two or more molten metals. An alloy is always harder than its component metals. Bronze is an alloy of copper and tin.
- Alluvial fan** - a triangular deposit of sediment left by a stream that has lost velocity upon entering a broad, relatively flat valley.
- Alluvium**- a deposit of sediment left by a stream on the stream's channel or flood plain
- Alpine glacier**- a mountain glacier that is confined by highlands
- Andesite**- the dark, aphanitic, extrusive rock that has a silica content of about 60% and is the second most abundant volcanic rock. Andesites are found in large quantities in the Andes Mountains.

<b><u>Andesite line-</u></b>	the geographic boundary between the basalts and gabbros of the Pacific Ocean basin and the Andesites at the subductive margins of the surrounding continents.
<b><u>Angle of repose-</u></b>	the maximum angle at which a pile of unconsolidated material can remain stable.
<b><u>Anthracite-</u></b>	a hard, jet black coal that develops from lignite and bituminous coal through metamorphism, has a carbon content of 92% to 98% and contains little or no gas. Anthracite burns with an extremely hot, blue flame and very little smoke, but it is difficult to ignite and both difficult and dangerous to mine.
<b><u>Anticline-</u></b>	a convex fold in rock, the central part of which contains the oldest section of rock. See also syncline.
<b><u>Aphanitic-</u></b>	of or being an igneous rock containing grains that are so small as to be barely visible to the naked eye.
<b><u>Aquiclude-</u></b>	an impermeable body of rock that may absorb water slowly but does not transmit it.
<b><u>Aquifer-</u></b>	a permeable body of rock or regolith that both stores and transports groundwater.
<b><u>Aquitard-</u></b>	a layer of rock having low permeability that stores groundwater but delays its flow.
<b><u>Arête-</u></b>	a sharp ridge of erosion-resistant rock formed between adjacent cirque glaciers.
<b><u>Aridity index-</u></b>	the ratio of a region's potential annual evaporation, as determined by its receipt of solar radiation, to its average annual precipitation.
<b><u>Arroyo-</u></b>	a small, deep, usually dry channel eroded by a short-lived or intermittent desert stream.
<b><u>Artesian-</u></b>	of, being, or concerning an aquifer in which water rises to the surface due to pressure from overlying water.
<b><u>Asthenosphere-</u></b>	a layer of soft but solid, mobile rock comprising the lower part of the upper mantle from about 100 to 350 kilometers beneath the Earth's surface. See also lithosphere.
<b><u>Atoll-</u></b>	a circular reef that encloses a relatively shallow lagoon and extends from a very great depth to the sea surface. An atoll forms when an oceanic island ringed by a barrier reef sinks below sea level.
<b><u>Atom-</u></b>	the smallest particle that retains all the chemical properties of a given element

**Atomic mass-**

1. The sum of protons and neutrons in an atom's nucleus
2. The combined mass of all the particles in a given atom

**Atomic number-** the number of protons in the nucleus of a given atom. Elements are distinguished from each other by their atomic numbers

**Aureole-** a section of rock that surrounds an intrusion and shows the effects of contact metamorphism

## **B**

**Backarc basin-** a depression landward of a volcanic arc in a subduction zone, which is lined with trapped sediment from the volcanic arc and the plate interior. See also forearc basin.

**Backarc spreading-** the process by which the overriding plate in a subduction zone becomes stretched to the point of rifting, so that magma can then rise into the gap created by the rift. Backarc spreading typically occurs when the subducting plate sinks more rapidly than the overriding plate moves forward.

**Backshore-** the portion of a beach that extends from the high tide line inland to the sea cliff or vegetation line. Swash reaches the backshore only during major streams.

**Backswamp-** the section of a flood plain where deposits of fine silts and clays settle after a flood. Backswamps usually lie behind a stream's natural levees.

**Backwash-** water that returns into an ocean or large lake after hitting the shore as swash.

**Banded iron formation-** a rock that is made up of alternating light silica-rich layers and dark-colored layers of iron-rich minerals, which were deposited in marine basins on every continent about 2 billion years ago.

**Barchans dune-** a crescent-shaped dune that forms around a small patch of vegetation, lies perpendicular to the prevailing wind direction, and has a gently, convex windward slope and a steep, concave leeward slope. Barchan dunes typically form in arid, inland deserts with stable wind direction and relatively little sand.

**Barrier island-** a ridge of sand that runs parallel to the main coast but is separated from it by a bay or lagoon. Barrier islands range from 10 to 100 kilometers in length and from 2 to 5 kilometers in width. A barrier island maybe as high as 6 meters above sea level.

**Barrier reef-** a long, narrow reef that runs parallel to the main coast but is separated from it by a wide lagoon.

<b><u>Basal sliding-</u></b>	the process by which a glacier undergoes thawing at its base, producing a film of water along which the glacier then flows. Basal sliding primarily affects glaciers in warm climates or mid-latitude mountain ranges.
<b><u>Basalt-</u></b>	the dark, dense, aphanitic, extrusive rock that has a silica content of 40% to 50% and makes up most of the ocean floor. Basalt is the most abundant volcanic rock in the earth's crust.
<b><u>Basaltic-</u></b>	of, containing, or composed of basalt.
<b><u>Base level-</u></b>	the lowest level to which a stream can erode the channel through which it flows, generally equal to the prevailing global sea level.
<b><u>Basin-</u></b>	a round or oval depression in the earth's surface, containing the youngest section of rock in its lowest, central part.
<b><u>Batholith-</u></b>	a massive discordant pluton with a surface area greater than 100 square kilometers, typically having a depth of about 30 kilometers. Batholiths are generally found in elongated mountain – ranges after the country rock above them has eroded.
<b><u>Bay-</u></b>	a recess in a shoreline, or an inlet between two headlands.
<b><u>Baymouth bar-</u></b>	a narrow ridge that stretches completely across the mouth of a bay (also called bay bar and bay barrier)
<b><u>Beach-</u></b>	the part of a coast that is washed by waves or tides, which cover it with sediments of various sizes and composition, such as sand or pebbles.
<b><u>Beach drift-</u></b>	1. The process by which swash and backwash move sediments along a beach face. 2. The sediments so moved. Beach drift typically consists of sand, gravel, shell fragments, and pebbles. See also long shore drift.
<b><u>Beach face-</u></b>	the portion of a foreshore that lies nearest to the sea – and regularly receives the swash of breaking waves. The beach face is the steepest part of the foreshore.
<b><u>Bed-</u></b>	a layer of sediment or sedimentary rock that can be distinguished from the surrounding layers by such features as chemical composition and grain size.
<b><u>Bed load-</u></b>	a body of coarse particles that move along the bottom of a stream.
<b><u>Bedding-</u></b>	the division of sediment or sedimentary rock into parallel layers (beds) that can be distinguished from each other by such features as chemical composition and grain size.
<b><u>Bedrock-</u></b>	the solid mass of rock that makes up the earth's crust.
<b><u>Benioff Zone-</u></b>	the solid mass of rock that makes up the earth's crust

<b><u>Benioff zone-</u></b>	a region where the subduction of oceanic plates causes earthquakes, the foci of which are deeper the farther inland they are.
<b><u>Berm-</u></b>	a low, narrow layer or mound of sediment deposited on backshore by storm waves.
<b><u>Biomass fuel-</u></b>	a renewable fuel derived from a living organism or the byproduct of a living organism. Biomass fuels include, wood, dung, methane gas, and grain alcohol.
<b><u>Bitumen-</u></b>	any of a group of solid and semi solid hydrocarbons that can be converted into liquid form by heating. Bitumen's can be refined to produce such commercial products as gasoline, fuel oil, and asphalt.
<b><u>Bituminous coal-</u></b>	a shiny black coal that develops from deeply buried lignite through heat and pressure, and that has a carbon content of 80% to 93%, which makes it a more efficient heating fuel than lignite.
<b><u>Blind valley-</u></b>	a valley formed by and containing sinkholes and disappearing streams, and therefore dry except during periods of such heavy rainfalls that the sinkholes cannot immediately drain the entire accumulations of water.
<b><u>Body wave-</u></b>	a type of seismic wave that transmits energy from an earthquakes focus through the earth's interior in all directions. See also surface wave.
<b><u>Bond-</u></b>	to combine, by means of chemical reaction, with another atom to form a compound. When an atom bonds with another, it either loses, gains, or shares electrons with the other atom.
<b><u>Bornhardt-</u></b>	a large, smooth, round, or dome shaped inselberg.
<b><u>Bowens reaction series-</u></b>	the sequence of igneous rocks formed from a mafic magma, assuming mineral crystals that have already formed continue to react with the liquid magma and so evolve into new minerals, thereby creating the next rock.
<b><u>Braided stream-</u></b>	a network of converging and diverging streams separated from each other by a narrow strips of sand and gravel.
<b><u>Breakwater-</u></b>	a wall built seaward off a coast to intercept incoming waves and to protect a harbor or shore. Bread water are tropically built parallel to the coast.
<b><u>Breccia-</u></b>	a clastic rock composed or particles more than 2 millimeters in diameter and marked by the angularity of its component grains and rock fragments.
<b><u>Breeder reactor-</u></b>	A nuclear reactor that manufactures more fission able isotopes than it consumes. Breeder reactors use the widely available, nonfissionable uranium isotope U-238, together with small amounts of fissionable U-235, to produce a fissionable isotope of plutonium, Pu-239

**Brittle failure-**

Rupture of rock, a type of permanent strain caused by relatively low stress.

**Burial metamorphism-**

A form of regional metamorphism that acts on rocks covered by 5 to 10 km of rock or sediment, caused by heat from the Earth's interior and lithostatic pressure.

## C

**Caldera-**

A vast depression at the top of a volcanic cone, formed when an eruption substantially empties the reservoir of magma beneath the cone's summit. Eventually the summit collapses inward, creating a caldera. A caldera may be more than 15 km in diameter and more than 1000 m deep.

**Caliche-**

A white soil horizon consisting of calcium carbonate, typical of arid and semi-arid areas. Brief heavy rains dissolve calcium carbonate in the upper layers of soil and transport it downward; the rainwater then evaporates rapidly, leaving the calcium carbonate to form a new, solid layer of soil.

**Capacity-**

The ability of a given stream to carry sediment, measured as the maximum quantity it can transport past a given point on the channel bank in a given amount of time. See also competence.

**Capillary fringe-**

The lowest part of the zone of aeration, marked by the rising of water from the water table due to the attraction of the water molecules to mineral surfaces and other molecules, and to pressure from the zone of saturation below.

**Carbon 14-dating-**

A form of radiometric dating that relies on the 5730-year half-life of radioactive carbon-14, which decays into nitrogen-14, to determine the age of rocks in which carbon-14 is present. Carbon-14 dating is used for rocks from 100 to 100,000 years old.

**Catastrophism-**

The hypothesis that a series of immense, brief, worldwide upheavals changed the Earth's crust greatly and can account for the development of mountains, valleys, and other features of the Earth. See also uniformitarianism.

**Carbonate-**

One of several minerals containing one central carbon atom with strong covalent bonds to three oxygen atoms and typically having ionic bonds to one or more positive ions.

**Cave-**

A naturally formed opening beneath the surface of the Earth, generally formed by dissolution of carbonate bedrock. Caves may also form by erosion of coastal bedrock, partial melting of glaciers, or solidification of lava into hollow tubes.

**Cementation-**

The diagenetic process by which sediment grains are bound together by precipitated minerals originally dissolved during the chemical weathering of preexisting rocks.

<b><u>Cenozoic Era-</u></b>	The latest era of the Phanerozoic Eon, following the Mesozoic Era and continuing to the present time, and marked by the presence of a wide variety of mammals, including the first hominids.
<b><u>Chemical Sediment-</u></b>	Sediment that is composed of previously dissolved minerals that have either precipitated from evaporated water or been extracted from water by living organisms and deposited when organisms died or discarded their shells.
<b><u>Chemical Weathering-</u></b>	The process by which chemical reactions alter the chemical composition of rocks and minerals that are unstable at the Earth's surface and convert them into more stable substances; weathering that changes the chemical makeup of a rock or mineral. See also mechanical weathering.
<b><u>Chert-</u></b>	A member of a group of sedimentary rocks that consist primarily of microscopic silica crystals. Chert may be either organic or inorganic, but the most common forms are inorganic.
<b><u>Cinder cone-</u></b>	A pyroclastic cone composed primarily of cinders.
<b><u>Cinders-</u></b>	Glassy, porous, pyroclastic rock fragments.
<b><u>Cirque-</u></b>	A deep, semi circular basin eroded out of a mountain by an alpine glacier.
<b><u>Cirque glacier-</u></b>	A small alpine glacier that forms inside a cirque, typically near the head of a valley.
<b><u>Clastic-</u></b>	Being or pertaining to a sedimentary rock composed primarily from fragments of preexisting rocks or fossils.
<b><u>Clay-</u></b>	A mineral particle of any composition that is less than 1/256 of a millimeter in diameter. Not to be confused with clay minerals.
<b><u>Clay mineral-</u></b>	One of a group of hydrous silicate minerals, such as kaolinite and smectite, the extremely small particle size of which imparts the ability to absorb water. Clay minerals are the stable end products of the chemical weathering of feldspars.
<b><u>Cleavage-</u></b>	The tendency of certain minerals to break along distinct planes in their crystal structures where the bonds are weakest. Cleavage is tested by striking or hammering a mineral, and is classified by the number of surfaces it produces and the angles between adjacent surfaces.
<b><u>Coal-</u></b>	A member of a group of easily combustible, organic sedimentary rocks composed mostly of plant remains containing a high proportion of carbon.
<b><u>Coast-</u></b>	The area of dry land that borders on a body of water.
<b><u>Cockpit karst-</u></b>	A karst environment marked by numerous closely spaced, irregular depressions and steep, conical hills.

<b><u>Col-</u></b>	A high mountain pass that forms when part of an arête erodes.
<b><u>Compaction-</u></b>	The diagenetic process by which the volume or thickness of sediment is reduced due to pressure from overlying layers of sediment.
<b><u>Composite cone-</u></b>	See stratovolcano
<b><u>Competence-</u></b>	The ability of a given stream to carry sediment, measured as the diameter of the largest particles that the stream can transport. See also capacity.
<b><u>Compound-</u></b>	An electrically neutral substance that consists of two or more elements combined in specific, constant proportions. A compound typically has physical characteristics different from those of its constituent elements.
<b><u>Compression-</u></b>	Stress that reduces the volume or length of a rock, as that produced by the convergence of plate margins.
<b><u>Concordant-</u></b>	Of or being a pluton that lies parallel to the surrounding layers of rock. See also discordant
<b><u>Cone of depression-</u></b>	An area in a water table along which water has descended into a well to replace water drawn out, leaving a gap shaped like an inverted cone.
<b><u>Confining Pressure-</u></b>	See lithostatic pressure.
<b><u>Conglomerate-</u></b>	A clastic rock composed of particles more than 2 millimeters in diameter and marked by the roundness of its component grains and rock fragments.
<b><u>Contact Metamorphism-</u></b>	Metamorphism that is caused by heat from a magmatic intrusion.
<b><u>Continental collision-</u></b>	The convergence of two continental plates, resulting in the formation of mountain ranges.
<b><u>Continental drift-</u></b>	The hypothesis, proposed by Alfred Wegener, that today's continents broke off from a single supercontinent called Pangaea and then plowed through the ocean floors in their present positions. This explanation of the shapes and location of Earth's current continents evolved into the theory of plate tectonics.
<b><u>Continental ice sheet-</u></b>	An unconfined glacier that covers much or all of a continent.
<b><u>Convection current-</u></b>	The cycle of movement in the asthenosphere that causes the plates of the lithosphere to move or the cycle of movement in the atmosphere that causes the circulation of air. Heated material in the asthenosphere becomes less dense and rises toward the solid lithosphere, through which it cannot rise further and therefore begins to move horizontally, dragging the lithosphere along with it and pushing forward the cooler, denser material in its path. The cooler material eventually sinks down lower into the mantle, becoming heated there and rising up again, continuing the cycle. See also plate tectonics.



<b><u>Convergence-</u></b>	The coming together of two lithospheric plates. Convergence causes subduction when one or both plates is oceanic, and mountain formation when both plates are continental. See also divergence.
<b><u>Core-</u></b>	The innermost layer of the Earth, consisting primarily of pure metals such as iron and nickel. The core is the densest layer of Earth, and is divided into the outer core, which is believed to be liquid, and the inner core, which is believed to be solid. See also crust and mantle.
<b><u>Correlation-</u></b>	The process of determining that two or more geographically distant rocks or rock strata originated in the same time period.
<b><u>Country rock-</u></b>	1. The preexisting rock into which magma intrudes. 2. The preexisting rock that surrounds a pluton.
<b><u>Covalent bond-</u></b>	The combination of two or more atoms by sharing electrons so as to achieve chemical stability under the octet rule. Atoms that form covalent bonds generally have the outer energy levels containing three, four, or five electrons. Covalent bonds are generally stronger than other bonds.
<b><u>Crater-</u></b>	See volcanic crater.
<b><u>Creep-</u></b>	The slowest form of mass movement, measured in millimeters or centimeters per year and occurring on virtually all slopes.
<b><u>Cross bed-</u></b>	A bed made up of particles dropped from a moving current, as a result of wind or water, and marked by a downward slope that indicates the direction of the current that deposited them.
<b><u>Crust-</u></b>	The outermost layer of the Earth, consisting of relatively low density rocks. See also core and mantle.
<b><u>Crystal-</u></b>	A mineral in which the systematic internal arrangement of atoms is outwardly reflected as a latticework or repeated three-dimensional units that form a geometric solid with a surface consisting of symmetrical planes.
<b><u>Crystal Structure-</u></b>	1. The geometric pattern created by the systematic internal arrangement of atoms in a mineral. 2. The systematic internal arrangement of atoms in a mineral. See also crystal.
<b><u>Crystalline-</u></b>	Marked by the systematic internal arrangement of atoms.
<b><u>Current-</u></b>	1. A broad flow of ocean water that maintains a stable direction and differs from the surrounding water in such features as temperature and salinity. 2. The water in such a flow.

# D

<b><u>Daughter isotope-</u></b>	an isotope that forms from the radioactive decay of a parent isotope. A daughter isotope may or may not be of the same element as its parent. If the daughter isotope is radioactive, it will eventually become the parent isotope of a new daughter isotope. The last daughter isotope to form from this process will be stable and nonradioactive.
<b><u>Debris avalanche-</u></b>	the sudden, extremely rapid mass movement downward of entire layers of regolith along very steep slopes. Debris avalanches are generally caused by heavy rains.
<b><u>Debris flow-</u></b>	1. The rapid, downward mass movement of particles coarser than sand, often including boulders one meter or more in diameter, at a rate ranging from 2 to 40 kilometers per hour. Debris flows occur along fairly steep slopes. 2. The material that descends in such a flow.
<b><u>Deflation-</u></b>	the process by which wind erodes bedrock by picking up and transporting loose rock particles
<b><u>Deformation-</u></b>	any of the processes by which a rock changes its shape, form, or volume.
<b><u>Degradation-</u></b>	the process by which a stream's gradient becomes less steep, due to the erosion of sediment from the stream bed. Such erosion generally follows a sharp reduction in the amount of sediment entering the stream.
<b><u>Delta-</u></b>	an alluvial fan having its apex at the mouth of a stream.
<b><u>Dendrochronology-</u></b>	a method of absolute dating that uses the number of tree rings found in a cross section of a tree trunk or branch to determine the age of the tree.
<b><u>Desert-</u></b>	a region with an average annual rainfall of 10 inches or less of sparse vegetation, typically having thin, dry, and crumbly soil. A desert has an aridity index greater than 4.0
<b><u>Desert pavement-</u></b>	a closely packed layer of rock fragments concentrated in a layer along the Earth's surface by the deflation of finer particles.
<b><u>Desert varnish-</u></b>	a thin, shiny red-brown or black layer, principally composed of iron manganese oxides, that coats the surfaces of many exposed desert rocks.
<b><u>Desertification-</u></b>	the process through which a desert takes over a formerly non desert are. When a region begins to undergo desertification, the new conditions typically include a significantly lowered water table, a reduced supply of surface water, increased salinity in natural waters and soils, progressive destruction of native vegetation of native vegetation, and an accelerated rate of erosion.

<b><u>Detrital sediment-</u></b>	sediment that is composed of transported solid fragments of preexisting igneous, sedimentary, or metamorphic rocks.
<b><u>Diagenesis-</u></b>	the set of processes that cause physical and chemical changes in sediment. Diagenesis may culminate in lithification.
<b><u>Dike-</u></b>	a discordant pluton that substantially wider than it is thick. Dikes are often steeply inclined or nearly vertical. See also sill.
<b><u>Dilatancy-</u></b>	the expansion of a rock's volume caused by stress and deformation.
<b><u>Diorite-</u></b>	any of a group of dark, phaneritic, intrusive rocks that are the plutonic equivalents of andesite.
<b><u>Dip-</u></b>	the angle formed by the inclined plane of a geological structure and the horizontal plane of the Earth's surface.
<b><u>Dip slip fault-</u></b>	a fault in which two sections of rock have moved apart vertically, parallel to the dip of the fault plane.
<b><u>Disappearing stream-</u></b>	a surface stream that drains rapidly and completely into a sinkhole.
<b><u>Discordant-</u></b>	of or being a pluton that lies perpendicular or oblique to the surrounding layers of rock. See also concordant.
<b><u>Dissolution-</u></b>	a form of chemical weathering in which water molecules, sometimes in combination with acid or another compound in the environment, attract and remove oppositely charged ions or ion groups from a mineral or rock.
<b><u>Dissolved load-</u></b>	a body of sediment carried by a stream in the form of ions that have dissolved in the water.
<b><u>Distributary-</u></b>	one of a network of small streams carrying water and sediment from a trunk stream into an ocean.
<b><u>Divergence-</u></b>	the process by which two lithospheric plates separated by rifting move farther apart, with soft mantle rock rising between them and forming new oceanic lithosphere. See also convergence.
<b><u>Dolostone-</u></b>	a sedimentary rock composed primarily of dolomite, a mineral made up of calcium, magnesium, carbon, and oxygen. Dolostone is thought to form when magnesium ions replace some of the calcium ions in limestone, to which dolostone is similar in both appearance and chemical structure.
<b><u>Dome-</u></b>	a round or oval bulge on the Earth's surface, containing the oldest section of rock in its raised, central part. See also basin
<b><u>Drainage basin-</u></b>	the area from which water flows into a stream. Also called a watershed.

<b><u>Drainage divide-</u></b>	an area of raised, dry land separating two adjacent drainage basins.
<b><u>Drainage pattern-</u></b>	the arrangement in which a stream erodes the channels of its network of tributaries.
<b><u>Drumlin-</u></b>	a long, spoon-shaped hill that develops when pressure from and overriding glacier reshapes a moraine. Drumlins range in height from 5 to 50 meters and in length from 400 to 2000 meters. They slope down in the direction of the ice flow.
<b><u>Ductile deformation-</u></b>	see plastic deformation
<b><u>Dune-</u></b>	a usually asymmetrical mound or ridge of sand that has been transported and deposited by wind. Dunes form in both arid and humid climates.

## **E**

<b><u>Earthflow-</u></b>	1. The flow of a dry, highly viscous mass of clay-like or silty regolith, typically moving at a rate of one or two meters per hour. 2. The material that descends in such a flow.
<b><u>Earthquake-</u></b>	a movement within the earth's crust or mantle, caused by the sudden rupture or repositioning of underground rocks as they release stress.
<b><u>Ebb tide-</u></b>	a tide that lowers the water surface of an ocean and moves the shoreline farther seaward.
<b><u>Echo sounding sonar-</u></b>	the mapping of ocean topography based on the time required for sound waves to reach the sea floor and return to the research ship that emits them.
<b><u>Elastic deformation-</u></b>	a temporary stress-induced change in the shape or volume of a rock, after which the rock returns to the original shape or volume.
<b><u>Elastic limit-</u></b>	see yield point
<b><u>Electron-</u></b>	a negatively charged particle that orbits rapidly around the nucleus of an atom. See also proton.
<b><u>Element-</u></b>	a form of matter that cannot be broken down into a chemically simpler form by heating, cooling, or chemical reactions. There are 106 known elements, 92 of them natural and 14 synthetic. See also atom, or atomic number.
<b><u>Energy level-</u></b>	the path of a five electron's orbit around a nucleus, marked by a constant distance from the nucleus.
<b><u>Epicenter-</u></b>	the point on the Earth's surface that is located directly above the focus of an earthquake.

<b><u>Equilibrium line-</u></b>	the point in a glacier where overall gain in volume equals overall loss, so that the net volume remains stable. The equilibrium line marks the border between the zone of accumulation and the zone of ablation.
<b><u>Erosion-</u></b>	the process by which particles of rock and soil are loosened, as by weathering, and then transported elsewhere, as by wind, water, ice, or gravity.
<b><u>Esker-</u></b>	a ridge of sediment that forms under a glacier's zone of ablation, made up of sand and gravel deposited by meltwater, An esker may be less than 100 meters or more than 500 kilometers long, and may be anywhere from 3 to 300 meters high.
<b><u>Evaporite-</u></b>	an inorganic chemical sediment that precipitates when the salty water in which it had dissolved evaporates.
<b><u>Extrusive rock-</u></b>	an igneous rock formed from lava that has flowed out onto the Earth's surface, characterized by rapid solidification and grains that are so small as to be barely visible to the naked eye.

## **F**

<b><u>Fall-</u></b>	the fastest form of mass movement, occurring when rock or sediment breaks off from a steep or vertical slope and descends at a rate of 9.8 meters per second. A fall can be extremely dangerous.
<b><u>Fault-</u></b>	a fracture dividing a rock into two sections that have visibly moved relative to each other.
<b><u>Fault block-</u></b>	a section of rock separated from other rock by one or more faults.
<b><u>Fault block mountain-</u></b>	a mountain containing tall horsts interspersed with much lower grabens and bound on at least one side by a high angle normal fault.
<b><u>Fault metamorphism-</u></b>	the metamorphism that acts on rocks grinding past one another along a fault and is caused by directed pressure and frictional heat.
<b><u>Feldspar-</u></b>	any of a group of light-colored, silicate, rock-forming minerals most often found in plutonic igneous rocks and metamorphic rocks and often containing potassium, sodium, or calcium. Feldspar constitutes 60% of the Earth's crust.
<b><u>Felsic-</u></b>	of or being a light-colored, igneous rock with a silica content of 70% or higher. Felsic rocks are generally rich in potassium feldspars, aluminum, and quartz
<b><u>Firn-</u></b>	firmly packed snow that has survived a summer melting sea son. Firm has a density of about 0.4 grams per cubic centimeter. Ultimately, firn turns into glacial ice.

<b><u>Fission-</u></b>	the division of the nucleus of a radioactive atom, which causes the release of several subatomic particles. The fission of a given element always occurs at a constant rate. (see also nuclear fission)
<b><u>Fission track dating-</u></b>	a form of absolute dating that relies on the constant rate of fission to determine the age of a crystal, by counting the fission tracks left in a given area of the crystal.
<b><u>Fission tracks-</u></b>	marks left in the latticework of a mineral crystal by subatomic particles released during the fission of a radioactive atom trapped inside the crystal.
<b><u>Fjord-</u></b>	a deep-steep walled, U-shaped valley formed by erosion by a glacier and submerged with seawater.
<b><u>Flood plain-</u></b>	the flat land that surrounds a stream and becomes submerged when the stream overflows its banks.
<b><u>Flood tide-</u></b>	a tide that raises the water surface of an ocean and moves the shoreline farther inland.
<b><u>Fluorescence-</u></b>	emission of visible light by a substance, such as a mineral, that is currently exposed to ultraviolet light and absorbs radiation from it. The light appears in the form of glowing, distinctive colors. The emission ends when the exposure to ultraviolet light ends.
<b><u>Focus (plural foci)-</u></b>	the precise point within the Earth's crust or mantle where rocks begin to rupture or move in an earthquake.
<b><u>Fold-</u></b>	a bend that develops in an initially horizontal layer of rock. Usually caused by plastic deformation. Folds occur most frequently in sedimentary rocks.
<b><u>Fold and thrust mountain-</u></b>	a mountain consisting of folds, which developed from extremely thick layers of sediment, and thrust fault blocks, and containing both igneous and metamorphic rocks. Fold and thrust mountains may be several thousands kilometers high and few hundred kilometers wide. The Alps, the Appalachians, the Carpathians, the Himalayas, and the Urals are all fold and thrust mountains.
<b><u>Foliation-</u></b>	the arrangement of a set of minerals in parallel, sheet like layers that lie perpendicular to the flattened plane of a rock. Occurs in metamorphic rocks on which directed pressure has been exerted.
<b><u>Footwall-</u></b>	the section of rock that lies below the fault plane in a dip slip fault. See also hanging wall.
<b><u>Forearc basin-</u></b>	a depression in the sea floor located between an accretionary wedge and volcanic arc in a subduction zone, and lined with trapped sediment. See also backarc basin.

<b><u>Foreshock-</u></b>	a minor, barely detectable earthquake, generally preceding a full scale earthquake with approximately the same focus. Major quakes may follow a cluster of foreshocks by as little as a few seconds or as much as several weeks.
<b><u>Foreshore-</u></b>	the portion of a beach that lies nearest to the sea, extending from the low tide line to the high tide line.
<b><u>Fossil-</u></b>	a remnant, an imprint, or a trace of an ancient organism, preserved in the Earth's crust.
<b><u>Fossil fuel-</u></b>	a nonrenewable energy source, such as oil, gas, or coal, that derives from the organic remains of past life. Fossil fuels consist primarily of hydrocarbons.
<b><u>Fractional crystallization-</u></b>	the process by which a magma produces crystals that then separate from the original magma, so that the chemical composition of the magma changes with each generation of crystals, producing igneous rocks of different compositions. The silica content of the magma becomes proportionately higher after each crystallization.
<b><u>Fracture-</u></b>	a crack or break in a rock. To break in random places instead of cleaving. Said of minerals.
<b><u>Fringing reef-</u></b>	a reef that forms against or near an island or continental coast and grows seaward, sloping sharply towards the sea floor. Fringing reefs usually range from 0.5 to 1.0 or more kilometers in width.
<b><u>Frost wedging-</u></b>	a form of mechanical weathering caused by the freezing of water that has entered a pore or crack in a rock. The water expands as it freezes, widening the cracks or pores and often loosening or dislodging rock fragments. As the ice forms, it attracts more water, increasing the effects of frost wedging.
<b><u>Fuel-</u></b>	a source of energy, especially a combustible substance that can be burned for heat or power, or matter used in nuclear fission.

## **G**

<b><u>Gabbro-</u></b>	any of a group, dense, phaneritic, intrusive rocks that are the plutonic equivalent to basalt.
<b><u>Geochronology-</u></b>	the study of the relationship between the history of the Earth and time.
<b><u>Geologic time scale-</u></b>	the division of all of earth history into blocks of time distinguished by geologic and evolutionary events, ordered sequentially and arranged into eons made up

of eras, which are in turn made up of periods, which are in turn made up of epochs.

**Geology-**

the scientific study of the earth, its origins and evolution, the materials that make it up, and the processes that act on it.

**Geophysics-**

the branch of geology that studies the physics of the earth, using the physical principles underlying such phenomena as seismic waves, heat flow, gravity, and magnetism to investigate planetary properties.

**Geyser-**

a natural spring marked by the intermittent escape of hot water

**Glacial-**

produced by, transported by, or concerning a glacier.

**Glacial abrasion-**

the process by which a glacier erodes the underlying bedrock through contact between the bedrock and rock fragments embedded in the base of the glacier. See also glacial quarrying.

**Glacial drift-**

a load of rock material transported and deposited by a glacier. Glacial drift is usually deposited when the glacier begins to melt.

**Glacial erratic-**

a rock or rock fragment transported by a glacier and deposited on bedrock of different composition. Glacial erratic range from a few millimeters to several yards in diameter.

**Glacial quarrying-**

the process by which a glacier erodes the underlying bedrock by loosening and ultimately detaching blocks of rock from the bedrock and attaching them instead to the glacier, which then bears the rock fragments away. See also glacial abrasion

**Glacial till-**

drift that is deposited directly from glacial ice and therefore not sorted. Also called till see also glacial drift.

**Glacier-**

a moving body of ice that forms on land from the accumulation and compaction of snow, and that flows down slope or outward due to gravity and the pressure of its own weight.

**Gneiss-**

a coarse grained, foliated metamorphic rock marked by bands of light colored minerals such as quartz and feldspar that alternate with bands of dark colored minerals. This alternation develops through metamorphic differentiation.

**Graded bed-**

a bed formed by the deposition of sediment in relatively still water, marked by the presence of particles that vary in size, density, and shape. The particles settle in a gradual slope with the coarsest particles at the bottom and the finest at the top.

**Graded stream-**

a stream maintaining an equilibrium between the processes of erosion and deposition, and therefore between aggradations and degradation.



<b><u>Gradient-</u></b>	the vertical drop in a stream's elevation over a given horizontal distance, expressed as an angle.
<b><u>Granite -</u></b>	a pink colored, felsic, plutonic rock that contains potassium and usually sodium feldspars, and has a quartz content of about 10% granite is commonly found on continents but virtually absent from the ocean basins.
<b><u>Gravity-</u></b>	the force of attraction exerted by one body in the universe on another. Gravity is directly proportional to the product of the masses of the two attracted bodies. The force of attraction exerted by the earth on bodies on or near its surface, tending to pull them toward the Earth's center.
<b><u>Gravity anomaly-</u></b>	the difference between an actual measurement of gravity at a given location and the measurement predicted by theoretical calculation.
<b><u>Groin-</u></b>	a structure that juts out into a body of water perpendicular to the shoreline and is built to restore an eroding beach by intercepting long shore drift and trapping sand.
<b><u>Guyot-</u></b>	a seamount, the top of which has been flattened by weathering, wave action, or stream erosion.

## H

<b><u>Half life-</u></b>	the time necessary for half of the atoms of a parent isotope to decay into the daughter isotope.
<b><u>Hanging wall-</u></b>	The section of rock that lies above the fault plane in a dip slip fault see also foot wall.
<b><u>Hardness-</u></b>	the degree of resistance of a given mineral to scratching, indicating the strength of the bonds that hold the mineral's atoms together. The hardness of a mineral is measured by rubbing it with substances of known hardness.
<b><u>Headland-</u></b>	a cliff that projects out from a coast into deep water
<b><u>Historical geology-</u></b>	the study of the history, origin, and evolution of the earth and all its life forms and geologic structures
<b><u>Holocene epoch-</u></b>	the second epoch of the quaternary period, beginning approx 10,000 years ago and continuing to the present time. See also Pleistocene epoch
<b><u>Hook-</u></b>	a spit that curves sharply at its coastal end.
<b><u>Horn-</u></b>	a high mountain peak that forms when the walls of three or more cirques intersect.

<b><u>Hornfels-</u></b>	a hard, dark-colored, dense metamorphic rock that forms from the intrusion of magma into shale or basalt
<b><u>Horst-</u></b>	a block of rock that lies between two faults and has moved upward relative to the two adjacent fault blocks. See also graben
<b><u>Hot spot-</u></b>	an area in the upper mantle, ranging from 100 to 200 km in width, from which magma rises in a plume to form volcanoes. Hot spot may endure for ten million years or more.
<b><u>Hydraulic conductivity-</u></b>	the extent to which a given substance allows water to flow through it, determined by such factors as sorting and grain size and shape.
<b><u>Hydraulic gradient-</u></b>	the difference in potential between two points, divided by the lateral distance between the points.
<b><u>Hydraulic lifting-</u></b>	the erosion of a stream bed by water pressure.
<b><u>Hydrocarbon-</u></b>	a molecule that is entirely made up of hydrogen and carbon
<b><u>Hydrofracking-</u></b>	is the propagation of fractures in a rock layer caused by the presence of a pressurized fluid. Hydraulic fractures may form naturally, as in the case of veins or dikes, or may be man-made in order to release petroleum, natural gas, coal seam gas, or other substances for extraction, where the technique is often called fracking.
<b><u>Hydrogen bond-</u></b>	an intermolecular bond formed with hydrogen
<b><u>hydrologic cycle-</u></b>	the perpetual movement of water among the mantle, oceans, land and atmosphere of the earth
<b><u>Hydrolysis-</u></b>	a form of chemical weathering in which ions from water replace equivalently charged ions from a mineral, especially a silicate.
<b><u>Hydrothermal deposit-</u></b>	a mineral deposit formed by the precipitation of metallic ions from water ranging in temperature from 500 to 7000 C
<b><u>Hypothesis-</u></b>	a tentative explanation of a given set of data that is expected to remain valid after future observation and experimentation. See also theory.
<b>I</b>	
<b><u>Ice age-</u></b>	a period during which the Earth is substantially cooler than usual and significant portion of its land surface is covered by glaciers. Ice ages generally last tens of millions of years
<b><u>Ice cap-</u></b>	an alpine glacier that covers the peak of a mountain

<b><u>Igneous rock-</u></b>	a rock made from molten (melted) or partly molten material that has cooled and solidified
<b><u>Index mineral -</u></b>	see metamorphic index mineral.
<b><u>Inselberg-</u></b>	a steep ridge or hill left when a mountain has eroded and found in an otherwise flat, typically desert plain.
<b><u>Intermolecular bonding-</u></b>	the act or process by which two or more groups of atoms or molecules combine due to weak positive charges that develop at various points within each group of atoms due to uneven distribution of their electrons. The side of molecule where electrons are more likely to be found will have a slight negative charge and the side where they are less likely to be found will have a slight positive charge. Such charged regions attract oppositely charged regions of nearby molecules, forming relatively weak bonds
<b><u>Internal deformation-</u></b>	the rearrangement of the planes within ice crystals, due to pressure from overlying ice and snow, that causes the downward or outward flow of a glacier.
<b><u>Intrusion-</u></b>	the entrance of magma into preexisting rock
<b><u>Intrusive rock-</u></b>	an igneous rock formed by the entrance of magma into preexisting rock
<b><u>Ion-</u></b>	an atom that has lost or gained one or more electrons, thereby becoming electrically charged.
<b><u>Ionic bond-</u></b>	the combination of an atom that has a strong tendency to lose electrons with an atom that has a strong tendency to gain electrons, such that the former transfers one or more electrons to the latter and each achieves chemical stability under the octet rule. The atom that gains electrons acquire a negative electric charge, so that – the resulting compound is electrically neutral.
<b><u>Ionic bonding-</u></b>	the act or process of forming of an ionic bond
<b><u>Ionic substitution-</u></b>	the replacement of one type of ion in a mineral by another that is similar to the first in size and charge.
<b><u>Iron catastrophe-</u></b>	the sequence of events resulting in the separation of the earth's matter into concentric zones of differing densities. This sequence began when the temperature of the earth at depths of 400 to 800 kilometers below the surface rose to the melting point of iron. Molten iron then gravitated toward the earth's center, and its movement raised the earth's temperature to approximately 20,000C. This let other substances to start melting. The densest matter then sank toward the earth's center, while lighter matter rose toward the surface. The iron catastrophe took place between a few hundred million and one billion years after the earth formed.

**Isostasy-** the equilibrium maintained between the gravity tending to depress and the buoyancy tending to raise a given segment of the lithosphere as it floats above the asthenosphere.

**Isotope-** one of two or more forms of a single element; the atoms of each isotope have the same number of protons but different numbers of neutrons in their nuclei. Thus, isotopes have the same atomic number but differ in atomic mass.

## **J**

**Jetty-** a structure built along the bank of a stream channel or tidal outlet to direct the flow of a stream or tide and keep the sediment moving so that it cannot build up and fill the channel. Jetties are typically built in parallel pairs along both banks of the channel. Jetties that are built perpendicular to a coast tend to interrupt long – shore drift and thus widen beaches.

**Joint-** a fracture dividing a rock into two sections that have not visibly moved relative to each other. See also fault.

**Juvenile water-** the steam that accompanies volcanic eruptions.

## **K**

**Karst-** a topography characterized by caves, sinkholes, disappearing streams, and underground drainage. Karst forms when groundwater dissolves pockets of limestone, dolomite, or gypsum in bedrock.

**Kerogen-** a solid, waxy, organic substance that forms when pressure and heat from the Earth act on the remains of plants and animals. Kerogen converts to various liquid and gaseous hydrocarbons at a depth of seven or more kilometers and temperature between 500 and 1,000C.

## **L**

**Laccolith-** a large concordant pluton that is shaped like a dome or a mushroom. Laccoliths tend to form at relatively shallow depths and are typically composed of granite. The country rock above them often erodes away completely.

**Lagoon-** a shallow body of water separated from the sea by a reef or barrier island.

**Lahar-** a flow of pyroclastic material mixed with water. A lahar is often produced when a snow-capped volcano erupts and hot pyroclastic melt a large amount of snow or ice.

**Lava-** magma that comes to the Earth's surface through a volcano or fissure.

<b><u>Leeward-</u></b>	of, located on, or being the side of a dune, hill, or ridge that is sheltered from the wind. See also windward.
<b><u>Levee-</u></b>	a protective barrier built along the banks of a stream to prevent flooding. See also natural levee.
<b><u>Lichen-</u></b>	plant-like colonies of fungi and algae that grow on the exposed surface of rocks. Lichen grows at a constant rate within a single geographic area.
<b><u>Lichenometry-</u></b>	a method of absolute dating that uses the size of lichen colonies on a rock surface to determine the surface's age, Lichenometry is used for rock surfaces less than about 9,000 years old.
<b><u>Lignite-</u></b>	a soft, brownish coal that develops from peat through bacterial action, is rich in kerogen, and has a carbon content of 70% which makes it a more efficient heating fuel than peat.
<b><u>Limestone-</u></b>	a sedimentary rock composed primarily of calcium carbonate. 10% to 15% of all sedimentary rocks are limestones. Limestone is usually organic but it may also be inorganic
<b><u>Liquefaction-</u></b>	the conversion of moderately cohesive, unconsolidated sediment into a fluid, water-saturated mass.
<b><u>Lithification-</u></b>	the conversion of loose sediment into solid sedimentary rock.
<b><u>Lithosphere-</u></b>	a layer of solid, brittle rock comprising the outer 100 kilometers of the Earth, encompassing both the crust and the outer most part of the upper mantle. See also asthenosphere.
<b><u>Lithostatic pressure-</u></b>	the force exerted on a rock buried deep within the Earth by overlying rocks. Because lithostatic pressure is exerted equally from all sides of a rock, it compresses the rock into a smaller, denser form without altering the rock's shape.
<b><u>Loess-</u></b>	a load of silt that is produced by the erosion of outwash and transported by wind. Much loess found in the Mississippi Valley, China, and Europe is believed to have been deposited during the Pleistocene Epoch.
<b><u>Longitudinal dune-</u></b>	one of a series of long, narrow dunes lying parallel both to each other and to the prevailing wind direction. Longitudinal dunes range from 60 meters to 100 kilometers in length and from 3 to 50 meters in height.
<b><u>Long shore current-</u></b>	an ocean current that flows close and almost parallel to the shoreline and is caused by the rush of waves toward the shore.

<b><u>Long shore drift-</u></b>	1. The process by which a current moves sediments along a surf zone. 2. The sediments so moved. Long shore drift typically consists of sand, gravel, shell fragments, and pebbles. See also beach drift.
<b><u>Low velocity zone-</u></b>	an area within the Earth's upper mantle in which both P waves and S waves travel at markedly slower velocities than in the outermost part of the upper mantle. The low-velocity zone occurs in the range between 100 and 350 kilometers of depth.
<b><u>Luster-</u></b>	1.the reflection of light on a given mineral's surface, classified by intensity and quality. 2. The appearance of a given mineral as characterized by the intensity and quality with which it reflects light.
<b>M</b>	
<b><u>Magma-</u></b>	molten (melted) rock that forms naturally within the earth. Magma may be either a liquid or a fluid mixture of liquid, crystals, and dissolved gases.
<b><u>Magnetic field-</u></b>	the region within which the magnetism of a given substance or particle affects other substances.
<b><u>Magnetic reversal-</u></b>	the process by which the earth's magnetic North Pole and its magnetic South Pole reverse their positions over time.
<b><u>Magnetism-</u></b>	the property, possessed by certain materials, to attract or repel similar materials. Magnetism is associated with moving electricity.
<b><u>Mantle-</u></b>	the middle layer of the earth, lying just below the crust and consisting of relatively dense rocks. The mantle is divided into two sections, the upper mantle and the lower mantle; the lower mantle has greater density than the upper mantle. See also core and crust.
<b><u>Marble-</u></b>	a coarse grained, non foliated metamorphic rock derived from limestone or dolostone.
<b><u>Massive sulfide deposit-</u></b>	an unusually large deposit of sulfide minerals
<b><u>Mass movement-</u></b>	the process by which such earth materials as bedrock, loose sediment, and soil are transported down slopes by gravity.
<b><u>Meandering stream-</u></b>	a stream that traverses relatively flat land in fairly evenly spaced loops and separated from each other by narrow strips of flood plain.
<b><u>Mechanical exfoliation-</u></b>	a form of mechanical weathering in which successive layers of a large plutonic rock break loose and fall when the erosion of overlying material permits the rock to expand upward. The thin slabs of rock that break off fall parallel to the

exposed surface of the rock, creating the long, broad steps that can be found on many mountains.

<b><u>Mechanical weathering-</u></b>	the process by which a rock or mineral is broken down into smaller fragments without altering its chemical makeup; weathering that affects only physical characteristics. See also chemical weathering.
<b><u>Mélange-</u></b>	a body of rock that forms along the inner wall of an ocean trench and is made up of fragments of lithosphere and oceanic sediment that have undergone metamorphism.
<b><u>Melt water-</u></b>	water formed from the melted ice of a glacier
<b><u>Mercalli intensity scale-</u></b>	a scale designed to measure the degree of intensity of earthquakes raging from I for the lowest intensity to XII for the highest. The classifications are based on human perceptions.
<b><u>Mesozoic era-</u></b>	the intermediate era of the Phanerozoic Eon, following the Paleozoic era and preceding the Cenozoic era, and marked by the dominance of marine and terrestrial reptiles, and the appearance of birds, mammals and flowering plants.
<b><u>Metallic bonding-</u></b>	the act or process by which two or more atoms of electron-donating elements pack so closely together that some of their electrons begin to wander around the nuclei rather than orbiting the nucleus of a single atom. Metallic bonding is responsible for the distinctive properties of metals.
<b><u>Metamorphic facies-</u></b>	1. A group of minerals customarily found together in metamorphic rocks and indicating a particular set of temperature and pressure conditions at which metamorphism occurred. 2. A set of metamorphic rocks characterized by the presence of such a group of minerals.
<b><u>Metamorphic grade-</u></b>	a measure used to identify the degree to which a metamorphic rock has changed from its parent rock. A metamorphic grade provides some indication of the circumstances under which the metamorphism took place.
<b><u>Metamorphic rock-</u></b>	a rock that has undergone chemical or structural changes. Heat, pressure, or a chemical reaction may cause such changes
<b><u>Metamorphism-</u></b>	the process by which conditions within the earth, below the zone of diagenesis, alter the mineral content, chemical composition, and structure of solid rock without melting it. Igneous, sedimentary, and metamorphic rocks may all undergo metamorphism.
<b><u>Meteoric water-</u></b>	the precipitation of condensed water from clouds as rain, snow, sleet, or hail
<b><u>Microcontinent-</u></b>	a section of continental lithosphere that has broken off from a larger, distant continent, as by rifting

<b><u>Mid-ocean ridge-</u></b>	an underwater mountain range that develops between the margins of two lithospheric plates, formed by rifting.
<b><u>Migmatite-</u></b>	a rock that incorporates both metamorphic and igneous material.
<b><u>Mineral-</u></b>	a naturally occurring, usually inorganic, solid consisting of either a single element or a compound, and having a definite chemical composition and systematic internal arrangement of atoms.
<b><u>Mineraloid-</u></b>	a naturally occurring, usually inorganic, solid consisting of either a single element or a compound, and having a definite chemical composition but lacking a systemic internal arrangement of atoms. See also mineral
<b><u>Mineral zone-</u></b>	an area of rock throughout which a given metamorphic index mineral is found, presumed to have undergone metamorphism under uniform temperature and pressure conditions.
<b><u>Moho (Mohorovicic)-</u></b>	the seismic discontinuity between the base of the earth's crust and the top of the mantle. P waves passing through the Moho change their velocity by approximately one kilometer per second. With the high velocity occurring in the mantle and the lower in the crust.
<b><u>Molecule-</u></b>	the smallest particle that retains all the chemical and physical properties of a given compound, consisting of a stable group of bonded atoms.
<b><u>Moraine-</u></b>	a single, large mass of glacial till that accumulates, typically at the edge of a glacier.
<b><u>Mudcrack-</u></b>	a fracture that develops at the top of a layer of fine grained, muddy sediment when it is exposed to the air, dries out, and then shrinks.
<b><u>Mudflow-</u></b>	the rapid flow of typically fine-grained regolith mixed with water. There may be as much as 60% water in a mudflow.

## **N**

<b><u>natural bridge-</u></b>	an arch shaped stretch of bedrock remaining in a karst region when the surrounding bedrock has dissolved.
<b><u>Natural levee-</u></b>	one of a pair of ridges of sediment deposited along both banks of a stream during successive floods
<b><u>Natural spring-</u></b>	a place where groundwater flows to the surface and issues freely from the ground
<b><u>Neutron-</u></b>	a particle that is found in the nucleus of an atom, has a mass approximately equal to that of a proton, and has no electric charge.



<b><u>Nonfoliated-</u></b>	being a metamorphic rock that does not show foliation.
<b><u>Normal fault-</u></b>	a dip slip fault marked by a generally steep dip along which the hanging wall has moved downward relative to the foot wall.
<b><u>Nuclear fission-</u></b>	the division of the nuclei of isotopes of certain heavy elements, such as uranium and plutonium, affected by bombardment with neutrons. Nuclear fission causes the release of energy, additional neutrons, and an enormous quantity of heat. Nuclear fission is used in nuclear power plants and nuclear weapons. A byproduct of nuclear fission is toxic radioactive waste. See also nuclear fusion.
<b><u>Nuclear fusion-</u></b>	a combination of the nuclei of certain extremely light elements, especially hydrogen, affected by the application of high temperature and pressure. Nuclear fusion causes the release of an enormous amount of heat energy, comparable to that released by nuclear fission. The principle byproduct of nuclear fusion is helium.
<b><u>Nucleus (plural nuclei)-</u></b>	the central part of an atom, containing most of the atom's mass and having a positive charge due to the presents of protons.
<b><u>Nuee ardent-</u></b>	a sometimes glowing cloud of gas and pyroclastics erupted from a volcano and moving swiftly down its slopes. Also called a pyroclastic flow.
<b>O</b>	
<b><u>Ocean trench-</u></b>	a deep, linear, relatively narrow depression in the sea floor, formed by the subduction of oceanic plates.
<b><u>Octet rule-</u></b>	a scientific law stating that all atoms, except those of hydrogen and helium, require with electrons in the outermost energy level in order to maintain chemical stability.
<b><u>Oil sand-</u></b>	a mixture of unconsolidated sand and clay that contains a semi-solid bitumen.
<b><u>Oil shale-</u></b>	a brown or black clastic source rock containing kerogen
<b><u>Ophiolite suite-</u></b>	the group of sediments, sedimentary rocks, and mafic and ultramafic igneous rocks that make up the oceanic lithosphere.
<b><u>Ore-</u></b>	a mineral deposit that can be mined
<b><u>Orogenesis-</u></b>	mountain formation, as caused by volcanism, subduction, plate divergence, folding, or the movement of fault blocks. Also called orogeny.
<b><u>Oscillatory motion-</u></b>	the circular movement of water up and down, with little or no change in position, as a wave passes.

<b><u>Outwash-</u></b>	a load of sediment, consisting of sand and gravel, that is deposited by meltwater in front of a glacier.
<b><u>Oxbow lake-</u></b>	a crescent shaped body of standing water formed from a single loop that was cut off from a meandering stream, typically by a flood that allowed the stream to flow through its flood plain bypass the loop
<b><u>Oxidation-</u></b>	the process of combining with oxygen ions. A mineral that is exposed to air may undergo oxidation as a form of chemical weathering.
<b><u>Oxide-</u></b>	one of several minerals containing negative oxygen ions bonded to one or more positive metallic ions.

## **P**

<b><u>Paleosol-</u></b>	an ancient, buried soil whose composition may reflect a climate significantly different from the climate now prevalent in the area where the soil is found.
<b><u>Paleomagnetism-</u></b>	1. The fixed orientation of rock's crystals, based on the earth's magnetic field at the time of the rocks formation, that remains constant even when the magnetic field changes. 2. The study of such phenomena as indicators of the earth's magnetic history.
<b><u>Paleozoic era-</u></b>	the earliest era of the Phanerozoic Eon, marked by the presence of marine invertebrates, fish, amphibians, insects, and land plants.
<b><u>Parabolic dune-</u></b>	a horseshoe shaped dune having a concave windward slope and a convex slope. Parabolic dunes tend to form along sandy ocean and lake shores. They may also develop from transverse dunes through deflation.
<b><u>Parent isotope-</u></b>	a radioactive isotope that changes into a different isotope when its nucleus decays. See also daughter isotope.
<b><u>Parent material-</u></b>	the source from which a given soil is chiefly derived, generally consisting of bedrock or sediment.
<b><u>Parent rock-</u></b>	the preexisting rock from which a metamorphic rock forms.
<b><u>Partial melting-</u></b>	the incomplete melting of a rock composed of minerals with differing melting points. When partial melting occurs, the mineral with higher melting points remain solid while the minerals whose melting points have been reached turn to magma.
<b><u>Passive continental margin-</u></b>	a border that lies between continental and oceanic lithosphere, but is not a plate margin. It is marked by lack of seismic and volcanic activity.

<b><u>Peat-</u></b>	a soft brown mass of compressed, partially decomposed vegetation that forms in a water-saturated environment and has a carbon content of 50%. Dried peat can be burned as fuel.
<b><u>Pediment-</u></b>	a broad surface at the base of a receding mountain. The pediment develops when running water erodes most of the mass of the mountain.
<b><u>Pegmatite-</u></b>	a coarse grained igneous rock with exceptionally large crystals, formed from a magma that contains a high proportion of water.
<b><u>Perched water table-</u></b>	a saturated area that lies within a zone of aeration.
<b><u>Peridotite-</u></b>	an igneous rock composed primarily of the iron magnesium silicate olivine and having a silica content of less than 40%
<b><u>Permafrost-</u></b>	permanently frozen regolith, ranging in thickness from 30 centimeters to over 1,000 meters.
<b><u>Permeability-</u></b>	the capability of a given substance to allow the passage of a fluid. Permeability depends upon the size of and the degree of connection among a substance's pores.
<b><u>Petroleum-</u></b>	any of a group of naturally occurring substances made up of hydrocarbons. These substances maybe gaseous, liquid, or semisolid
<b><u>Phaneritic-</u></b>	of or being an igneous rock containing components large enough to be seen with the unaided eye.
<b><u>Phanerozoic eon-</u></b>	the eon that started 570 million years ago, when numerous fossils of sea shells began to be formed, and that continues to the present time.
<b><u>Phosphorescence-</u></b>	emission of visible light by a substance, such as a mineral, that is exposed to ultraviolet light and absorbs radiation from it. The light appears in the form of glowing, distinctive colors. The emission continues after the exposure to ultraviolet light ends.
<b><u>Phyllite-</u></b>	emission of visible light by a substance, such as a mineral, that is exposed to ultraviolet light and absorbs radiation from it. The light appears in the form of glowing, distinctive colors. The emission continues after the exposure to ultraviolet light ends.
<b><u>Placer deposit-</u></b>	a deposit of heavy or durable minerals, such as gold or diamonds, typically found where the flow of water abruptly slows.
<b><u>Plastic deformation-</u></b>	a permanent strain that entails no rupture.
<b><u>Plate-</u></b>	one of the large, thin, rigid units making up the earth's lithosphere. Plates may be continental, oceanic, or both.

<b><u>Plate tectonics-</u></b>	the theory that the earth's lithosphere consists of large, rigid plates that move horizontally in response to the flow of the asthenosphere beneath them, and that interactions among the plates at their borders cause most major geologic activity, including the creation of oceans, continents, mountains, volcanoes, and earthquakes.
<b><u>Playa-</u></b>	a dry lake basin found in a desert
<b><u>Pleistocene epoch-</u></b>	the first epoch of the quaternary period, beginning two to three million years ago and ending approximately 10,000 years ago. See also Holocene epoch.
<b><u>Plume-</u></b>	an upward flow of hot material from the earth's mantle into the crust.
<b><u>Pluton-</u></b>	an intrusive rock, as distinguished from the preexisting country rock that surrounds it
<b><u>Plutonic rock-</u></b>	an intrusive rock formed inside the earth
<b><u>Pluvial lake-</u></b>	a lake that formed from rainwater falling into a landlocked basin during a glacial period marked by a greater precipitation than is found in the region in prior or subsequent periods.
<b><u>Point bar-</u></b>	a low ridge of sediment that forms along the inner bank of a meandering stream
<b><u>Polymorph-</u></b>	a mineral that is identical to another mineral in chemical composition but differs from it in crystal structure
<b><u>Porosity-</u></b>	the percentage of a soil, rock, or sediment's volume that is made up of pores
<b><u>Porphyritic-</u></b>	of or being an igneous rock containing some large grains within a smaller grained matrix.
<b><u>Porphyry copper deposit-</u></b>	a crystallized rock, typically porphyritic, having hairline fractures that contain copper and other metals.
<b><u>Potassium argon dating-</u></b>	a form of radiometric dating that relies on the extremely long half-life of radioactive isotopes of potassium, which decay into isotopes of argon, to determine the age of rocks in which argon is present. Potassium argon dating is used for rocks between 100,000 and 4 billion years old.
<b><u>Potential-</u></b>	the combined influence of gravity and water pressure on groundwater flow at a given depth.
<b><u>Potentiometric surface-</u></b>	the level to which the water in an artesian aquifer would rise if unaffected by friction with the surrounding rocks and sediments.
<b><u>Precipitate-</u></b>	to separate from solution in solid form. Minerals may precipitate because of cooling, evaporation, or loss of acidity.

<b><u>Precipitation-</u></b>	1. The process by which a substance becomes precipitated. 2. Water that falls from the atmosphere to earth's surface in the form of rain, snow, sleet or hail
<b><u>Primary coast-</u></b>	a coast shaped primarily by nonmarine process, such as glacial erosion or biological processes.
<b><u>Principle of cross cutting relationships-</u></b>	the scientific law stating that a pluton is always younger than the rock that surrounds it.
<b><u>Principle of faunal succession-</u></b>	the scientific law stating that an organism is always simpler than those that evolved later and more – complex than those that evolved earlier.
<b><u>Principle of inclusions-</u></b>	the scientific law stating that rock fragments contained within a larger body of rock are always older than the surrounding body of rock.
<b><u>Principle of original horizontality-</u></b>	the scientific law stating that sediments settling out from bodies of water are deposited horizontally or nearly horizontally in layers that lie parallel or nearly parallel to the earth's surface.
<b><u>Principle of superposition-</u></b>	the scientific law stating that in any unaltered sequence of rock strata, each stratum is younger than the one beneath it and older than the one above it, so that the youngest stratum will be at the top of the sequence and the oldest at the bottom.
<b><u>Principle of uniformitarianism-</u></b>	the scientific law stating that the geological process taking place in the present operated similarly in the past and can therefore be used to explain past geologic events.
<b><u>Property-</u></b>	a characteristic that distinguishes one substance from another
<b><u>Proton-</u></b>	a positively charged particle that is found in the nucleus of an atom and has a mass approximately 1836 times that of an electron.
<b><u>P wave -</u></b>	abbreviation for Primary Wave; a body wave that causes the compression of rocks when its energy acts upon them. When the P wave moves past a rock, the rock expands beyond its original volume, only to be compressed again by the next P wave. P waves are the fastest of all seismic waves. See also S wave.
<b><u>P wave shadow zone-</u></b>	the region that extends from 1030 to 1430 from the epicenter of an earthquake and is marked by the absence of P waves. The p wave shadow zone is due to the refraction of seismic waves in the liquid outer core. See also S wave shadow zone.
<b><u>Pyroclastic-</u></b>	being or pertaining to rock fragments formed in a volcanic eruption.
<b><u>Pyroclastic cone-</u></b>	a usually steep, conic volcano composed almost entirely of an accumulation of loose pyroclastic material. Pyroclastic cones are usually less than 450 meters high. Because no lava binds the pyroclastics, pyroclastic cones erode easily.

**Pyroclastic flow-** a rapid, extremely hot, downward stream of pyroclastics, air, gases, and ash ejected from an erupting volcano. A pyroclastic flow may be as hot as 8000C or more and may move at speeds higher than 150 kilometers per hour.

**Pyroclastics-** particles and chunks of igneous rock ejected from a volcanic vent during an eruption.

## Q

**Quake-** see earthquake

**Quartzite-** an extremely durable, non foliated metamorphic rock derived from pure sandstone and consisting primarily of quartz.

**Quaternary ice age-** an ice age that began approximately 1.6 million years ago and continues to the present time.

**Quaternary period-** the second period of the Cenozoic Era, beginning two to three million years ago and continuing to the present time.

**Quick clay-** sediment that sets off a sudden mudflow by changing rapidly from solid to liquid form, as after an earthquake, an explosion, or thunder.

## R

**Radioactive decay-** the process of spontaneously emitting protons and neutrons that transforms one isotope into another.

**Radiometric dating-** The process of using relative proportions of parent to daughter isotopes in radioactive decay to determine the age of a given rock or rock stratum.

**Rain shadow effect-** the result of the process by which moist air on the windward of a mountain rises and cools, causing precipitation and leaving the leeward side of the mountain dry

**Recrystallization-** the diagenetic process by which unstable minerals in buried sediment are transformed into stable ones

**Reef-** a ridge that forms in clear, moderately salty seawater near the shoreline and is composed of the carbonate remains of algae, sponges, and especially corals.

**Regional metamorphism-** Metamorphism that affects rocks over vast geographic areas stretching for thousands of square kilometers.

**Regolith-** the unconsolidated material that covers almost all of the earth's land surface and is composed of soil, sediment, and fragments from the bedrock beneath it.

<b><u>Relative dating-</u></b>	the fixing of a geologic structure or event in a chronological sequence relative to other geologic structures or events. See also absolute dating.
<b><u>Reserve-</u></b>	a known resource that can be exploited for profit with available technology under existing political and economic conditions
<b><u>Reservoir rock-</u></b>	a permeable rock containing oil or gas.
<b><u>Resource-</u></b>	a mineral or fuel deposit, known or not yet discovered , that maybe or become available for human exploitation.
<b><u>Reverse fault-</u></b>	a dip slip fault marked by hanging wall that has moved upward relative to the footwall. Reverse faults are often caused by convergence of lithospheric plates.
<b><u>Rhyolite-</u></b>	any of group of felsic igneous rocks that are the extrusive equivalents of granite.
<b><u>Richter scale-</u></b>	a logarithmic scale that measures the amount of energy released during an earthquake on the basis of the amplitude of the highest peak recorded on a seismogram. Each unit increase in the Richter scale represents a 10 fold increase in the amplitude recorded on the seismogram and a 30 fold increase in energy released by the earthquake. Theoretically the Richter scale has no upper limit, but the yield point of the Earth's rock imposes an effective limit between 9.0 and 9.5
<b><u>Rifting-</u></b>	the tearing apart of a plate to form a depression in the earth's crust and often eventually separating the plate into two or more smaller plates.
<b><u>Rip current-</u></b>	a strong, rapid, and brief current that flows out to sea moving perpendicular to the shoreline.
<b><u>Ripple marks-</u></b>	a pattern of wavy lines formed along the top of a bed by wind, water currents, or waves.
<b><u>Riprap-</u></b>	a pile of large, angular boulders built seaward of the shoreline in order to prevent erosion by waves or currents. See also seawall.
<b><u>Rock-</u></b>	a naturally formed aggregate of usually inorganic materials from within the earth.
<b><u>Rock cycle-</u></b>	a series of events through which a rock changes, over time, between igneous, sedimentary and metamorphic forms.
<b><u>Rock forming mineral-</u></b>	one of the twenty or so minerals contained in the rock that composes the earth's crust and mantle
<b><u>Rubidium strontium dating-</u></b>	a form of radiometric dating that relies on the 47 billion year half life of radioactive isotopes of rubidium, which decay into isotopes of rubidium, which decay into isotopes of strontium, to determine the age of rocks in which

strontium is present. Rubidium-strontium dating is used for rocks that are at least 10 million years old, deep earth plutonic rocks, and moon rocks

## S

### Sand-

1. A particle of rock or mineral material, coarser than silt, that has been transported from its place of origin, as by water or wind. A particle of sand is usually between 1/16 and two millimeters in diameter. Sands are frequently composed of quartz. 2. A loosely connected body of such particles.

### Sandstone-

a clastic rock composed of particles that range in diameter from 1/16 millimeter to 2 millimeters in diameter. Sandstones make up about 25% of all sedimentary rocks.

### Saturation zone-

see zone of saturation.

### Scarp-

the steep cliff face that is formed by a slump.

### Scientific law-

1. A natural phenomenon that has been proven to occur invariably whenever certain conditions are met. 1. A former statement describing such a phenomenon and the conditions under which it occurs. Also called law

### Scientific methods-

techniques that involve gathering all available data on a subject, forming an hypothesis to explain the data, conducting experiments to test the hypothesis and modifying or confirming the hypothesis as necessary to account for the experimental results.

### Schist-

a coarse grained, strongly foliated metamorphic rock that develops from phyllite and splits easily in to flat, parallel slabs.

### Sea stack-

a steep, isolated island of rock, separated from a head land by the action of waves, as when the overhanging section of a sea arch is eroded.

### Sea floor spreading-

the formation and growth of oceans that occurs following rifting and is characterized by eruptions along mid ocean ridges, forming new oceanic lithosphere, and expanding ocean basins. See also divergence

### Seamount-

a conical underwater mountain formed by a volcano and rising 1000 meters or more from the sea floor.

### Seawall-

a wall of stone, concrete, or other sturdy material, built along the shoreline to prevent erosion even by the strongest and highest of waves. See also riprap

### Secondary coast-

a coast shaped primarily by erosion or deposition by sea currents and waves.



<b><u>Secondary enrichment-</u></b>	the process by which a metal deposit becomes concentrated when other minerals are eliminated from the deposit, as through dissolution, precipitation or weathering.
<b><u>Sediment-</u></b>	a collection of transported fragments or precipitated materials that accumulate, typically in loose layers as of sand or mud.
<b><u>Sedimentary environment-</u></b>	the continental, oceanic, or coastal surroundings in which sediment accumulates.
<b><u>Sedimentary facies-</u></b>	1. A set of characteristics that distinguish a given section of sedimentary rock from nearby sections such characteristics include mineral content, grain size, shape, and density. 2. A section of sedimentary rock so characterized
<b><u>Sedimentary rock-</u></b>	a rock made from the consolidation of solid fragments, as of other rocks or organic remains, or by precipitation of minerals from solution.
<b><u>Sedimentary structure-</u></b>	a physical characteristic of a detrital sediment that reflects the conditions under which the sediment was deposited.
<b><u>Seismic-</u></b>	of, concerning, subject to, or produced by an earthquake
<b><u>Seismic discontinuity-</u></b>	a surface marking the boundary between two layers of the earth differing in composition. Seismic waves passing through a seismic discontinuity undergo an abrupt change in velocity.
<b><u>Seismic gap-</u></b>	a locked fault segment that has not experienced seismic activity for a long time. Because stress tends to accumulate in seismic gaps, they often become the sites of major earthquakes.
<b><u>Seismic profiling-</u></b>	the mapping of rocks lying along and beneath the ocean floor by recording the reflections and refractions of seismic waves.
<b><u>Seismic tomography-</u></b>	the process whereby a computer first synthesizes data on the velocities of seismic waves from thousands of recent earthquakes in order to make a series of images depicting successive planes within the earth, and then uses these images to construct a three dimensional representation of the earth's interior.
<b><u>Seismic wave-</u></b>	one of a series of progressive disturbances that reverberate through the earth to transmit the energy released from an earthquake.
<b><u>Seismogram-</u></b>	a visual record produced by a seismograph and showing the arrival times and magnitudes of various seismic waves.
<b><u>Seismograph-</u></b>	a machine for measuring the intensity of earthquakes by recording the seismic waves that they generate.

<b><u>Seismology-</u></b>	the study of earthquakes and the structure of the earth, based on data from seismic waves.
<b><u>Shale-</u></b>	a sedimentary rock composed of detrital sediment particles less than 0.004 millimeters in diameter. Shales tend to be red, brown, black or gray, and usually originate in relatively still waters.
<b><u>Shearing stress-</u></b>	stress that slices rocks into parallel blocks that slide in opposite directions along their adjacent sides. Shearing stress may be caused by transform motion.
<b><u>Shield volcano-</u></b>	a low, broad, gently sloping, dome shaped structure that forms over time as repeated eruptions eject basaltic lava through one or more vents and the lava solidifies in approximately the same volume all around.
<b><u>Shock metamorphism-</u></b>	the metamorphism that results when a meteorite strikes rocks at the earth's surface. The meteoric impact generates tremendous pressure and extremely high temperatures that cause minerals to shatter and recrystallize, producing new minerals which cannot arise under any other circumstances.
<b><u>Shoreline-</u></b>	the boundary between a body of water and dry land. Silica A compound consisting of silicon and oxygen
<b><u>Silicate-</u></b>	one of several rock forming minerals that contain silicon, oxygen, and usually one or more other common elements.
<b><u>Silicon-oxygen tetrahedron-</u></b>	a four sided geometric form created by the tight bonding of four oxygen atoms to each other, and also to a single silicon atom that lies in the middle of the form.
<b><u>Sill-</u></b>	a concordant pluton that is substantially wider than it is thick. Sills form within a few kilometers of the earth's surface. See also dike
<b><u>Silt-</u></b>	1. A particle of rock or mineral material, finer than sand but coarser than clay, that has been transported from its place of origin, typically by wind or water. A particle of silt is usually between $1/16$ and $1/256$ of a millimeter in diameter. 2. A loosely connected body of such particles.
<b><u>Sinkhole-</u></b>	a circular, often funnel shaped depression in the ground that forms when soluble rocks dissolve.
<b><u>Skarn-</u></b>	a coarse grained, non foliated metamorphic rock containing silicates that are rich in calcium
<b><u>Slate-</u></b>	a fine grained foliated metamorphic rock that develops from shale and tends to break into thin, flat sheets
<b><u>Slide-</u></b>	the mass movement of a single, intact mass of rock, soil, or unconsolidated material along a weak, such as a fault, fracture, or bedding plane. A slide may

involve as little as a minor displacement of soil or as much as the displacement of an entire mountainside.

**Slip face-**

the steep leeward slope of a dune.

**Slip plane-**

a weak plane in a rock mass from which material is likely to break off in a slide.

**Slump-**

1. Downward and outward slide occurring along a concave slip plane. 2. The material that breaks off at such a slide

**Snowline-**

the lowest point at which snow remains year round

**Soil-**

the top few meters of regolith, generally including some organic matter derived from plants.

**Soil horizon-**

a layer of soil that can be distinguished from the surrounding solid by such features as chemical composition, color and texture

**Soil profile-**

a vertical strip of solid stretching from the surface down to the bedrock and including all of the successive soil horizons

**Soilification-**

a form of creep in which soil flows downslope at 0.5 to 15 centimeters per year. Soilification occurs in relatively cold regions when the brief warmth of summer thaws only the upper meter or two of regolith, which becomes waterlogged because the underlying ground, remains frozen and therefore the water cannot drain into it

**Source rock-**

a rock in which hydrocarbons originate

**Sorting-**

the process by which a given transport medium separates out certain particles, as on the basis of size, shape, density.

**Specific gravity-**

the ratio of the weight of a particular volume of a given substance to the weight of an equal volume of pure water.

**Speleotherm-**

a mineral deposit of calcium carbonate that precipitates from solution in a cave.

**Spheroidal weathering-**

the process by which chemical weathering especially by water, decomposes the angles and edges of a rock or boulder, leaving a rounded form from which concentric layers are then stripped away as the weathering continues

**Spit-**

a narrow, fingerlike ridge of sand that extends from land into open water.

**Stalactite-**

an icicle like mineral formation that hangs from the ceiling of a cave and is usually made up of travertine, which precipitates as water rich in dissolved limestone drips down from the cave's ceiling.

<b><u>Stalagmite-</u></b>	a cone shaped mineral deposit that forms on the floor of a cave and is usually made up of travertine, which precipitates as water rich in dissolved limestone drips down from the cave's ceiling. See also stalactite.
<b><u>Star dune-</u></b>	a dune with three or four arms radiating from its usually higher center so that it resembles a star in shape. Star dunes form when winds blow from three or four directions, or when the wind direction shifts frequently.
<b><u>Stratification-</u></b>	see bedding
<b><u>Stratovolcano-</u></b>	a cone shaped volcano built from alternating layers of pyroclastics and viscous andesitic lava. Stratovolcanos tend to be very large and steep
<b><u>Stratum (plural strata)-</u></b>	a layer of sedimentary rock that is visibly distinct from the surrounding layers.
<b><u>Streak-</u></b>	the color of a mineral in its powdered form. This color is usually determined by rubbing the mineral against an unglazed porcelain slab and observing the mark made by it on the slab
<b><u>Strain-</u></b>	the change in the shape or volume of a rock that results from the stress
<b><u>Stream-</u></b>	a body of water found on the earth's surface and confined to a narrow topographic depression, down which it flows and transports rock particles, sediment, and dissolved particles. River's, creeks, brooks, and runs are all streams
<b><u>Stream discharge-</u></b>	the volume of water to pass a given point on a stream bank per unit of time, usually expressed in cubic meters of water per second.
<b><u>Stream terrace-</u></b>	a level plain lying above and running parallel to a stream bed. A stream terrace is formed when a stream's bed erodes to a substantially lower level, leaving its flood plain high above it.
<b><u>Stress-</u></b>	the force acting on a rock or another solid to deform it, measured in kilograms per square centimeter or pounds per square inch.
<b><u>Striation-</u></b>	one of a group of usually parallel scratches engraved in bedrock by a glacier or other geological agent.
<b><u>Strike-</u></b>	1. The horizontal line marking the intersection between the inclined plane of a solid geological structure and the earth's surface. 2. The compass direction of this line, measured in degrees from the true north.
<b><u>Strike slip fault-</u></b>	a fault in which two sections of rock have moved horizontally in opposite directions, parallel to the line of the fracture that divided them. Strike slip faults are caused by shearing stress.

<b><u>Structural geology-</u></b>	the scientific study of the geological processes that deform the earth's crust and create mountains
<b><u>Subduction-</u></b>	the sinking of an oceanic plate edge as a result of convergence with a plate of lesser density. Subduction often causes earthquakes and creates volcano chains.
<b><u>Subsidence-</u></b>	the lowering of the earth's surface, caused by convergence with a plate of lesser density. Subduction often causes earthquakes and creates volcano chains.
<b><u>Sulfate-</u></b>	one of several containing positive sulfur ions bonded to negative oxygen ions.
<b><u>Sulfide-</u></b>	one of several minerals containing negative sulfur ions bonded to one or more positive metallic ions.
<b><u>Surface wave-</u></b>	one of a series of seismic waves that transmits energy from an earthquakes epicenter along the earth's surface. See also body wave.
<b><u>Surf zone-</u></b>	the area running from the shoreline to the farthest point in the sea where waves begin to break
<b><u>Surge-</u></b>	to flow more rapidly than usually. Said of a glacier
<b><u>Suspended load-</u></b>	a body of fine, solid particles, typically of sand, clay and silt, that travels with stream water without coming into contact with the stream bed
<b><u>Suture zone-</u></b>	the area where two continental plates have joined together through continental collision. Suture zones are marked by extremely high mountain ranges, such as the Himalayas and the Alps
<b><u>Swash-</u></b>	the rush of water onto a beach after a wave breaks
<b><u>S wave-</u></b>	(abbreviation for secondary waves) a body wave that causes the rocks along which it passes to move up and down perpendicular to the direction of its own movement.
<b><u>S wave shadow zone-</u></b>	the region within the arc of 1540 directly opposite an earthquake's epicenter that is marked by the absence of S waves. The S wave shadow zone is due to the fact that S waves cannot penetrate the liquid outer core. See also p wave shadow zone.
<b><u>Syncline-</u></b>	a concave fold, the central part of which contains the youngest section of rock. See also anticline.

## **T**

<b><u>Talus-</u></b>	a pile of rock fragments lying at the bottom of the cliff or steep slope from which they have broken off.
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<b><u>Tarn-</u></b>	a deep typically circular lake that forms when a cirque glacier melts.
<b><u>Tectonic creep-</u></b>	the almost constant movement of certain fault blocks that allows strain energy to be released without major earthquakes.
<b><u>Tension-</u></b>	stress that stretches or extends rocks, so that they become thinner vertically and longer laterally. Tension may be caused by divergence or rifting
<b><u>Tephra (plural noun)-</u></b>	pyroclastic materials that fly from an erupting volcano through the air before cooling, and range in size from fine dust to massive blocks
<b><u>Terminus-</u></b>	the outer margin of glacier
<b><u>Theory-</u></b>	a comprehensive explanation of a given set of data that has been repeatedly confirmed by observation and experimentation and has gained general acceptance within the scientific community but has not yet been decisively proven. See also hypothesis and scientific law.
<b><u>Thermal expansion-</u></b>	a form of mechanical weathering in which heat causes a mineral's crystal structure to enlarge
<b><u>Thermal plume-</u></b>	a vertical column of upwelling mantle material 100 to 250 kilometers in diameter that rises from beneath a continent or ocean and can be perceived at the earth's surface as a hot spot. Thermal plumes carry enough energy to move a plate, and they may be found at both at plate boundaries and plate interiors.
<b><u>Thrust fault-</u></b>	a reverse fault marked by a dip of 45° or less.
<b><u>Tidal bore-</u></b>	a turbulent, abrupt, wall like wave that is caused by a flood tide
<b><u>Tide-</u></b>	the cycle of alternate rising and falling of the surface of an ocean or large lake, caused by the gravitational pull of the sun and especially moon in interaction with the earth's rotation. Tides occur on a regular basis, twice every day on most of the earth. A single rise or fall within this cycle.
<b><u>Till-</u></b>	see glacial till
<b><u>Topography-</u></b>	the set of physical features, such as mountains, valleys, and the shapes of landforms, that characterizes a given landscape.
<b><u>Transition zone-</u></b>	the seismic discontinuity located in the upper mantle just beneath the asthenosphere and characterized by a marked increase in the velocity of seismic waves.
<b><u>Transform motion-</u></b>	the movement of two adjacent lithospheric plates in opposite directions along a parallel line at the common edge. Transform motion often causes earthquakes.

<b><u>Translatory-</u></b>	of concerning, or being the movement of water over a significant distance in the direction of a wave.
<b><u>Transport medium-</u></b>	a natural agent, such as water, air, or ice that moves a particle of particles from one location on the earth's surface to another.
<b><u>Transverse dune-</u></b>	one of a series of dunes having an especially steep slip face and a gentle windward slope and standing perpendicular to the prevailing wind direction and parallel to each other. Transverse dunes typically form in arid and semi arid regions with plentiful sand, stable wind direction, and scarce vegetation. A transverse dune may be as much as 100 kilometers long, 200 meters high and 3 kilometers wide.
<b><u>Travertine-</u></b>	crystalline deposits of calcium carbonate precipitated from solution, often found in caves.
<b><u>Tributary-</u></b>	a stream that supplies water to a larger stream.
<b><u>Trunk stream-</u></b>	a large stream into which tributaries carry water and sediment.
<b><u>Tsunami-</u></b>	a vast sea wave caused by the sudden dropping or rising of a section of the sea floor following an earth quake. Tsunami may be as much as 30 meters high and 200 kilometers long, may move as fast as 250 kilometers an hour, and may continue to occur for as long as a few days.
<b><u>Tuff-</u></b>	see volcanic tuff
<b>U</b>	
<b><u>Uniformitarianism-</u></b>	the hypothesis that current geologic processes, such as the slow erosion of a coast under the impact of waves, have been occurring in a similar manner throughout the earth's history and that these processes can account for past geologic events. See also catastrophism
<b><u>Unconformity-</u></b>	a boundary separating two or more rocks of markedly different ages, marking a gap in the geologic record.
<b><u>Upwarped mountain-</u></b>	a mountain consisting of a broad area of the earth's crust that has moved gently upward without much apparent deformation, and usually containing sedimentary, igneous, and metamorphic rocks.
<b><u>Uranium lead dating-</u></b>	a form of radio metric dating that relies on the extremely long half life of radioactive isotopes of uranium, which decay into isotopes of lead, to determine the age of rocks in which uranium and lead are present.

## V

<b><u>Valley glacier-</u></b>	an alpine glacier that flows through a preexisting stream valley.
<b><u>Van der waals bond-</u></b>	a relatively weak kind of intermolecular bond that forms when one side of a molecule develops a slight negative charge because a number of electrons have temporarily moved to that side of a molecule, and this negative charge attracts the nuclei of the atoms of a neighboring molecule, while the side of the molecule with fewer electrons develops a slight positive charge that attracts the electrons of the atoms of neighboring molecules.
<b><u>Varve-</u></b>	a pair of sediment beds deposited by a lake on its floor, typically consisting of a thick, coarse, light colored bed deposited in the summer and a thin, fine grained, dark colored bed deposited in the winter. Varves are most often found in lakes that freeze in the winter. The number and nature of varves on the bottom of a lake provides information about the lake's age and geologic events that affected the lake's development.
<b><u>Vent-</u></b>	an opening in the earth's surface through which lava, gases, and hot particles are expelled. Also called volcanic vent and volcano
<b><u>Ventifact-</u></b>	a stone that has been flattened and sharpened by wind abrasion. Ventifacts are commonly found strewn across a desert floor.
<b><u>Viscosity-</u></b>	a fluid's resistance to flow. Viscosity increases as temperatures decrease.
<b><u>Volcanic arc-</u></b>	a chain of volcanoes fueled by magma that rises from an underlying subducting plate.
<b><u>Volcanic cone-</u></b>	a cone shaped mountain that forms around a vent from the debris of pyroclastics and lava ejected by numerous eruptions over time.
<b><u>Volcanic crater-</u></b>	a steep, bowl shaped depression surrounding a vent. A volcanic crater forms when the walls of a vent collapse inward following an eruption.
<b><u>Volcanic dome-</u></b>	a bulb shaped solid that forms over a vent when lava so viscous that it cannot flow out of the volcanic crater cools and hardens. When a volcanic dome forms, it traps the volcano's gases beneath it. They either escape along a side vent of the volcano or build pressure that causes another eruption and shatters the volcanic dome.
<b><u>Volcanic rock-</u></b>	see extrusive rock
<b><u>Volcanic tuff-</u></b>	a solid rock made up of tephra that have consolidated and become cemented together. Also called tuff.
<b><u>Volcanism-</u></b>	the set of geological processes that result in the expulsion of lava, pyroclastics, and gases at the earth's surface.



**Volcano-**

the solid structure created when lava, gases, and hot particles escape to the earth's surface through vents. Volcanoes are usually conical. A volcano is "active" when it is erupting or has erupted recently. Volcanoes that have not erupted recently but are considered likely to erupt in the future are said to be "dormant". A volcano that has not erupted for a long time and is not expected to erupt in the future is "extinct".

**W****Watershed-**

see drainage basin

**Water table-**

the surface that lies between the zone of aeration and the underlying zone of saturation.

**Wave refraction-**

the process by which a wave approaching the shore changes direction due to slowing of those parts of the wave which enter shallow water first, causing a sharp decrease in the angle at which the wave approaches until the wave is almost parallel to the coast.

**Wave cut bench-**

a relatively level surface formed when waves erode the base of a cliff, causing the overlying rock to fall into the surf. A wave cut bench stands above the water and extends seaward from what remains of the cliff

**Weathering-**

the process by which exposure to atmospheric agents, such as air or moisture, causes rocks and minerals to break down. This process takes place at or near the earth's surface. Weathering entails little or no movement of the material that it loosens from rocks and minerals. See also erosion.

**Wetland-**

a lake, marsh, or swamp that supports wildlife and replenishes the groundwater system.

**Wind abrasion-**

the process by which wind erodes bedrock through contact between the bedrock and rock particles carried by the wind.

**Windward-**

of, located on, or being the side of a dune, hill, or ridge facing in to the wind. See also leeward

**Xenolith-**

a preexisting rock embedded in a newer igneous rock. Xenoliths are formed when a rising magma incorporates the preexisting rock. If the preexisting rock does not melt, it will not be assimilated into the magma and will therefore remain distinct from the new igneous rock that surrounds it.

**X**

**X ray diffraction-**

the scattering of x rays passed through a mineral sample so as to form a pattern peculiar to the given mineral.

**Yield point-**

the maximum stress that a given rock can withstand without becoming permanently deformed.

**Y**

**Z**

**Zone of ablation-**

the part of a glacier in which there is greater over all loss than gain in volume. A zone of ablation can be identified in the summer by an expanse of bare ice. See also zone of accumulation.

**Zone of accumulation-**

the part of a glacier in which there is greater overall gain than loss in volume. A zone of accumulation can be identified by a blanket of snow that survives summer melting. See also zone of ablation.

**Zone of aeration-**

a region below the earth's surface that is marked by the presence of both water and air in the pores of rocks and soil. Also called aeration zone.

**Zone of saturation-**

a region that lies below the zone of aeration and is marked by the presence of water and the absence of air in the pores of rocks and soil.