

# Glossary

## A

- absolute dating** – a method of estimating the age of a rock sample in years.
- accurate** – a measurement that is factual.
- active volcano** – a volcano that is erupting or that has erupted recently.
- aftershock** – a small tremor that follows an earthquake.
- air** – the mixture of gases that make up Earth's atmosphere.
- altitude** – a measure of the distance an object is above sea level.
- amplitude** – the vertical distance between a wave crest or trough and the average level of motion.
- aquifer** – a underground area of sediment and rocks that is filled with groundwater.
- asteroid** – an object that orbits the Sun but is too small to be considered a planet.
- asthenosphere** – the lower part of the upper mantle. Lithospheric plates slide on this layer.
- astronomical unit** – equal to 150 million km, or the distance from Earth to the Sun.
- atmosphere** – the layer of gases that surrounds Earth.
- atmospheric pressure** – a measure of the force per unit area of air molecules in the atmosphere given altitude.
- atom** – a particle of matter.
- aurora** – a phenomenon that occurs when Earth's atmosphere is energized by solar winds.
- axis** – the imaginary line that passes through the center of a planet from pole to pole.

## B

- barometer** – an instrument that measures atmospheric pressure.
- basalt** – a dark-colored igneous rock with fine crystals
- bathymetric map** – a map that shows the depths of a body of water such as a lake or an ocean.
- beach** – a sandy zone above the foreshore in a shallow marine environment.
- Big Bang theory** – a theory that the universe began as a huge explosion 10 billion to 20 billion years ago.
- biomes** – major climate regions with particular plant and animal communities. Earth has six important biomes.
- body waves** – seismic waves that travel through the interior of Earth.
- braided stream** – a stream that has many channels that crisscross each other.
- brightness** – measures the amount of light reaching Earth.
- buoyant force** – an upward lifting force that acts on an object when it pushes aside a fluid.

## C

- caldera** – the bowl-shaped vent of a volcano after it has erupted.
- cementation** – the process by which sediment particles are "glued" together to make sedimentary rock.
- channel** – the path that a river or stream follows.
- chemical weathering** – weathering of rock that involves chemical reactions.
- cinder cone** – a volcano that has low-silica magma with high levels of dissolved gas; these volcanoes produce "fire fountain" eruptions.
- cleavage plane** – a surface along which a mineral cleanly splits.
- climate** – the long-term record of temperature, precipitation, and wind for a region.
- cloud** – a group of water droplets or ice crystals that you can see in the atmosphere.
- coast** – the boundary between land and a body of water like the ocean.
- cold front** – a front that occurs when a cold air mass moves in and replaces a warm air mass.
- comet** – an object in space made mostly of ice and dust.
- compaction** – the process by which sediment is pressed together as more and more layers or beds of sediment form on top of each other.
- composite volcano** – a tall, explosive, cone-shaped volcano formed by layers of silica-rich lava and ash.
- condensation** – the process by which a substance in its gaseous phase loses energy and enters the liquid phase.
- conduction** – transfer of heat by direct contact of atoms and molecules.
- constellation** – a group of stars that, when seen from Earth, form a pattern.
- continental drift** – the idea that continents move around on Earth's surface.
- continental margin** – the region around continents that includes the continental shelf and continental slope.
- continental plates** – thick, less-dense lithospheric plates that are made of granite and form the continents.

**continental shelf** – the ocean bottom that extends from a coast; where the continental shelf ends, the ocean becomes distinctly deeper.

**contour lines** – curved lines on a map that indicate all the points where the elevation or depth is the same.

**contour lines** – curved lines on a topographic (or bathymetric) map that indicate all the points where the elevation is the same.

**control variable** – a variable that is held constant in an experiment.

**convection** – transfer of heat through the motion of liquids and gases.

**convection cells** – large wind patterns in Earth's atmosphere caused by convection.

**convergent boundary** – a lithospheric plate boundary where two plates come together.

**core** – the center of Earth; it is divided into the inner core and the outer core.

**Coriolis effect** – the bending of currents of air or water due to Earth's rotation.

**craters** – large, round pits formed by impacts from large space objects.

**crest** – the high point of a wave.

**cross bedding** – when a graded bedding pattern in a sedimentary rock is cut off and covered with another graded bedding pattern running in another direction.

**crust** – the outermost surface of Earth.

**crystallization** – the process by which crystals grow in size.

**cyclone** – a low-pressure center surrounded by rotating winds.

## D

**data** – pieces of information collected to test a hypothesis.

**deep ocean currents** – density- and temperature-driven currents that move slowly within the ocean, also called thermohaline currents.

**density** – the mass of an object divided by the object's volume.

**dependent variable** – a variable that is affected by the change to the independent variable.

**deposition** – the process of depositing sediment after it has been moved by water, wind, ice, or gravity.

**desert** – a climate region that averages less than 35 centimeters of rainfall per year.

**dew point** – the temperature at which more water condenses than evaporates in an air mass at a constant atmospheric pressure.

**direction of younging** – the order in which sedimentary rock layers are formed—from larger to finer particles.

**disturbance** – a movement that begins in one location and sets things in motion farther away.

**divergent boundary** – a lithospheric plate boundary where two plates move apart.

**dormant volcano** – a volcano that is not erupting now, but that may erupt in the future.

## E

**earthquake** – the movement of Earth's crust as a result of the buildup of friction between two lithospheric plates.

**element** – a substance composed of only one kind of atom.

**elevation** – the height of an object measured from a reference level.

**emissions** – tiny particles and gases released into the air.

**epicenter** – a point on Earth's surface right above the focus of an earthquake.

**equator** – an imaginary line around the middle of Earth between the north and south poles.

**erosion** – the process of moving sediment by wind, water, ice, or gravity.

**evaporation** – the process by which a substance in its liquid phase gains energy and enters its gaseous phase.

**exosphere** – the region of the atmosphere that begins at about 500 km above Earth and extends into space.

**experiment** – an activity performed to prove or disprove a hypothesis.

**extinct volcano** – a volcano that no longer erupts and is in the process of eroding.

**extrusive rock** – an igneous rock that forms outside of Earth's crust.

## F

**fault** – a region on Earth's surface that is split into two pieces.

**fetch** – the amount of open water over which wind blows.

**floodplain** – flat land near a river that tends to flood and that is usually located some distance from the source of the river.

**fluid** – matter that can flow, usually a liquid or a gas.

**focus** – the point below Earth's surface where a rock breaks and causes an earthquake.

**foreshock** – a small burst of shaking that occurs before a large earthquake.

**fossil** – a part of a dead animal or plant that has been preserved for a long time.

**fossil fuels** – substances found in Earth’s crust that were formed over millions of years from the remains of dead organisms.

**front** – the border between two different air masses.

**frost wedging** – physical weathering that results from freezing water.

## G

**galaxy** – a huge collection of gas, dust, and billions of stars.

**gas giants** – planets that are made mostly of hydrogen and helium.

**geologic time scale** – a model of the history of life on Earth.

**geology** – the study of rocks and rock formations.

**giant impact theory** – explains how the Moon was formed.

**glacier** – a huge mass of ice that forms on land when snow and ice accumulate faster than they melt.

**globe** – a map of Earth that models its shape, and the locations and relative sizes of oceans and continents.

**graded bedding** – the order of rocks from large to small that settle on a lake or pond bottom when water flow slows down.

**gram** – the basic unit of mass in the SI Units measuring system; one-thousandth of a liter.

**granite** – an igneous rock with large, visible crystals, formed from silic-rich magma.

**graph** – a picture that shows how two variables are related.

**grasslands** – climate regions with too little rainfall to support a forest. Grasslands have grasses as the main vegetation.

**gravitational force** – the force of attraction between all objects.

**groundwater** – water that collects under ground.

**gyres** – large rotating ocean current systems.

## H

**half-life** – the amount of time it takes for half of the unstable atoms in a sample to decay.

**heat** – a form of energy caused by the motion of atoms and molecules.

**high-pressure center** – a high-pressure area created by sinking cold air.

**hot spot** – the top of an established mantle plume.

**humus** – the dark, organic material in soil produced by the decay of plant and animal matter.

**hurricane** – a tropical cyclone with wind speeds of at least 74 miles per hour (119 kilometers per hour).

**hydrosphere** – an Earth system that includes all the water on the planet.

**hypothesis** – a possible answer to a scientific question based on observations.

## I

**inergy** – a measure of a system’s ability to change.

**igneous rock** – a rock formed from the cooling and crystallizing of magma or lava.

**independent variable** – a variable that is changed in an experiment.

**inference** – a statement based on experiences.

**international dateline** – an imaginary longitude line located 180 degrees from the prime meridian.

**intertidal zone** – the zone of a marine environment below the beach and between the high and low tide lines; also called the foreshore.

**intrusive rock** – an igneous rock that forms inside of Earth’s crust.

**ion** – a charged element or molecule.

**ionosphere** – portions of the atmosphere in the region of the thermosphere where electricity can be transmitted.

**isobar** – a line on a weather map that connects places that have the same atmospheric pressure.

## J

**jet streams** – high-altitude, fast-moving winds.

## K

**kinetic energy** – motion energy.

## L

**lahars** – a mudflow that results from a volcanic eruption.

**landslide** – a large mass of soil or rock that slides down a volcano or mountain. Landslides can be caused by volcanic events, earthquakes, or other factors.

**latitude** – east-west lines that are north or south of the equator.

**lava** – magma that has reached and cooled on Earth’s surface.

**lava bombs** – blobs of glowing lava thrown from an explosive eruption.

**lava lake** – a lake that contains lava that has formed in a caldera.

**law of universal gravitation** – states that the strength of the gravitational force depends on the mass of the objects and the distance between them.

**leaching** – a process by which water dissolves substances and causes them to be removed from one location to another.

**legend** – a special area on a map that lists the symbols that are used.

**light year** – a measurement that is equal to the distance that light travels through space in one year.

**lightning** – a bright spark of light that occurs inside a storm cloud, between a cloud and Earth's surface, or between two clouds.

**liter** – the basic unit of volume in the SI Units measuring system.

**lithosphere** – a layer of Earth that includes the crust and a thin part of the upper mantle.

**lithospheric plates** – large pieces of Earth's lithosphere that move over the asthenosphere.

**longitude** – north-south lines that are east or west of the prime meridian.

**longshore drift** – the flow of sand along a coast.

**low-pressure center** – a low-pressure area created by rising warm air.

**luminosity** – the total amount of light given off by a star.

**lunar cycle** – the gradual change in the appearance of the Moon due to the positions of Earth, the Moon, and the Sun.

**lunar eclipse** – occurs when Earth's shadow falls on the moon.

## M

**magma** – underground melted rock.

**magma chamber** – a location where magma collects inside Earth.

**mantle** – the warm, flowing, solid layer of Earth between the crust and the core.

**mantle plume** – heated lower mantle rock that rises toward the lithosphere because it is less dense than surrounding mantle rock.

**marine** – a term that describes things that are part of the ocean.

**mass** – the amount of matter that an object has.

**mass wasting** – the downhill movement of large amounts of rock and sediment due to the force of gravity.

**matter** – the substance of all objects; all matter is made of atoms and has mass.

**meanders** – S-shaped curves in a river.

**measurement** – a number that includes a unit.

**Mercalli Intensity scale** – a scale that rates the damage suffered by buildings, the ground, and people during an earthquake.

**mesosphere** – a layer of atmosphere that occurs from about 50 km to 80 km above Earth's surface.

**metamorphic rock** – a rock formed from another rock because of heat and pressure.

**meteor** – a chunk of burning rock traveling through Earth's atmosphere.

**meteorite** – a meteor that passes through Earth's atmosphere and strikes the ground.

**meteorologist** – an individual who uses scientific principles to forecast the weather.

**meter** – the basic distance unit for the SI Units system of measurement.

**mid-ocean ridges** – long chains of undersea mountains.

**mineral** – a solid, naturally-occurring, crystalline object with a defined chemical composition.

**Mohs hardness scale** – a scale to identify minerals based on their hardness or resistance to being scratched.

**Moment Magnitude scale** – a scale that rates the total energy released by earthquakes.

## N

**natural resource** – a feature of Earth that benefits people.

**nebula** – a huge cloud of gas (mostly hydrogen) and dust from which stars are formed.

**nonrenewable resource** – a natural resource that is not replaced as it is used.

## O

**oceanic plates** – thin, dense lithospheric plates that are made of basalt and form the ocean floor.

**orbit** – regular, repeating path that an object in space follows around another object.

## P

**paleontologist** – a scientist who studies and identifies fossils.

**Pangaea** – an ancient, huge landmass composed of earlier forms of today's continents; an ancient supercontinent.

**percolation** – the process of liquid moving through a porous substance.

**period** – the time it takes for one wavelength to pass a single point.

**permafrost** – a permanently frozen soil located from 25 to about 100 centimeters below Earth's surface.

**petroleum** – another name for the natural resource called oil.

**physical weathering** – physical forces that break rocks down into smaller pieces.

**planet** – a massive object orbiting a star like the Sun.

**plate tectonics** – a theory explaining how the pieces of Earth's surface (the plates) move.

**pollution** – a change to the environment that is harmful to humans or other living things.

**potential energy** – stored energy.

**power plant** – a place where electricity is generated.

**precipitation** – condensed water vapor in the atmosphere falling back to Earth in the form of rain, hail, sleet, or snow.

**precise** – a measurement that is consistent although it may or may not be accurate.

**prime meridian** – an imaginary line through Greenwich, England that is perpendicular to the equator.

**P-waves** – seismic waves that move with a forward-and-back motion; these waves are faster than S-waves.

**pyroclastic flow** – a destructive cloud of volcanic material that moves quickly down the side of a volcano after an explosive eruption.

## R

**radiation** – heat transfer that involves energy waves and no direct contact or movement by atoms.

**radioactive decay** – refers to how unstable atoms lose energy and matter over time.

**relative dating** – a method of putting events in the order in which they happened.

**relief** – the distance between a high and low place on a map.

**renewable resource** – a natural resource that can be replaced.

**reservoir** – a protected artificial or natural lake that is used to store water.

**resource conservation** – protecting, preserving, and managing Earth's natural resources.

**resurgent dome** – a mound in the vent of an erupted volcano.

**revolution** – the motion of Earth moving around the Sun; one revolution is called a year.

**Richter scale** – a scale that rates earthquakes according to the size of the seismic waves.

**Ring of Fire** – a region of Earth's plate boundaries where oceanic crust is subducting under other plates.

**river** – a large body of water that flows into an ocean or lake.

**rock** – a naturally-formed solid made of one or more minerals.

**rock cycle** – the formation and recycling of rocks by geologic processes.

**rockfall** – an event that results in a large amount of rock splitting off of a landform.

**rotation** – the motion of Earth spinning on its axis; one rotation is called a day.

## S

**salinity** – a term that describes the saltiness of water.

**satellite** – an object in orbit around another object.

**science** – a process for answering questions.

**scientific law** – a statement that describes an observed phenomenon; it is supported by evidence collected from many observations and experiments.

**scientific method** – a series of steps including observation, forming a question, stating a hypothesis, collecting data, and reaching a conclusion.

**scientific notation** – a mathematical abbreviation, using powers of 10, for writing very large or very small numbers.

**scientific theory** – a statement that explains a complex idea; it is supported by evidence collected from many experiments.

**sea level** – the average level of the ocean; the halfway point between high tide and low tide.

**sea-floor spreading** – a hypothesis that new sea floor is created at mid-ocean ridges and that in the process the continents are pushed apart from each other.

**sediment** – small rock particles, minerals, and bits of once living things.

**sedimentary rock** – a rock made of sediments that are cemented together by pressure and chemical changes.  
**seismic waves** – vibrations that travel through Earth and are caused by events like earthquakes or human-made blasts.  
**seismograph** – an instrument that measures and records seismic waves.  
**seismologist** – a scientist who detects and interprets seismic waves.  
**shield volcano** – a flat and wide volcano that has low-silica magma with low or high levels of dissolved gas.  
**slope** – a measure of how steep land is, also called gradient.  
**slumping** – an event that occurs when soil particles become surrounded by water so that the ground sinks or "slumps."  
**slumping** – an event that occurs when soil particles become surrounded by water so that the ground slides or "slumps."  
**soil** – the portion of Earth's surface that consists of organic matter, sediment, air, and water.  
**soil profile** – cross-section that shows the different layers of soil in the ground.  
**solar eclipse** – an eclipse that takes place when the new moon passes between Earth and the sun and the shadow formed reaches Earth; may be classified as total, partial, or annular.  
**solar energy** – energy from the Sun.  
**solar system** – the Sun and all objects that are bound by gravitational force to the Sun.  
**specific heat** – the amount of energy needed to raise the temperature of 1 gram of a substance by 1 degree Celsius.  
**spectroscopy** – a measurement of the electromagnetic radiation (including visible light) produced by a star or other object (called its spectrum).  
**star** – a giant, hot ball of gas held together by gravity.  
**storm cell** – a convection cell within a cloud that is associated with a storm.  
**stratosphere** – a layer of atmosphere that occurs from about 11 km to 50 km above Earth's surface.  
**stream** – a small river.  
**subduction** – a process that involves a lithospheric plate sinking into the mantle.  
**sunspot** – a dark area in the photosphere of the sun caused by a lowered temperature.  
**surface ocean currents** – wind-driven currents that move at the ocean surface, often for long distances.  
**surface runoff** – water that flows over land until it reaches lakes, rivers, and oceans.  
**surface water** – water found on Earth's surface in places like oceans, lakes, rivers, and reservoirs.  
**surface waves** – body waves that reach and travel along Earth's surface.  
**S-waves** – seismic waves that move with a side-to-side motion and are slower than P-waves.  
**swells** – long, fast-moving waves.  
**system** – a group of objects and the factors that affect the objects.

## T

**taiga** – the largest climate region, found in the higher latitudes; also known as a boreal or coniferous forest.  
**telescope** – any device that collects radiation, which may be in the form of electromagnetic or particle radiation, from a limited direction in space.  
**temperate deciduous forests** – climate regions in the midlatitudes that have seasons.  
**temperature** – measure of the speed of an individual atom or the average speed of a sample containing lots of atoms.  
**terrestrial planets** – planets that are made mostly from rock and metal.  
**thermal** – small heat-driven air current.  
**thermosphere** – a layer of atmosphere that occurs from about 80 km to about 500 km. This layer has a low density of air molecules and a very high temperature.  
**thunder** – a sound that occurs when a lightning spark heats air and the air expands.  
**tidal flat** – a flat, muddy area in the intertidal zone.  
**tide** – the daily rising and falling of an ocean's water levels.  
**topographic map** – maps that use contour lines to show elevation.  
**tornado** – a system of rotating winds around a low-pressure center. A tornado is smaller than a hurricane, but has faster winds.  
**transform fault boundary** – a lithospheric plate boundary where two plates slide by each other.  
**transpiration** – the process by which plants lose water through tiny pores on their leaves.  
**trench** – a valley in the ocean created where one lithospheric plate subducts under another.  
**tropical rainforests** – climate regions found near the equator that have a lot of rainfall and high biodiversity.  
**troposphere** – a layer of atmosphere that occurs from 0 to about 11 kilometers above Earth's surface and where all weather occurs.  
**trough** – the low point of a wave.  
**tsunami** – a huge wave made by a large disturbance like an underwater earthquake, landslide, or volcanic eruption.  
**tundra** – a climate region located in high latitudes; known as the coldest land biome.

## U

**unit** – a specific quantity that is counted to make a measurement.

**universe** – everything that exists, including all matter and energy.

## V

**variable** – a factor that affects an object; examples include mass, temperature, speed, and time.

**volcanic island** – a volcano that forms away from a plate boundary on an oceanic plate.

**volcanic island chain** – a series of volcanoes formed by a hot spot as a lithospheric plate moves over the hot spot.

**volcanic neck** – solid remains of magma that filled the conduit of an extinct volcano. The neck is exposed as the volcano erodes.

**volcano** – an erupting vent through which molten rock reaches Earth's surface, or a mountain built from the products of an eruption.

**volume** – a measurement of how much space is occupied by an object.

## W

**warm front** – a front that occurs when a warm air mass moves in and replaces a cold air mass.

**water cycle** – a set of processes energized by the Sun that keep water moving from place to place on Earth.

**water table** – the upper level of water under ground. Below the water table, all spaces are filled with groundwater.

**water vapor** – water in gas form.

**watershed** – an area of land that catches all precipitation and surface runoff and collects it in a body of water such as a river.

**wave train** – many waves traveling together.

**wavelength** – the distance between two wave crests, or the distance between two wave troughs.

**weather** – the condition of the atmosphere as it is affected by wind, water, temperature, and atmospheric pressure.

**weathering** – the process of breaking down rock and minerals.

**weathering** – the process of breaking down rock.

**weight** – a measure of mass and the force of gravity on an object.

**wind** – air that flows, often because of heating and cooling of air or unequal air pressure.