

A glossary is an alphabetical list of important words found in the sections in this book. Use this glossary just as you would use a dictionary: to find out the meaning of unfamiliar words. This glossary gives the meaning that applies to the words as they are used in the sections of this book. As with any subject, science has its own vocabulary. The study of science is more meaningful if you know the language of science.

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 become 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. Formed from lava that is not silica-rich.

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 silica-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 underground.

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

energy – 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 or from 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 underground. 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.