EARTH SCIENCE GLOSSARY

abrasion the process of particles rubbing against each other, wearing down the sharp edges into smaller pieces.

absolute magnitude how bright a star appears from 32.6 light years away.

absolute zerotemperature at which all molecular motion ceases (0°K, −273.15°C, or −459.67°F).

acid test tests a mineral or rock for calcite or calcium in its composition.

active continental margin plate boundary where mountains are formed.

active volcano volcano that has erupted in recorded history.

advected fog fog caused by air moving from one region to another region with a different surface temperature.

advection movement of air from one area to another, creating unusually warm or cold conditions.

air mass large mass of air at the surface of the Earth with similar characteristics of temperature and humidity throughout the mass.

albedo reflection of sunlight.

altitude angle of a celestial object above the horizon.

anemometer instrument used to determine wind speed.

anticline parallel rock layers folded upward, like an arch.

aphelion point in an orbit farthest from the Sun.

apogee point in an orbit farthest from the Earth.

apparent diameter the diameter of an object as it appears to an observer; changes with distance.

apparent magnitude how bright a star appears to someone on Earth.

arid climates that are extremely dry, with low precipitation and high evapotranspiration.

asteroid belt the orbiting band of rocks between Mars and Jupiter.

asthenosphere the outer layer of the Earth's mantle, which has a plastic-like composition; site of convection currents that move the plates on the surface.

astronomical unit measurement used in the solar system, the average distance from the Earth to the Sun (150,000,000 km or 93,000,000 mi).

atmosphere the gas layer surrounding the Earth.

atoll ring of coral reefs surrounding a sunken island.

aurora light created in the sky by the interference of charged solar particles with the magnetic field of the Earth.

autumnal equinox September 23, when the vertical ray of the Sun is at the Equator; the entire Earth has 12 hours of day and 12 hours of night.

azimuth direction along the horizon when looking for an object in the sky.

big-bang hypothesis says that origin of the universe was when all matter was collected together and exploded, about 15 billion years ago.

blue shift apparent shortening of starlight as it moves toward you (Doppler).

buoyant describes a property that causes materials to appear to float in or on a fluid.

caldera extinct volcano that has a collapsed cone.

capillary water that works its way upward in the ground through adhesion to rock particles and cohesion to itself.

carbonates the family of minerals composed of carbon and oxygen.

Cephid a star that varies in its light output.

chemical weathering the breaking down of rock material by chemical means, forming a new substance.

chromosphere reddish layer of the Sun that is hydrogen burning.

cinder cone steep cone of a volcano formed from ash and loose rock.

cirrus very high clouds formed by ice crystals; look like feathers; usually associated with fair weather.

clastic pieces of rocks.

cleavage the way a mineral splits or breaks along weak bonds in planes.

climate the overall temperature, precipitation, and weather conditions for an area.

cold front the leading edge of a cold air mass.

color an easy test in the identification of minerals, but not always reliable.

column pillar of rock formed when a stalactite and stalagmite merge.

comet a mass of frozen gases, ice, and rock that orbits the Sun.

composite volcano a volcano consisting of a cone of alternating layers of solidified lava and rock particles.

compound a molecule made up of two or more elements.

condensation the process of a substance changing states from gas to liquid.

conduction transfer of energy through solids by direct contact.

constellation a group of stars that appears to be in a pattern.

contact metamorphism the process of changing rocks into metamorphic rocks by nearby magma.

continental glacier a thick sheet of ice covering a mass of land all year round, moving outward from the thickest part; found only in Greenland and Antarctica.

continental rise area which connects the continental slope to the ocean floor.

continental shelf ocean bottom along the coasts with a low gradient.

continental slope ocean bottom that connects the continental shelf to the deep ocean floor.

contour farming planting crops along contour lines on a hill to help prevent soil erosion.

contour interval the elevation difference between contour lines.

contour line line connecting points of equal elevation.

convection transfer of energy in fluids; can create currents by density differences.

converging plate boundary region where plates move toward each other.

coordinate system rectangular grid system for plotting points.

Copernicus, Nicholas astronomer who developed the heliocentric model.

corona outermost layer surrounding the Sun.

crater impact mark left on a planet or moon by a collision with a another object.

craton core rock base of a continent.

creep slow movement of rocks and sediments down a hillside.

crust the thin, outer layer of the solid part of the Earth.

crystal shape the arrangement of molecules in a mineral.

cumulonimbus cumulus cloud that builds vertically; usually associated with a cold front and thunderstorms.

cumulus puffy, cotton-like clouds formed by rising air.

cyclogenesis the process of forming storm systems.

deficit time during the water budget when drought conditions occur; there is not enough water to supply the needs of an area.

delta a triangle-shaped area of deposition located at the mouth of an older river.

density the amount of matter in a given space.

deposition the rare process of a substance changing states from gas directly to a solid.

derived unit unit that is a combination of basic units.

dew point) temperature at which water vapor condenses into liquid water.

discharge the amount of water in a river or stream that passes a certain point in a given amount of time.

diverging plate boundary region where plates move apart.

doldrums region along the Equator where the weather conditions are fairly consistent.

dormant volcano volcano that has not erupted during recorded history.

drainage basin the area around a stream that could drain into the stream.

drainage divide the outer edge between drainage basins.

drift small particles carried away from larger rocks by glacial meltwater.

drizzle liquid precipitation that is less than .02 cm in diameter.

dry adiabatic lapse rate rate at which dry air cools as it rises upward.

dry-bulb temperature temperature of the air.

dynamic equilibrium a system that fluctuates, but overall is in balance.

El Niño, La Niña long-term weather patterns associated with changing global winds and ocean temperatures in the Pacific Ocean.

electromagnetic spectrum diagram that breaks down energy by wavelength.

epicenter location on the Earth's surface directly above the focus of an earthquake.

epicycle small circle made by a planet's orbit in the geocentric model.

equilibrium a system that is in balance.

erosion the transportation of weathered materials.

erratic a large rock that is deposited by a glacier.

explosive eruption volcanic activity containing thick lava and more gases under pressure; creates steeper cones.

extrusive rock that forms on the Earth's surface.

eye center of circulation in a hurricane, where the conditions are calm.

eye wall area surrounding the eye of a hurricane, where winds are most intense.

fault a crack or break in a rock.

fault plane the surface that rocks move along when plates shift.

fault-block mountains mountain range formed when sections of sedimentary rocks are tilted upward in sections.

felsic magma that is aluminum or silica based, lighter in color, and less dense than mafic magma.

fetch length of open ocean for wind to create waves.

field an area where there is a measurable amount of a specific value at every point.

flood plain the area along the banks of a meandering river that are prone to flooding at various times.

focus exact site of the origin of an earthquake, below the epicenter.

folded mountains mountain range formed by the collision of continental plates, causing the rock layers to be crumpled.

foliated texture layered mineral crystals in a metamorphic rock.

fossil evidence that life was present, preserved in a rock.

fracture the uneven breaking or cracking of a mineral.

front the boundary between two air masses.

frost point dew point temperature, below 0°C.

Fujita scale scale for measuring the intensity of a tornado from F0 to F5.

Galileo scientist whose observations supported the Copernican model.

geocentric a model in which Earth is at the center of the universe.

geyser groundwater deep in the Earth that turns to steam and is forced to the surface when enough pressure is generated.

granule one of the individual cells that make up the photosphere of the sun.

graphical model a graph showing relationships.

greenhouse effect incoming (shortwave) energy is reradiated as heat energy (longwave) and trapped by the greenhouse gases in the atmosphere; causes global warming.

greenhouse gas a gas produced from burn fossil fuels, which hold and trap heat energy; carbon dioxide is an example.

ground fog fog formed by radiational cooling.

guyot flat-topped seamount, eroded by ocean waves while exposed.

hail layers of ice formed in a large thunderstorm cloud that fall to Earth.

half-life the amount of time it takes a radioactive element to decay into half of its original mass.

heliocentric sun-centered model of the solar system.

Horse Latitudes area of little surface winds and high pressure along 30° N latitude.

hot spot weak or thin area in a plate that allows magma to rise up and reach the surface.

hot spring groundwater heated by magma rising to the surface through an opening in the ground.

hurricane low-pressure system with sustained winds of 74 mph or greater.

hydrosphere the water layer of the Earth.

hygrometer an instrument used to measure humidity; can be made from hair.

igneous rock formed when molten rock cools.

impermeable rock that water cannot sink into or through.

index fossil a fossil of an organism that occurred for a short amount of time and over a widespread area; used to connect rock layers over long distances.

inference an educated guess based on collected data.

infiltration water sinking into the ground.

inner core the solid center of the Earth, composed of iron and nickel.

insolation a combination of the words *incoming solar radiation*.

instrument tool used to extend your senses and gather data.

International Date Line the longitude line measuring 180° where the day changes.

Intertropical Convergence Zone area along the Equator where trade winds from the Northern and Southern hemispheres meet, forming thunderstorms.

intrusion magma that crosses through other rock layers, cooling and hardening before reaching the surface.

intrusive rock that forms below the Earth's surface (plutonic).

inversion an atmospheric condition where warm air is on top of cold air.

isobar line connecting areas of equal pressure on a map.

isoline line that connects equal values.

isosurface three-dimensional diagram showing surfaces connecting equal values.

isotherm line connecting areas of equal temperature on a map.

isotopes two elements that have the same atomic number but different atomic masses.

jet stream band of fast-moving air in the upper troposphere.

Jovian planet outer planet (Jupiter, Saturn, Uranus, and Neptune) consisting of a gaseous surface.

Kepler, Johnannes astronomer who developed three laws of planetary motion: planets move in elliptical orbits; planets sweep out equal area in equal time; the period of revolution is proportional to the distance to the Sun.

kettle a steep-sided pond created by a glacier when a block of ice is left behind as the glacier retreats.

key bed a layer in the rock record showing an event that occurred quickly and over a widespread area; is used like an index fossil.

land breeze local wind that forms at night along a beach due to uneven cooling rates of land and water, wind moves from land to water.

lateral moraine the pile of rocks that accumulate along the edges of a glacier.

latitude coordinate lines for locating a position on Earth that run east and west and are parallel to each other, running from 0° to 90° (angle from the equator).

lava liquid rock on the surface of the Earth.

leeward the side opposite from the prevailing wind direction.

lifting condensation level formula used to find the height at which clouds can form.

light year the distance that light travels in one year, about 9.5 trillion kilometers.

lightning electricity generated by a thunderstorm.

line graph points plotted on a coordinate system and connected with a line.

lithosphere the rock layer on the outer edge of the Earth.

local noon occurs when the Sun is at its highest point for the day.

longitude coordinate lines for locating position on Earth that run north and south through the poles, are farthest apart at the Equator, run from 0° to 180°, are equal in length, and are measured from the Prime Meridian.

longshore current a current moving parallel to the coast.

low-pressure center counterclockwise circulation center, formed along a stationary front in the Northern Hemisphere.

luminosity actual brightness of a star.

lunar eclipse the Moon goes out of view as it moves into the Earth's shadow; occurs during the Full Moon phase.

luster the way a mineral shines in reflected light.

L-wave longitudinal wave created by the P-wave and S-waves of an earthquake at the surface of the Earth; these are the slowest and move outward like ripples on a pond.

mafic magma that is iron or magnesium-based, darker in color, and more dense than felsic magma.

magma liquid rock below the Earth's surface.

magnetic declination the number of degrees that a compass needle is pulled away from True North to point toward Magnetic North.

Magnetic North the area near Hudson Bay, Canada, where the Earth's magnetic field is strongest in the Northern Hemisphere (location changes over time).

main sequence star star that falls into broad band along the H-R diagram.

mantle the layer below the crust; about 2,900 km thick; contains rocks rich in iron, magnesium, and silicon.

maria large, flat areas on the Moon.

Marianas Trench deepest trench in the world; lies off the coast of Japan.

mathematical model an equation representing an idea.

matter anything that has mass and takes up space.

mechanical model a physical model with moving parts.

mechanical weathering the physical breaking down of rock, changing only its size (smaller); examples are ice wedging, plant action, and pressure unloading.

medial moraine the moraine created when two glaciers meet and their lateral moraines merge.

mental model an idea or model that exists in your mind.

Mercalli Scale scale for measuring earthquakes based on obsevations.

meridian line of longitude.

mesopause region between the mesosphere and the thermosphere.

mesosphere part of the atmosphere between the stratosphere and the thermosphere; temperatures decrease with altitude.

metamorphic existing rock that undergoes extreme heat or pressure and is recrystallized.

meteor a meteoroid that enters the Earth's atmosphere; also known as a shooting star.

meteorite a meteor that reaches the surface of the Earth.

meteoroid a rock fragment orbiting in the solar system.

mid-latitude low low-pressure system that forms along a stationary front.

mid-ocean ridge area between two diverging plates, where magma reaches the surface and causes an area of increased elevation and new crust along the ocean floor.

Milankovic period long term climate changes due the wobble of the Earth's revolution around the Sun.

Milky Way galaxy the spiral galaxy that includes our solar system near its outer edge.

model a scale representation of another object or idea.

Moh's hardness scale a relative scale ranging from 1 to 10, measuring whether a mineral can scratch another mineral.

moist adiabatic lapse rate rate at which humid air cools as it rises upward.

monsoon seasonal wind pattern changes that cause rainy and dry seasons.

moraine large area of deposition left behind from the advance of a glacier.

natural selection theory by Charles Darwin which states that organisms best fit for their environment will survive and pass along these traits.

neap tide tide with the smallest tidal range; during both quarter phases.

nebula a cloud of gas and dust in space.

Newton, Issac developed the universal law of gravity.

nonrenewable resources natural resources that cannot be replenished for millions of years, if at all.

normal fault fault that occurs when rocks are pulled apart, causing one side to move downward.

oblate spheroid the shape of the Earth; not a perfect sphere, but flatter at the poles and slightly bulging at the Equator.

observation data that is collected through your senses.

occluded front front that forms when a cold front catches up to a warm front.

orogeny a mountain-building period or event.

outer core the iron- and nickel-rich liquid layer near the center of the Earth.

outgassing gases that escape to the atmosphere during volcanic eruptions.

outwash plain sandy area downstream from a moraine created by drift particles and meltwater from a glacier.

overriding plate crustal plate which collides with a more dense plate and moves above the plate.

overturning rock layers that are flipped upside-down during the mountain-building process.

parallax) the apparent change in the position of stars due to Earth's revolution.

parallels lines that never meet, such as latitude.

passive continental margin area along the coast where sediments are deposited.

pause a region separating two layers of the atmosphere.

penumbra the lighter, gray area of a shadow.

percent error formula used to find the inaccuracy of a measurement.

perigee position in an orbit that is closest to the Earth.

perihelion point in an orbit that is closest to the Sun.

permeability the rate at which water sinks into the ground.

photosphere outer layer of the Sun.

physical model a representation of an object that you can hold.

phytoplankton microscopic plants floating freely in the ocean.

plutonic rock that forms below the Earth's surface (intrusive).

Polaris the North Star, located in the Little Dipper constellation.

pollution a substance that harms living organisms or the environment.

porosity the percentage of open space between soil particles and rocks.

porphyritic texture rocks that have different-sized crystals, created at different times.

prevailing westerlies planetary winds between 30° and 60° latitude; they guide weather systems for the United States (from SW to NE).

prime meridian 0° longitude line, running though Greenwich, England.

profile side view of land on a topographic map.

psychrometer an instrument with a dry-bulb thermometer and a wet-bulb thermometer; used to measure dewpoint and relative humidity.

Ptolemy astronomer who developed the geocentric model.

pulsar a star that sends energy out in pulses.

punctuated equilibrium theory that organisms just "appear" on Earth.

P-waves primary waves generated by an earthquake; these compression waves are the fastest and travel through solids, liquids, and gases.

radiation transfer of energy through a vacuum; the way in which the Sun supplies the Earth with energy.

radioactive element an atom that emits gamma rays, alpha particles, and beta particles; can be used to determine age.

radiosonde weather balloon that carries instruments to record data and transmit readings to a base unit.

rain liquid precipitation larger than .02 cm in diameter.

recharge the period of time during the water-budget cycle when the water in the ground is being replenished.

red giant stage of the life cycle of a star in which it expands and cools.

red shift apparent lengthening of starlight as it moves away from you (Doppler).

regionally metamorphic rock that undergoes intense heat and pressure over large areas.

relative humidity a measure of how much water is in the air compared to how much it can hold, given as a percentage.

renewable resources energy sources or other natural resources that are replenished shortly after being used.

retrograde motion the apparent backward movement of a celestial object.

reverse fault rocks that crack and are thrust upward, forming an overhang; caused by the compression of rocks.

Richter Scale scale for measuring earthquakes based on energy released.

rift eruption lava flows in long, narrow cracks of the Earth's crust.

rift valley the space between diverging plates.

rip currents strong surface currents that move like small rivers perpendicular to the shoreline, caused by water returning from the beach to the ocean.

rock cycle the continuous flow from one type of rock to another.

Saffir-Simpson scale scale for measuring hurricane intensity, from Category I to Category V.

salinity amount of dissolved salts in water.

saturated cannot hold any more water, as in groundwater or air (humidity).

scalar field values that measure magnitude.

scale the proportion of a model in relation to the original.

scientific notation a method of converting very large or very small numbers into a convenient value using exponents.

sea breeze local wind that develops during the day along a beach due to uneven heating of land and water; wind moves from water to land.

seamount underwater mountain.

sedimentary rock formed from the compaction and cementation of fragments from other rocks.

seismogram paper record graphing earthquake motions, created by a seismograph.

seismograph machine that detects earthquakes.

severe thunderstorm thunderstorm that has winds in excess of 50 mph and can produce large hail.

shadow zone area of the Earth shielded from earthquake waves by the outer core (where S-waves are absorbed and P-waves are refracted).

shield cone broad cone of a volcano resulting from smooth lava flows.

silicates group of minerals with silicon and oxygen as a base.

sliding plate boundary region where plates move next to each other.

sling psychrometer a handheld psychrometer than spins around, used to measure dewpoint and relative humidity.

slip face the back side of a sand dune.

slump rock material that is moved downhill as a block of land is uplifted.

solar eclipse event in which the view of the Sun is blocked by the Moon during a New Moon phase, when the Moon's shadow reaches the Earth.

solar noon the highest point of the Sun on any day.

solar prominence flame-like arc extending out from the Sun.

specific gravity the relative density of a mineral, compared to water.

specific humidity) a measure of how much water is actually in the air.

spectroscope instrument for separating visible light into colors.

spiral galaxy galaxy with bands of stars that rotate around the center.

spring tide extreme tides during Full and New Moon phases.

stalactite rock icicle forming from the ceiling of a cave.

stalagmite rock formation rising up from a cave floor.

station model a diagram on a weather map showing weather data from a specific city at a given time.

stationary front initial boundary between two air masses.

storm surge bubble of water carried by a hurricane, causing coastal flooding.

stratopause the region between the stratosphere and the mesosphere.

stratosphere the layer of the atmosphere above the troposphere; temperature increases with altitude.

stratus layered, sheet-like clouds, usually associated with warm fronts and found at lower altitudes.

streak the color of the powder left behind when a mineral is rubbed along an unglazed porcelain tile.

striations parallel scratches on the Earth's surface caused by rocks dragged by a glacier; the scratches point in the direction of the glacial movement.

strike-slip fault a fault where rock plates move horizontally to each other.

subducting plate crustal plate which collides with another plate and moves under it.

sublimation the rare process of a substance changing states from solid directly to a gas.

subsidence land sinks into the sea; opposite of uplifting.

summer solstice June 21, when the vertical ray of the Sun is at the Tropic of Cancer (23.5° N latitude), and is the longest day of the year in the Northern Hemisphere.

sunspot cooler area on the surface of the Sun.

supercell thunderstorm with strong updrafts that exist for hours and can spawn tornadoes.

supernova the explosion of a star.

surplus the period of time when the precipitation exceeds the needs for an area and the ground is saturated; runoff occurs, causing flooding conditions.

S-waves secondary waves created by an earthquake; these shearing waves move at right angles to the path of travel and are stronger than P-waves, but only move through solids.

syncline parallel rock layers folded downward in a valley-like formation.

talus a pile of rocks at the bottom of a hill.

terminal moraine a moraine created at the end of the advance of a glacier.

terrane large pieces of rock that are moved large distances; can be from another plate.

terrestrial planet inner planet (Mercury, Venus, Earth, and Mars) with a rocky surface.

thermocline zone in water where the temperature changes drastically.

thermosphere uppermost layer of the atmosphere; temperatures increase with altitude.

thin-skinned thrusting thin, horizontal sheets of rock from the edge of a continent are forced inland.

till an unsorted pile of sediment left behind when a glacier melts.

topographic map map that shows elevations above sea level.

tornado narrow, funnel-shaped column of wind created by a thunderstorm.

trace fossil evidence that life existed in the past, such as footprints and burrows.

trade winds planetary winds between 0° and 30° latitude.

transform plate boundary region where plates move next to each other.

transparent light can pass through the substance.

trench a deep canyon in the ocean caused by a plate being subducted under another plate.

tropical depression strong low-pressure system formed in low latitudes.

tropical storm low-pressure system with sustained winds from 39 to 73 mph.

tropopause region between the troposphere and the stratosphere.

troposphere lowest level of the atmosphere, where weather occurs; temperature decreases with altitude.

True North geographic North Pole, latitude 90° N.

tsunami a large wave created by an underwater earthquake or landslide.

turbidity currents undersea mudslides.

umbra the darkest part of a shadow.

unconformity a break or gap in the rock record where layers of rock have been eroded.

universal law of gravity formula that measures the force of gravity; developed by Isaac Newton.

updraft wind current moving upward in a cloud.

upwelling deep ocean water is pulled to the surface by currents.

urban heat island effect city areas are warmer than suburbs or rural areas due to less vegetation, more land coverage and other infrastructure.

usage time in the water budget for an area when water is being used faster than it is being replenished.

valley glacier a glacier located on top of a mountain, also called an alpine glacier, that moves downhill through the valley.

vaporization the process of boiling.

varve alternating layers of sediment showing yearly cycles.

vector field quantity that measures magnitude and direction.

Vernal equinox March 21, when the vertical ray of the Sun is at the Equator; the entire Earth has 12 hours of day and 12 hours of night.

vertical ray radiational energy from the Sun that strikes the Earth at a right angle.

vesicular texture rock that has gas pockets and air that was trapped during the rock's formation.

waning part of the lunar cycle in which the Moon is getting less full and the "left side is lit up" (left side lit).

warm front the leading edge of a warm air mass.

water table the surface of the water in the zone of saturation.

waxing part of the lunar cycle when the Moon is getting more full, and the "right side is lit up."

weathering the physical or chemical breaking down of rocks due to exposure to the atmosphere.

wet-bulb depression difference between wet-bulb and dry-bulb temperatures, used to find relative humidity and dew point temperatures.

white dwarf final stage of a star as it collapses onto itself.

windward the side facing the wind.

Winter solstice December 21, when the vertical ray of the Sun is at the Tropic of Capricorn (23.5° S latitude), the shortest day of the year in the Northern Hemisphere.

zenith the point directly overhead of an observer.

zone of accumulation upper level of a glacier where more snow falls than melts.

zone of aeration area underground above the water table where the spaces between rocks contain a mixture of air and water.

zone of saturation area underground where the spaces between rock particles are filled with water.