

Glossary

Key to Phonetic Spellings

Sound symbol	Key word(s)	Phonetic spelling	Sound symbol	Key word(s)	Phonetic spelling
a	map	MAP	uhr	paper fern	PAY puh FUHRN
ay	face day	FAYS DAY	yoo	yule globule	YOOL GLAHB yool
ah	father cot	FAH thuh KAHT	yu	cure	KYUR
aw	caught law	KAWT LAW	y	yes	YES
ee	eat ski	EET SKEE	g	get	GET
e	wet rare	WET RER	j	jig	JIG
oy	boy foil	BOY FOYL	k	card kite	KARD KIET
ow	out now	OWT NOW	s	cell kiss	SEL KIS
oo	shoot suit	SHOOT SOOT	ch	chin	CHIN
u	book put	BUK PUT	sh	shell	SHEL
uh	sun cut	SUHN KUHT	th	thin	THIN
i	lip	LIP	zh	azure	AZH uhr
ie	tide sigh	TIED SIE	ng	bring	BRING
oh	over coat	OH vuhr KOHT	nj	change	CHAYNJ
	overcoat	OH vuhr KOHT	z	is	IZ

CAPS = primary stress; SMALL CAPS = secondary stress; lowercase = unstressed

A

absolute zero (AB suh LOOT ZIR oh) the temperature at which an object's energy is minimal (327)

acceleration (ak SEL uhr AY shuhn) the change in velocity divided by the time interval in which the change occurred (259)

accuracy (AK yur uh see) the extent to which a measurement approaches the true value (25)

acid (AS id) a substance that donates protons, H^+ , to form hydronium ions, H_3O^+ , when dissolved in water (199)

acid rain (AS id RAYN) any precipitation that has an unusually high concentration of sulfuric or nitric acids resulting from chemical pollution of the air (585)

air mass (ER MAS) a large body of air with uniform temperature and moisture content (613)

alkali metals (AL kuh LIE MET uhls) the highly reactive metallic elements located in Group 1 of the periodic table (87)

alkaline-earth metals (AL kuh LIN UHRTH MET uhls) the reactive metallic elements located in Group 2 of the periodic table (88)

alpha particle (AL fuh PAHRT i kuhl) a positively charged particle, emitted by some radioactive nuclei, that consists of two protons and two neutrons (221)

alternating current (AWL tuhr NAYT ing KUHR uhnt) an electric current that changes direction at regular intervals; also called AC (476)

amino acid (uh MEE noh AS id) any one of 20 different naturally occurring organic molecules that combine to form proteins (134)

amplitude (AM pluh TOOD) the greatest distance that particles in a medium move from their normal position when a wave passes by (366)

analog signal (AN uh LAWG SIG nuhl) a signal corresponding to a quantity whose values can change continuously (491)

anion (AN IE ahn) an ion with a negative charge (81)

antacid (ANT AS id) a weak base that neutralizes excess stomach acid (210)

asteroid (AS tuhr OYD) a small rocky object that orbits the sun, usually in a band between the orbits of Mars and Jupiter (545)

asthenosphere (as THEN uh SFIR) the zone of the mantle beneath the lithosphere that consists of slowly flowing solid rock (561)

atmospheric transmission (AT muhs FIR ik trans MISH uhn) the transmission of a signal using electromagnetic waves (498)

atom (AT uhm) the smallest particle that has the properties of an element (39)

atomic mass unit (amu) (uh TAHM ik MAS YOON it) a quantity equal to one-twelfth the mass of a carbon-12 atom (84)

atomic number (uh TAHM ik NUHM buhr) the number of protons in the nucleus of an atom (82)

average atomic mass (AV uhr ij uh TAHM ik MAS) the weighted average of the masses of all naturally occurring isotopes of an element (84)

Avogadro's constant (AH voh GAH drohz KAHN stuhnt) the number of particles in 1 mol; equals 6.022×10^{23} /mol (96)

B

background radiation (BAK grownd RAY dee AY shuhn) the nuclear radiation that arises naturally from cosmic rays and from radioactive isotopes in the soil and air (235)

balanced forces (BAL uhnt FOHR sez) the forces acting on an object that combine to produce a net force that is equal to zero (263)

barometric pressure (BAR uh ME trik PRESH uhr) the pressure due to the weight of the atmosphere; also called *air pressure* or *atmospheric pressure* (609)

base (BAYS) a substance that either contains hydroxide ions, OH^- , or reacts with water to form hydroxide ions (201)

beta particle (BAYT uh PAHRT i kuhl) an electron emitted during the radioactive decay of a neutron in an unstable nucleus (221)

big bang theory (BIG BANG THEE uh ree) a scientific theory that states that the universe began 10 billion to 20 billion years ago in an enormous explosion (532)

biochemical compound (BIE oh KEM i kuhl KAHM pownd) any organic compound that has an important role in living things (134)

black hole (BLAK HOHL) an object so massive and dense that not even light can escape its gravity (541)

bleach (BLEECH) a basic solution that can either be used as a disinfectant or to remove colors and stains (209)

boiling point (BOYL ing POYNT) the temperature at which a liquid becomes a gas below the surface (54)

bond angle (BAHND AYN guhl) the angle formed by two bonds to the same atom (110)

bond length (BAHND LENGKTH) the average distance between the nuclei of two bonded atoms (110)

buoyancy (BOY uhn see) the force with which a more dense fluid pushes a less dense substance upward (57)

C

carbohydrate (CAHR boh HIE drayt) any organic compound that is made of carbon, hydrogen, and oxygen and that provides nutrients to the cells of living things (134)

- carrier** (CAR ee uhr) a continuous wave that can be modulated to send a signal (500)
- catalyst** (CAT uh list) a substance that changes the rate of chemical reactions without being consumed (171)
- cathode ray tube** (CATH OHD RAY TOOB) a tube that uses an electron beam to create a display on a phosphorescent screen (502)
- cation** (CAT IE ahn) an ion with a positive charge (81)
- cell** (SEL) a device that is a source of electric current because of a potential difference, or voltage, between the terminals (438)
- chemical bond** (KEM i kuhl BAHND) the attractive force that holds atoms or ions together (109)
- chemical change** (KEM i kuhl CHAYNJ) a change that occurs when a substance changes composition by forming one or more new substances (58)
- chemical energy** (KEM i kuhl EN uhr jee) the energy stored within atoms and molecules that can be released when a substance reacts (151)
- chemical equation** (KEM i kuhl ee KWAY zhuhn) an equation that uses chemical formulas and symbols to show the reactants and products in a chemical reaction (161)
- chemical formula** (KEM i kuhl FOHR myoo luh) the chemical symbols and numbers indicating the atoms contained in the basic unit of a substance (41)
- chemical property** (KEM i kuhl PRAHP uhr tee) the way a substance reacts with others to form new substances with different properties (53)
- chemical structure** (KEM i kuhl STRUHK chuhr) the arrangement of bonded atoms or ions within a substance (110)
- chemistry** (KEM is tree) the study of matter and how it changes (38)
- circuit breaker** (SUHR kit BRAYK uhr) a device that protects a circuit from current overloads (452)
- climate** (KLIE muht) the general weather conditions over many years (617)
- cluster** (KLUHS tuhr) a group of galaxies bound by gravity (530)
- code** (KOHD) a set of rules used to interpret signals that convey information (489)
- colloid** (KAHL OYD) a mixture of very tiny particles of pure substances that are dispersed in another substance but do not settle out of the substance (187)
- combustion reaction** (kuhm BUHST shuhn ree AK shuhn) a reaction in which a compound and oxygen burn (155)
- community** (kuh MYOO nuh tee) all of the animals and plants living in one area in an ecosystem (631)
- compound** (KAHM pownd) a substance made of atoms of more than one element bound together (39)
- compound machine** (KAHM pownd muh SHEEN) a machine made of more than one simple machine (296)
- computer** (kum PYOOT uhr) an electronic device that can accept data and instructions, follow the instructions, and output the results (506)
- concentration** (KAHN suhn TRAY shuhn) the quantity of solute dissolved in a given quantity of solution (196)
- condensation** (KAHN duhn SAY shuhn) the change of a substance from a gas to a liquid (49)
- conduction** (kuhn DUK shuhn) the transfer of energy as heat between particles as they collide within a substance or between two objects in contact (332)
- conductor** (kuhn DUK tuhr) a material through which energy can be easily transferred as heat (334); a material that transfers charge easily (432)
- constellation** (KAHN stuh LAY shuhn) a group of stars appearing in a pattern as seen from Earth (535)
- constructive interference** (kuhn STRUHK tiv IN tuhr FIR uhns) any interference in which waves combine so that the resulting wave is bigger than the original waves (377)
- convection** (kuhn VEK shuhn) the transfer of energy by the movement of fluids with different temperatures (332)
- convection current** (kuhn VEK shuhn KUHR uhnt) the flow of a fluid due to heated expansion followed by cooling and contraction (333)
- conversion factor** (kuhn VUHR zhuhn FAK tuhr) a ratio equal to one that expresses the same quantity in two different ways (97)
- cooling system** (KOOL ing SIS tuhm) a device that transfers energy as heat out of an object to lower its temperature (343)
- core** (KOHR) the center of a planetary body, such as Earth (559)
- Coriolis effect** (KOHR ee OH lis e FEKT) the change in the direction of an object's path due to Earth's rotation (611)

- covalent bond** (KOH VAY luhnt BAHND) a bond formed when atoms share one or more pairs of electrons (119)
- crest** (KREST) the highest point of a transverse wave (366)
- critical mass** (KRIT i kuhl MAS) the minimum mass of a fissionable isotope in which a nuclear chain reaction can occur (233)
- critical thinking** (KRIT i kuhl THINGK ing) the application of logic and reason to observations and conclusions (12)
- crust** (KRUHST) the outermost and thinnest layer of Earth (558)
- current** (KUHR uhnt) the rate that electric charges move through a conductor (439)

D

- decomposition reaction** (DEE kahm puh ZISH uhn ree AK shuhn) a reaction in which one compound breaks into at least two products (155)
- density** (DEN suh tee) the mass per unit volume of a substance (55)
- deposition** (DE puh ZISH uhn) the process in which sediment is laid down (586)
- destructive interference** (di STRUK tiv IN tuhr FIR uhns) any interference in which waves combine so that the resulting wave is smaller than the largest of the original waves (377)
- detergent** (dee TUHR jent) a nonsoap water-soluble cleaner that can emulsify dirt and oil (208)
- dew point** (DOO POYNT) the temperature at which water vapor molecules start to form liquid water (608)
- diffraction** (di FRAK shuhn) the bending of a wave as it passes an edge or an opening (375)
- digital signal** (DIJ i tuhl SIG nuhl) a signal that can be represented as a sequence of discrete values (491)
- disinfectant** (DIS in FEK tuhnt) a substance that kills harmful bacteria or viruses (209)
- dispersion** (di SPUHR zhuhn) an effect in which white light separates into component colors (417)
- domain** (doh MAYN) a microscopic magnetic region composed of a group of atoms whose magnetic fields are aligned in a common direction (471)
- Doppler effect** (DAHHP luhr e FEKT) an observed change in the frequency of a wave when the source or observer is moving (373)
- double-displacement reaction** (DUHB uhl dis PLAYS muhnt ree AK shuhn) a reaction in which a gas, a solid precipitate, or a molecular compound is formed from the apparent exchange of ions between two compounds (158)

E

- eclipse** (i KLIPS) an event that occurs when one object passes into the shadow of another object (549)
- ecosystem** (EK oh SIS tuhm) all of the living and nonliving elements in a particular place (630)
- efficiency** (e FISH uhn see) a quantity, usually expressed as a percentage, that measures the ratio of useful work output to work input (312)
- electric charge** (ee LEK trik chahrj) an electrical property of matter that creates a force between objects (430)
- electric circuit** (ee LEK trik SUHR kit) an electrical device connected so that it provides one or more complete paths for the movement of charges (446)
- electric field** (ee LEK trik FEELD) the region around a charged object in which other charged objects experience an electric force (435)
- electric force** (ee LEK trik FOHRS) the force of attraction or repulsion between objects due to charge (434)
- electric motor** (ee LEK trik MOHT uhr) a device that converts electrical energy to mechanical energy (472)
- electrical energy** (ee LEK tri kuhl EN uhr jee) the energy associated with electrical charges, whether moving or at rest (450)
- electrical potential energy** (ee LEK tri kuhl poh TEN shuhl EN uhr jee) the potential energy of a charged object due to its position in an electric field (437)
- electrolysis** (EE lek TR AHL i sis) the decomposition of a compound by an electric current (155)
- electromagnet** (ee LEK troh MAG nit) a strong magnet created when an iron core is inserted into the center of a current-carrying solenoid (470)
- electromagnetic induction** (ee LEK troh mag NET ik in DUHK shuhn) the production of a current in a circuit by a change in the strength, position, or orientation of an external magnetic field (474)
- electromagnetic wave** (ee LEK troh mag NET ik WAYV) a wave that is caused by a disturbance in electric and magnetic fields and that does not require a medium; also called a light wave (357)

Glossary

electron (ee LEK trahn) a tiny negatively charged subatomic particle moving around outside the nucleus of an atom (72)

element (EL uh muhnt) a substance that cannot be broken down into simpler substances (39)

empirical formula (em PIR i kuhl FOHR myoo luh) the simplest chemical formula of a compound that tells the smallest whole-number ratio of atoms in the compound (126)

emulsion (ee MUHL shuhn) any mixture of immiscible liquids in which the liquids are spread throughout one another (188)

endothermic reaction (EN doh THUHR mik ree AK shuhn) a reaction in which energy is transferred to the reactants from the surroundings usually as heat (151)

energy (EN uhr jee) the ability to change or move matter (48)

energy level (EN uhr jee LEV uhl) any of the possible energies an electron may have in an atom (73)

enzyme (EN ZIEM) a protein that speeds up a specific biochemical reaction (171)

epicenter (EP i SEN tuhr) the point on Earth's surface directly above the focus of an earthquake (568)

equilibrium (EE kwi LIB ree uhm) the state in which a chemical reaction and its reverse occur at the same time and at the same rate (174)

erosion (ee ROH zhuhn) the process by which rock and/or the products of weathering are removed (586)

eutrophication (yoo TRAHF i KAY shuhn) an increase in the amount of nutrients, such as nitrates, in an environment (652)

evaporation (ee VAP uh RAY shuhn) the change of a substance from a liquid to a gas (49)

exothermic reaction (EK soh THUHR mik ree AK shuhn) a reaction that transfers energy from the reactants to the surroundings usually as heat (151)

F

fault (FAWLT) a crack in Earth created when rocks on either side of a break move (564)

fission (FISH uhn) the process by which a nucleus splits into two or more smaller fragments, releasing neutrons and energy (231)

focus (FOH kuhs) the area along a fault at which slippage first occurs, initiating an earthquake (568)

force (FOHRS) the cause of an acceleration, or change in an object's velocity (262)

fossil fuels (FAHS uhl FYOO uhlz) any fuels formed from the remains of ancient plant and animal life (639)

fossils (FAHS uhlz) the traces or remains of a plant or an animal found in sedimentary rock (578)

free fall (FREE FAWL) the motion of a body when only the force of gravity is acting on it (271)

frequency (FREE kwuhn see) the number of vibrations that occur in a 1 s time interval (367)

friction (FRIK shuhn) the force between two objects in contact that opposes the motion of either object (265)

front (FRUHNT) the boundary between air masses of different densities (613)

fuse (FYOOZ) an electrical device containing a metal strip that melts when current in the circuit becomes too great (452)

fusion (FYOO zhuhn) the process in which light nuclei combine at extremely high temperatures, forming heavier nuclei and releasing energy (234)

G

galaxy (GAL uhk see) a collection of millions or billions of stars bound together by gravity (527)

galvanometer (GAL vuh NAH muht uhr) an instrument that measures the amount of current in a circuit (471)

gamma ray (GAM uh RAY) the high-energy electromagnetic radiation emitted by a nucleus during radioactive decay (222)

generator (JEN uhr AYT uhr) a device that uses electromagnetic induction to convert mechanical energy to electrical energy (476)

geothermal energy (JEE oh THUHR muhl EN uhr jee) the energy drawn from heated water within Earth's crust (642)

global warming (GLOH buhl WAHRM ing) an increase in Earth's temperature due to an increase in greenhouse gases (650)

gravity (GRAV i tee) the attraction between two particles of matter due to their mass (266)

greenhouse effect (GREEN HOWS e FEKT) the process by which the atmosphere traps some of the energy from the sun in the troposphere (604)

group (GROOP) a vertical column of elements in the periodic table; also called a family (80)

H

- half-life** (HAF LIEF) the time required for half a sample of radioactive nuclei to decay (225)
- halogens** (HAL oh juhnhz) the highly reactive elements located in Group 17 of the periodic table (92)
- hardware** (HAHRD WER) the equipment that makes up a computer system (510)
- heat** (HEET) the transfer of energy from the particles of one object to those of another object due to a temperature difference (330)
- heating system** (HEET ing SIS tuhm) a device that transfers energy as heat to a substance to raise the temperature of the substance (340)
- humidity** (hyoo MID uh tee) the quantity of water vapor in the atmosphere (607)
- hydroelectric power** (HIE DROH ee LEK trik POW uhr) the energy of moving water converted to electricity (636)

I

- igneous rock** (IG nee uhs RAHK) any rock formed from cooled and hardened magma or lava (577)
- immiscible** (im MIS uh buhl) describes two or more liquids that do not mix into each other (42)
- indicator** (IN di KAYT uhr) a compound that can reversibly change color in a solution, depending on the concentration of H_3O^+ ions (199)
- inertia** (in UHR shuh) the tendency of an object to remain at rest or in motion with a constant velocity (269)
- infrasound** (IN fruh sownd) any sound consisting of waves with frequencies lower than 20 Hz (393)
- insulator** (IN suh LAYT uhr) a material that is a poor energy conductor (335); a material that does not transfer charge easily (432)
- intensity** (in TEN suh tee) the rate at which light or any other form of energy flows through a given area of space (402)
- interference** (IN tuhr FIR uhns) the combination of two or more waves that exist in the same place at the same time (376)
- Internet** (IN tuhr NET) a large computer network that connects many local and smaller networks (513)
- interstellar matter** (IN tuhr STEL uhr MA tuhr) the gas and dust between the stars in a galaxy (528)

- ion** (IE ahn) an atom or group of atoms that has lost or gained one or more electrons and therefore has a net electric charge (81)
- ionic bond** (ie AHN ik BAHND) a bond formed by the attraction between oppositely charged ions (116)
- ionization** (IE uhn i ZAY shuhn) the process of adding electrons to or removing electrons from an atom or group of atoms (81)
- isobar** (IE soh BAHR) a line drawn on a weather map connecting points of equal barometric or atmospheric pressure (617)
- isotopes** (IE suh TOHPS) any atoms having the same number of protons but different numbers of neutrons (83)

K

- kinetic energy** (ki NET ik EN uhr jee) the energy of a moving object due to its motion (300)

L

- length** (LENGTH) the straight-line distance between any two points (18)
- lens** (LENZ) a transparent object that refracts light rays, causing them to converge or diverge to create an image (415)
- light ray** (LIET RAY) a model of light that represents light traveling through space in an imaginary straight line (406)
- light-year** (LIET YIR) a unit of distance equal to the distance light travels in one year; $1 \text{ ly} = 9.5 \times 10^{15} \text{ m}$ (527)
- lithosphere** (LITH oh SFIR) the thin outer shell of Earth, consisting of the crust and the rigid upper mantle (560)
- longitudinal wave** (LAHN juh TOOD uhn uhl WAYV) a wave that causes the particles of the medium to vibrate parallel to the direction the wave travels (363)

M

- magma** (MAG muh) the molten rock within Earth (562)
- magnetic field** (mag NET ik FEELD) a region where a magnetic force can be detected (465)

magnetic pole (mag NET ik POHL) an area of a magnet where the magnetic force appears to be the strongest (464)

magnification (MAG nuh fi KAY shuhn) a change in the size of an image compared with the size of an object (415)

mantle (MAN tuhl) the layer of rock between Earth's crust and its core (558)

mass (MAS) a measure of the quantity of matter in an object (18)

mass number (MAS NUHM buhr) the total number of protons and neutrons in the nucleus of an atom (82)

matter (MAT uhr) anything that has mass and occupies space (38)

mechanical advantage (muh KAN i kuhl ad VANT ij) a quantity that measures how much a machine multiplies force or distance (289)

mechanical energy (muh KAN i kuhl EN uhr jee) the sum of the kinetic and potential energy of large-scale objects in a system (302)

mechanical wave (muh KAN i kuhl WAYV) a wave that requires a medium through which to travel (357)

medium (MEE dee uhm) the matter through which a wave travels (357)

melting point (MELT ing POYNT) the temperature at which a solid becomes a liquid (54)

mesosphere (MES oh SFIR) the coldest layer of the atmosphere; located above the stratosphere (601)

metallic bond (muh TAL ik BAHND) a bond formed by the attraction between positively charged metal ions and the electrons around them (118)

metals (MET uhls) the elements that are good conductors of heat and electricity (87)

metamorphic rock (MET uh MOHR fik RAHK) any rock formed from other rocks as a result of heat, pressure, or chemical processes (579)

mineral (MIN uhr uhl) a natural, inorganic solid with a definite chemical composition and a characteristic internal structure (576)

miscible (MIS uh buhl) describes two or more liquids that are able to dissolve into each other in various proportions (42)

mixture (MIKS chuhr) a combination of more than one pure substance (41)

modulate (MAHJ uh LAYT) the process of changing a wave's amplitude or frequency in order to send a signal (500)

molar mass (MOH luhr MAS) the mass in grams of 1 mol of a substance (96)

molarity (moh LER i tee) a concentration unit of a solution that expresses moles of solute dissolved per liter of solution (198)

mole (MOHL) the SI base unit that describes the amount of a substance (96)

mole ratio (MOHL RAY shee OH) the smallest relative number of moles of the substances involved in a reaction (168)

molecular formula (moh LEK yoo luhr FOHR myoo luh) a chemical formula that reports the actual numbers of atoms in one molecule of a compound (128)

molecule (MAHL i KYOOL) the smallest unit of a substance that exhibits all of the properties characteristic of that substance (40)

momentum (moh MEN tuhm) a quantity defined as the product of an object's mass and velocity (256)

N

nebular model (NEB yuh luhr MAHD uhl) a model that describes the sun and the solar system forming together out of a cloud of gas and dust (548)

neutralization reaction (NOO truhl i ZAY shuhn ree AK shuhn) a reaction in which hydronium ions from an acid and hydroxide ions from a base react to produce water molecules (204)

neutron (NOO trahn) a neutral subatomic particle in the nucleus of an atom (72)

neutron emission (NOO trahn ee MISH uhn) the release of a high-energy neutron by some neutron-rich nuclei during radioactive decay (222)

neutron star (NOO trahn STAHR) a dead star with the density of atomic nuclei (541)

noble gases (NOH buhl GAS iz) the unreactive gaseous elements located in Group 18 of the periodic table (93)

nonmetals (NAHN MET uhlz) the elements that are usually poor conductors of heat and electricity (87)

nonrenewable resources (NAHN ri NOO uh buhl REE sohrr uz) any resources that are used faster than they can be replaced (640)

nuclear chain reaction (NOO klee uhr CHAYN ree AK shuhn) a series of fission processes in which the neutrons emitted by a dividing nucleus cause the division of other nuclei (232)

nuclear radiation (NOO klee uhr RAY dee AY shuhn) the charged particles or energy emitted by an unstable nucleus (220)

nucleus (NOO klee uhs) the center of an atom; made up of protons and neutrons (72)

O

operating system (AHP uhr AYT ing SIS tuhm) the software that controls a computer's activities (510)

optical fiber (AHP ti kuhl FIE buhr) a hair-thin, transparent strand of glass or plastic that transmits signals using pulses of light (493)

orbital (OHR bit uhl) a region in an atom where there is a high probability of finding electrons (75)

organic compound (ohr GAN ik KAHM pownd) any covalently bonded compound that contains carbon (129)

ozone (OH ZOHN) the form of atmospheric oxygen that has three atoms per molecule (600)

P

P waves (PEE WAYVZ) primary waves; the longitudinal waves generated by an earthquake (568)

parallel (PAR uh LEL) describes components in a circuit that are connected across common points, providing two or more separate conducting paths (449)

period (PIR ee uhd) a horizontal row of elements in the periodic table (80); the time required for one full wavelength to pass a certain point (367)

periodic law (PIR ee AHD ik LAW) the properties of elements tend to repeat in a regular pattern when elements are arranged in order of increasing atomic number (77)

pH (pee AYCH) a measure of the hydronium ion concentration in a solution (202)

phases (FAYZ iz) the different apparent shapes of the moon or a planet due to the relative positions of the sun, Earth, and the moon or planet (549)

photon (FOH tahn) a particle of light (400)

physical change (FIZ i kuhl CHAYNJ) a change that occurs in the physical form or properties of a substance that occurs without a change in composition (59)

physical property (FIZ i kuhl PRAHP uhr tee) a characteristic of a substance that can be observed or measured without changing the composition of the substance (54)

physical transmission (FIZ i kuhl trans MISH uhn) the transmission of a signal using wires, cables, or optical fibers (498)

pitch (PICH) the perceived highness or lowness of a sound, depending on the frequency of sound waves (392)

pixel (PIKS uhl) the smallest element of a display image (503)

planet (PLAN it) any of the nine primary bodies orbiting the sun; a similar body orbiting another star (542)

plate tectonics (PLAYT tek TAHN iks) the theory that Earth's surface is made up of large moving plates (560)

pollution (puh LOO shuhn) the contamination of the air, water, or soil (647)

polyatomic ion (PAHL ee uh TAHM ik IE ahn) an ion made of two or more atoms that are covalently bonded and that act like a single ion (120)

polymer (PAHL i MUHR) a large organic molecule made of many smaller bonded units (133)

potential difference (poh TEN shuhl DIF uhr uhns) the change in the electrical potential energy per unit charge (438)

potential energy (poh TEN shuhl EN uhr jee) the stored energy resulting from the relative positions of objects in a system (298)

power (POW uhr) a quantity that measures the rate at which work is done (286)

precipitation (pree SIP uh TAY shuhn) any form of water that falls back to Earth's surface from clouds; includes rain, snow, sleet, and hail (607)

precision (pree SIZH uhn) the degree of exactness of a measurement (24)

pressure (PRESH uhr) the force exerted per unit area of a surface (47)

prism (PRIZ uhm) a transparent block with a triangular cross section (417)

product (PRAHD uhkt) a substance that is the result of a chemical change (149)

protein (PROH teen) a biological polymer made of bonded amino acids (134)

proton (PROH tahn) a positively charged subatomic particle in the nucleus of an atom (72)

pure substance (PYUR SUB stuhns) any matter that has a fixed composition and definite properties (41)

R

radar (RAY DAHR) a system that uses reflected radio waves to determine the distance to and location of objects (404)

radiation (RAY dee AY shuhn) the transfer of energy by electromagnetic waves (333)

radicals (RAD ik uhls) the fragments of molecules that have at least one electron available for bonding (159)

radioactive tracer (RAY dee oh AK tiv TRAYS uhr) a radioactive material added to a substance so that the substance's location can later be detected (238)

radioactivity (RAY dee oh ak TIV uh tee) a process by which an unstable nucleus emits one or more particles or energy (220)

random-access memory (RAN duhm AK SES MEM uh ree) a storage device that allows any stored data to be read in the same access time (509)

reactant (REE AK tuhnt) a substance that undergoes a chemical change (149)

reactivity (REE ak TIV i tee) the ability of a substance to combine chemically with another substance (54)

read-only memory (REED OHN lee MEM uh ree) a memory device containing data that cannot be changed (510)

real image (REEL IM ij) an image of an object formed by many light rays coming together in a specific location (409)

recycling (ree SIE kuhl ing) the process of breaking down discarded material for re-use in other products (656)

red giant (RED JIE uhnt) a large, reddish star late in its life cycle that fuses helium into carbon or oxygen (540)

red shift (RED SHIFT) a shift toward the red end of the spectrum in the observed spectral lines of stars or galaxies (531)

reduction/oxidation (redox) reaction (ri DUK shuhn AHKS i DAY shuhn (REE DAHKS) ree AK shuhn) a reaction that occurs when electrons are transferred from one reactant to another (159)

reflection (ri FLEK shuhn) the bouncing back of a wave as it meets a surface or boundary (374)

refraction (ri FRAK shuhn) the bending of waves as they pass from one medium to another (376)

refrigerant (ri FRIJ uhr uhnt) a substance used in cooling systems that transfers large amounts of energy as it changes state (344)

relative humidity (REL uh tiv hyoo MID uh tee) the ratio of the quantity of water vapor in the air to the maximum quantity of water vapor that can be present at that temperature (607)

renewable resources (ri NOO uh buhl REE sohrr uhz) any resources that can be continually replaced (641)

resistance (ri ZIS tuhns) the ratio of the voltage across a conductor to the current it carries (441)

resonance (REZ uh nuhns) an effect in which the vibration of one object causes the vibration of another object at a natural frequency (395)

Richter scale (RIK tuhr SKAYL) a scale that expresses the relative magnitude of an earthquake (571)

S

S waves (ES WAYVZ) secondary waves; the transverse waves generated by an earthquake (569)

salt (SAWLT) an ionic compound composed of cations bonded to anions, other than oxide or hydroxide anions (205)

saturated solution (SACH uh RAYT id suh LOO shuhn) a solution that cannot dissolve any more solute at the given conditions (196)

schematic diagram (skee MAT ik DIE uh GRAM) a graphic representation of an electric circuit or apparatus, with standard symbols for the electrical devices (447)

science (SIE uhns) a system of knowledge based on facts or principles (6)

scientific law (SIE uhn TIF ik LAW) a summary of an observed natural event (8)

scientific method (SIE uhn TIF ik METH uhd) a series of logical steps to follow in order to solve problems (13)

scientific notation (SIE uhn TIF ik noh TAY shuhn) a value written as a simple number multiplied by a power of 10 (22)

scientific theory (SIE uhn TIF ik THEE uh ree) a tested, possible explanation of a natural event (8)

sedimentary rock (SED uh MEN tuh ree RAHK) any rock formed from compressed or cemented deposits of sediment (578)

- seismology** (siez MAHL uh gee) the study of earthquakes and related phenomena (569)
- semiconductors** (SEM i kuhn DUHK tuhrz) the elements that are intermediate conductors of heat and electricity (87)
- series** (SIR eez) describes a circuit or portion of a circuit that provides a single conducting path (449)
- signal** (SIG nuhl) a sign that represents information, such as a command, a direction, or a warning (488)
- significant figures** (sig NIF uh kuhnt FIG yurz) the digits in a measurement that are known with certainty (24)
- simple machine** (SIM puhl muh SHEEN) any one of the six basic types of machines of which all other machines are composed (291)
- single-displacement reaction** (SING guhl dis PLAYS muhnt ree AK shuhn) a reaction in which atoms of one element take the place of atoms of another element in a compound (157)
- soap** (SOHP) a cleaner that dissolves in both water and oil (207)
- software** (SAWFT WER) the instructions, data, and programming that enables a computer system to work (510)
- solar system** (SOH luhr SIS tuhm) the sun and all the objects that orbit around it (543)
- solenoid** (SOH luhr noyd) a long, wound coil of insulated wire (469)
- solubility** (SAHL yoo BIL uh tee) the greatest quantity of a solute that will dissolve in a given quantity of solvent to produce a saturated solution (197)
- solute** (SAHL YOOT) the substance that dissolves in a solution (190)
- solution** (suh LOO shuhn) a homogeneous mixture of two or more substances uniformly spread throughout a single phase (190)
- solvent** (SAHL vuhnt) the substance that dissolves the solute to make a solution (190)
- sonar** (SOH NAHR) a system that uses reflected sound waves to determine the distance to, and location of, objects (397)
- specific heat** (spuh SIF ik HEET) the amount of energy transferred as heat that will raise the temperature of 1 kg of a substance by 1 K (336)
- speed** (SPEED) the distance traveled divided by the time interval during which the motion occurred (252)
- standing wave** (STAN ding WAYV) a wave form caused by interference that appears not to move along the medium and that shows some regions of no vibration (nodes) and other regions of maximum vibration (antinodes) (379)
- star** (STAHR) a huge ball of hot gas that emits light (527)
- stratosphere** (STRAT uh SFIR) the layer of the atmosphere that extends upward from the troposphere to an altitude of 50 km; contains the ozone layer (600)
- strong nuclear force** (STRAWNG NOO klee uhr FOHRS) the force that binds protons and neutrons together in a nucleus (230)
- subduction** (suhb DUHK shuhn) the process in which a tectonic plate dives beneath another tectonic plate and into the asthenosphere (562)
- sublimation** (SUHB luhr MAY shuhn) the change of a substance from a solid to a gas (50)
- substrate** (SUHB STRAYT) the specific substance affected by an enzyme (172)
- succession** (suhk SESH uhn) the gradual repopulating of a community by different species over a period of time (634)
- supergiant** (SOO puhrr JI uhnt) an extremely large star that creates elements as heavy as iron (540)
- supernova** (SOO puhrr NOH vuh) a powerful explosion that occurs when a massive star dies (540)
- supersaturated solution** (SOO puhrr SACH uh RAYT uhd suh LOO shuhn) a solution holding more dissolved solute than is specified by its solubility at a given temperature (197)
- surface waves** (SUHR fis WAYVZ) the seismic waves that travel along Earth's surface (569)
- suspension** (suh SPEN shuhn) a mixture that looks uniform when stirred or shaken that separates into different layers when it is no longer agitated (186)
- synthesis reaction** (SIN thuh sis ree AK shuhn) a reaction of at least two substances that forms a new, more complex compound (154)

T

- technology** (tek NAHL uh gee) the application of science to meet human needs (7)
- telecommunication** (TEL i kuh MYOO ni KAY shuhn) a communication method using electromagnetic means (490)

temperature (TEM puh uh chuhr) a measure of the average kinetic energy of all the particles within an object (324)

temperature inversion (TEM puh uh chuhr in VUHR zhuhn) the atmospheric condition in which warm air traps cooler air near Earth's surface (599)

terminal velocity (TUHR muh nuhl vuh LAHS uh tee) the maximum velocity reached by a falling object, occurring when resistance of the medium is equal to the force due to gravity (272)

thermometer (thuhr MAHM uht uhr) a device that measures temperature (325)

thermosphere (THURM oh SFIR) the atmospheric layer above the mesosphere (601)

topography (tuh PAHG ruh fee) the surface features of Earth (619)

total internal reflection (TOHT uhl in TUHR nuhl ri FLEK shuhn) the complete reflection of light at the boundary between two transparent mediums when the angle of incidence exceeds the critical angle (414)

transformer (trans FOHRM uhr) a device that can change one alternating-current voltage to a different alternating-current voltage (479)

transition metals (tran ZISH uhn MET uhls) the metallic elements located in Groups 3–12 of the periodic table (89)

transpiration (TRAN spuh RAY shuhn) the evaporation of water through pores in a plant's leaves (607)

transverse wave (TRANS VUHRS WAYV) a wave that causes the particles of the medium to vibrate perpendicularly to the direction the wave travels (363)

troposphere (TRO poh SFIR) the atmospheric layer closest to Earth's surface where nearly all weather occurs (599)

trough (TRAWF) the lowest point of a transverse wave (366)

U

ultrasound (UHL truh SOWND) any sound consisting of waves with frequencies higher than 20 000 Hz (393)

unbalanced forces (UHN BAL uhnst FOHR sez) the forces acting on an object that combine to produce a net nonzero force (263)

universe (YOON uh VUHRS) the sum of all matter and energy that exists, that ever has existed, and that ever will exist (526)

unsaturated solution (UHN SACH uh RAYT uhd suh LOO shuhn) a solution that is able to dissolve more solute (196)

V

valence electron (VAY luhns ee LEK trahn) an electron in the outermost energy level of an atom (76)

variable (VER ee uh buhl) anything that can change in an experiment (13)

velocity (vuh LAHS uh tee) a quantity describing both speed and direction (254)

vent (VENT) an opening through which molten rock flows onto Earth's surface (572)

virtual image (VUHR choo uhl IM ij) an image that forms at a point from which light rays appear to come but do not actually come (408)

viscosity (vis KAHS uh tee) the resistance of a fluid to flow (48)

volume (VAHL yoom) a measure of space, such as the capacity of a container (18)

W

water cycle (WAH tuhr SIE kuhl) the continuous movement of water from the atmosphere to Earth and back (606)

wave (WAYV) a disturbance that transmits energy through matter or space (356)

wave speed (WAYV SPEED) the speed at which a wave passes through a medium (369)

wavelength (WAYV LENGTH) the distance between any two successive identical parts of a wave (366)

weathering (WETH uhr ing) the change in the physical form or chemical composition of rock materials exposed at Earth's surface (578)

weight (WAYT) the force with which gravity pulls on a quantity of matter (18)

white dwarf (HWIET DWOHRF) a small, very dense star that remains after fusion in a red giant stops (540)

work (WUHRK) quantity of energy transferred by a force when it is applied to a body and causes that body to move in the direction of the force (284)