

Glossary

A simple, phonetic spelling is given for words in this book that may be unfamiliar or hard to pronounce.

Stressed syllables are printed in capital letters. Sometimes a word has two stressed syllables. The syllable with the primary stress is printed in FULL capitals. The syllable with the secondary stress is printed in SMALL capitals.

Most of the time, the phonetic spelling can be interpreted without referring to the key. The key below gives the pronunciations for letters that are commonly used for more than one sound.

Example: *Bioluminescence* is pronounced BY oh Loo muh NES uhns.

Pronunciation Key

a	cat	ih	pin
ah	hot	oh	grow
ai	care	oo	rule, music
aw	all	ow	now
ay	say, age	oy	voice
ee	meet	u	put
eh	let	uh	sun, about
eye	ice or by	ur	term

A absolute zero The temperature at which molecules do not move; the lowest temperature matter can have. Abbreviated: 0 K. (p. 211)

acceleration A change in velocity, or the rate at which this change occurs. (p. 39)

acid A chemically active substance low on the pH scale that gives up hydrogen ions (H⁺) in a water solution. (p. 527)

acid rain Rainwater polluted with sulfuric acid, nitric acid, or both. (p. 624)

activation energy Energy required to start a chemical reaction. (p. 504)

air pollution A high concentration of harmful gases and solids in the air. (p. 621)

airfoil An object, such as a plane's wing, with one flat and one curved surface that causes a pressure difference and a reaction force when moving through air. (p. 98)

alpha decay Radioactive decay in which alpha particles are released from the nucleus of an atom. (p. 566)

ampere (AM peer) SI unit of electric current. Abbreviated: A, or amps. (p. 270)

amplitude (AM pluh too'd) The distance in a transverse wave between the line of origin and each crest or trough. (p. 344)

applied science The use of science or technical knowledge to achieve a practical purpose; technology. (p. 21)

astigmatism A vision disorder in which an imperfectly shaped cornea unevenly bends light entering the eye. (p. 439)

atom The smallest particle of an element with all the properties of the element that can combine with other atoms to form a molecule. (p. 157)

B base A chemically active substance high on the pH scale that gives up hydroxide ions (OH⁻) in a water solution. (p. 527)

basic Having the characteristics of a base or containing a base. (p. 528)

beta decay Radioactive decay in which beta particles are released from the nucleus of an atom. (p. 566)

binding energy Energy of the force that holds protons and neutrons together. (p. 562)

bioluminescence (BY oh Loo muh NES uhns) The emission of light by living things. (p. 434)

biomass Organic matter that can be used as fuel. (p. 591)

boiling point The temperature at which a substance changes from a liquid to a gas. (p. 223)

Boyle's Law The principle stating that the pressure of gas in a confined space increases when the volume of the gas is reduced, if its temperature is kept constant. (p. 143)

buoyant force The upward force acting on an object in a fluid. Buoyant force equals the weight of the fluid displaced by the object. (p. 91)

C calorie The amount of heat needed to raise the temperature of 1g of water 1° C. (p. 217)

carbohydrate (kar boh HY drayt) An organic compound of carbon, hydrogen, and oxygen, such as a starch or sugar, with a ratio of hydrogen and oxygen atoms that is two to one. (p. 545)

catalyst (CAT uh lihst) A substance that initiates or speeds up a chemical reaction without being used up in the process. (p. 506)

central heating system A network of wires, pipes, ducts, and vents that transfers heat throughout a building from a central location. (p. 231)

centripetal acceleration (sehn TRIP uh tuhl) Acceleration caused by movement in a circle. (p. 43)

centripetal force The force necessary to keep an object moving in a circle and that is directed inward toward the center. (p. 68)

ceramic Material made by firing clay or other substance at a high temperature. (p. 616)

charge Electric force of a proton, electron, or an object having an unequal number of protons and electrons. (p. 257)

Charles' Law The principle stating that the volume of a gas increases as its temperature is increased, if its pressure remains constant. (p. 144)

chemical bond The attractive force that holds atoms or ions together. (p. 467)

chemical change Change in the chemical identity of a substance. (p. 149)

chemical equation A combination of chemical symbols and formulas that represent a chemical reaction. (p. 494)

chemical reaction Interaction between substances in which existing chemical bonds break and new bonds form, creating one or more new substances. (p. 489)

circuit A closed, contiguous path through which electric current flows. (p. 267)

cochlea (KOHK lee uh) The coil-shaped organ in the inner ear that is lined with hair cells that detect motion, sound waves, and send a nerve impulse to the brain. (p. 386)

coefficient (koh uh FIHSH uhnt) The number in a chemical equation that shows how many atoms or molecules of a substance are involved in a reaction. (p. 496)

cogeneration An energy-saving process in which heat and electricity are produced and utilized from the same fuel source. (p. 599)

colloid (KAHL oyd) A mixture with particles larger than those in a solution and smaller than those in a suspension. Colloids are not completely homogeneous, but are less heterogeneous than suspensions. (p. 523)

combustion Any type of chemical reaction with oxygen that gives off heat or light. (p. 244)

compass An instrument for determining direction with a magnetized needle that aligns itself with the earth's magnetic field. (p. 290)

composite Material made of fibers that are embedded in a matrix. (p. 618)

compound machine A system of two or more simple machines. (p. 120)

compound A substance made of two or more chemically combined elements. (p. 168)

compression Part of a longitudinal wave where the particles of matter through which the energy wave is moving are pressed together. (p. 337)

concave A surface that is curved or rounded inward, like the inside surface of a bowl. (p. 443)

concentration The amount of solute relative to the amount of solvent. (p. 520)

conduction The transfer of heat energy or electrons between objects in direct contact. (pp. 213, 262)

conductor A substance through which electric charges or heat can move easily. (p. 263)

constant The factor that is kept the same in a controlled experiment. (p. 7)

constructive interference The interaction of energy waves in which the same parts of two waves match up so that the amplitudes of the waves add to each other. (pp. 376-377)

controlled experiment An experiment with two test groups: an experimental group and a control group. (p. 7)

convection The transfer of heat energy by the movement of a fluid. (p. 214)

convex A surface that is curved or rounded outward like the surface of a ball. (p. 443)

cornea The transparent structure that covers the pupil and the iris of the eye. (p. 438)

covalent bond (koh VAY lent) A type of chemical bond formed between nonmetals in which atoms share one or more electrons. (pp. 469, 478)

crest The highest point of a transverse wave. Indicates the amount of energy in the wave. (p. 336)

crystal lattice The structure of an ionic solid in which an orderly three-dimensional pattern of atoms is repeated over and over. (p. 474)

cubic meter The basic SI unit of volume; space occupied by a cube 1 m x 1 m x 1 m. Abbreviated: m³. (p. 12)

D data Information from which analyses and conclusions can be made. (p. 3)

deceleration A decrease in velocity over a period of time. (p. 40)

decibel The unit used to measure sound intensity. Abbreviated: dB. (p. 367)

decomposition reaction A chemical reaction in which a single reactant breaks down into simpler parts, such as elements. (p. 500)

density The measure of how much mass exists in a given volume; density = mass/volume. (p. 13)

destructive interference The interaction of waves in which the same parts of each wave do not match. The amplitudes of the waves subtract from each other. (p. 376)

diffraction Bending of a wave as a result of the interaction between the wave and the edge of an object. (p. 350)

diode A vacuum tube through which electrons flow in only one direction. (p. 310)

Doppler effect A change in wave frequency, and therefore the pitch of a sound, caused by movement of either the source or the receiver. (p. 369)

double-replacement reaction A chemical reaction in which two different ions trade places between different ionic compounds, forming two new compounds. (p. 501)

drag The force that opposes the movement of an object through a fluid. (p. 99)

E **echolocation** (EK oh loh KAY shuhn) The method used by animals to locate objects by sending and receiving high-frequency sound waves. (p. 402)

electric current Flow of electric charge. Abbreviated: *I*. (p. 267)

electromagnet A magnet made of a soft-iron core surrounded by a coil of wire through which an electric current is passed. (p. 294)

electromagnetic induction The process of producing an electric current by moving a magnetic field through a wire coil without touching it. (p. 300)

electromagnetic spectrum The entire range of visible and invisible electromagnetic waves. (p. 428)

electron A subatomic particle with a negative charge located outside of an atom's nucleus. (p. 158)

electronics The specialized field of physics dealing with behavior and control of electrons. (p. 309)

element Matter that cannot be changed into a simpler form by any ordinary physical or chemical process. (p. 157)

emulsifier (ee MUHL sih FY er) A substance that helps to disperse tiny particles of liquid throughout another substance. (p. 526)

endothermic reaction (EN duh THER mihk) Any chemical reaction that absorbs energy. (p. 492)

energy The ability to cause change or do work. (pp. 45–46)

enzyme A biological catalyst that controls the rate of a specific chemical reaction in a living thing. (p. 508)

exothermic reaction (EK suh THER mihk) A chemical reaction that releases energy. (p. 492)

F **fluid** Any substance that tends to flow or to conform to the outline of its container, such as a liquid or a gas. (p. 85)

fluorescent Referring to light produced by electrons colliding with gas particles in a tube coated with phosphor. (p. 434)

focal length The distance from a lens to the point where light rays that pass through the lens are focused. (p. 446)

force The push or pull on an object that causes motion or change. (p. 55)

fossil fuel Fuel, such as oil, formed naturally from the remains of ancient organisms over millions of years. (p. 586)

frame of reference A place or object that is assumed to be fixed and by which the movement of other objects is determined. (p. 31)

frequency (FREE kwuhn see) The number of wavelengths that pass a point in a given time. (p. 344)

friction The force of resistance that occurs when movement takes place between any two objects or substances that make contact. (p. 57)

fulcrum The fixed point of a lever. (p. 117)

G **gamma decay** Radioactive decay in which no matter is released, but which releases energy called gamma radiation, or gamma rays. (p. 566)

gamma ray The electromagnetic wave with the shortest wavelength that is emitted by radioactive materials during a nuclear reaction. (p. 420)

gas Matter having no definite shape and no definite volume. (p. 142)

geothermal Relating to the heat produced beneath the earth's surface. (p. 592)

global warming The increase of the earth's atmospheric temperature as a result of the greenhouse effect. (p. 622)

greenhouse effect A process that traps energy from the sun by allowing radiant energy to enter a given space, but prevents heat energy from escaping. (p. 622)

H half-life The amount of time it takes for half the atoms of a quantity of a radioactive isotope to decay. (p. 568)

halogen Any one of the five elements in Group 17 of the periodic table (fluorine, chlorine, bromine, iodine, and astatine) that can combine with a metal to form a salt. (p. 197)

hardware The equipment and components that make up a computer, such as a central processing unit, main storage, input devices, and output devices. (p. 323)

heat energy A form of energy produced by vibration of molecules that can be absorbed, given up, or transferred between substances. (p. 209)

hertz The unit used to measure the frequency of waves. Abbreviated: Hz. (p. 368)

heterogeneous mixture A mixture in which the components are not evenly mixed so that different parts of the mixture have different compositions. (p. 176)

hologram A three-dimensional picture formed on photographic film by the interference pattern of a split beam of laser light. (p. 456)

homogeneous mixture A mixture in which the components are evenly mixed so that every part of the mixture is the same as any other. Same as *solution*. (p. 176)

hydrocarbon (hy druuh KAR buhn) An organic compound that contains only hydrogen and carbon atoms. (p. 539)

hydroelectric power Electricity generated by the power of moving water. (p. 586)

I illuminated An object or substance that is visible because it is reflecting light. (p. 433)

incandescent Light produced by a heated object that glows. (p. 434)

inclined plane A slanted-surface, simple machine that is used to raise or lower an object. (p. 116)

induction The transfer of electrons between objects that are not in direct contact. (p. 262)

Inertia The tendency of an object to remain at rest or in motion until acted upon by an external force. (p. 61)

infrared Invisible electromagnetic waves with wavelengths slightly longer than red light. Infrared waves have a penetrating heating effect. (p. 420)

inner ear The part of a human ear that contains the cochlea and the semicircular canals. (p. 386)

insulation (ihn suh LAY shuhn) A substance that slows the transfer of heat. (p. 236)

insulator A substance through which electric charges or heat can't move readily. (p. 263)

integrated circuit A tiny electric circuit that contains transistors, diodes, and resistors usually located on a small piece of silicon. (p. 313)

interference The effect of two or more waves interacting. (p. 352)

Internal energy The total amount of energy a substance contains. (p. 209)

Internal reflection The reflection of light off the inner surface of an object, as in a tube or optical fiber. (p. 457)

ion An atom or group of atoms having an electric charge as a result of losing or gaining one or more electrons. (p. 170)

Ionic bond (eye AHN ihk) A chemical bond between a metal and a nonmetal in which electrons are transferred from one atom to another. (pp. 469, 471)

Iris The colored portion of the eye that surrounds the pupil. (p. 437)

Isomer (EYE suh mur) An organic compound that has the same chemical formula for which more than one structure is possible. (p. 541)

isotope (EYE soh tohp) Atoms of the same element that have different numbers of neutrons, and therefore different atomic masses. (p. 161)

J joule (JOOL) The metric unit that measures work or energy. Abbreviated: J. (p. 108)

K Kelvin The SI temperature scale using units equivalent to Celsius degrees and beginning at absolute zero. (p. 211)

kilogram The basic SI unit of mass. Abbreviated: kg. (p. 13)

kinetic energy (KUH neht ihk) The energy of motion. Abbreviated: K.E. (p. 47)

L laser A device that produces coherent light of one wavelength that does not spread out as it travels. An acronym for **L**ight **A**mplification by **S**timulated **E**missions of **R**adiation. (p. 455)

Law of Conservation of Mass and Energy The principle that the amount of matter and energy in the universe cannot be created or destroyed. (p. 124)

lens A curved transparent object that forms an image by refracting light passing through it. (p. 446)

lever A simple machine that does work by moving around a fixed point. (p. 117)

lift Upward force acting on an airfoil moving through air. (p. 98)

lipid (LIH pihd) An organic compound, such as fat or oil, that has long hydrocarbon chains and does not dissolve in water. (p. 547)

liquid Matter having definite volume but not definite shape. A fluid. (p. 141)

liter A metric unit of volume. Abbreviated: L. (p. 12)

longitudinal wave (lahn juh TOOD uh nuhl) An energy wave consisting of a series of compressions and rarefactions that moves through a medium in the same direction the wave is travelling. (p. 337)

luminous (LOO muh nuhs) Referring to an object that produces light. (p. 433)

luster A property of metal that enables it to reflect light from the surface. (p. 189)

M machine A device that makes work easier by changing the direction or distance an object moves, or by reducing the amount of force needed to do work. (p. 112)

magnetic domain Magnetic regions in which the poles of individual atoms line up and group together. (p. 289)

magnetic field The area of magnetic force surrounding a magnet. (p. 288)

magnetic pole One of the two ends of a magnet where magnetic force is strongest. (p. 288)

malleability (MAL ee uh BIL uh tee) The ability to be flattened, bent, and shaped without breaking; a property of metals. (p. 189)

mass The scientific measurement of the amount of matter that an object contains. Abbreviation: *m*. (p. 13)

matrix Material in which another material or substance is embedded in a composite. (p. 618)

matter Any object or substance that has mass and takes up space. (p. 135)

mechanical advantage The advantage gained by using a machine to transmit force. Mechanical advantage = resistance force/effort force. Abbreviated: M.A. (p. 113)

mechanical efficiency The measurement that compares a machine's work output with its work input. Mechanical efficiency = work output/work input x 100% (p. 114)

melting point The temperature at which a substance changes from a solid to a liquid. (p. 224)

metalloid An element that has the properties of both a metal and a nonmetal. (p. 187)

metallurgy (MEHT uh LUR jee) The process and science of taking metals from the earth and making them into useful products. (p. 614)

meter The basic SI unit of length. Abbreviated: m. (p. 12)

microprocessor An integrated circuit that can hold all of a computer's problem-solving capabilities on one small silicon chip. (p. 322)

middle ear The part of the human ear between the eardrum and the oval window containing the hammer, anvil, and stirrup. (p. 386)

molecule Two or more chemically bonded atoms; the smallest part of a compound having all the properties of the compound. (p. 170)

momentum The product of the mass and velocity of an object. Momentum = mass x velocity. (p. 67)

N neutralization A process in which bases and acids react to form products that are neither acids nor bases. (p. 527)

neutron (NOO trahn) A subatomic particle located in an atom's nucleus that has no electric charge and that has a mass similar to that of a proton. (p. 160)

newton The basic SI unit of force. Abbreviated: N. (p. 56)

noise An unwanted sound that may disturb or threaten mental or physical health. (p. 394)

nonrenewable resource A natural resource, such as oil or natural gas, that can't be replaced by natural cycles or processes within a human lifetime. (p. 596)

nuclear fission Splitting of an atom's nucleus into two smaller nuclei, releasing a large amount of energy. (p. 571)

nuclear force The force within the nucleus of the atom that holds the parts of the nucleus together. (p. 78)

nuclear fusion Joining of two or more atoms' nuclei, which releases an enormous amount of energy. (p. 573)

nucleus The central region of an atom where neutrons and protons are located. (p. 159)

O **ohm** (OHM) The SI unit of resistance force. Abbreviated: Ω . (p. 271)

opaque (oh PAYK) Referring to a material that absorbs most light that strikes it. (p. 423)

optic nerve Nerve fibers connecting the rods and cones of the retina to the brain. (p. 438)

optical fiber A thin, flexible, glass or plastic fiber that transmits light throughout its length by internal reflection. (p. 457)

ore A mineral containing a relatively large amount of a metal compound. (p. 192)

organic compound A carbon compound that occurs naturally in all living things. (p. 537)

outer ear The part of the human ear that is visible from the exterior, and includes the ear canal and the eardrum. (p. 386)

overtone One of the higher pitched tones produced when a note is sounded and that contributes to the timbre of the sound. (p. 391)

P **particle model** The idea stating that all matter is made of tiny particles which are in constant motion. (p. 135)

periodic Describing a regular, repeating pattern, such as the periodic table of the elements or the periodic phases of the moon. (p. 183)

permanent magnet A magnet that retains its magnetism after the magnetizing force is removed. (p. 289)

petrochemicals (peh troh KEHM ih kuhls) Synthetic materials and chemical substances produced from petroleum. (p. 609)

petroleum A dark, oily, liquid mixture of hydrocarbons formed from organic material over millions of years; crude oil. (p. 605)

pH A measurement that shows how acidic or basic a solution is. (p. 529)

photoelectric effect The release of electrons by certain substances, such as metals, when struck by high-energy light. (p. 411)

photon (FOH tahn) The packet of light energy given off by an atom. (p. 409)

photosynthesis (FOH toh SIHN teh suhs) A chemical process by which plants use water, carbon dioxide, and energy from the sun to make oxygen and glucose for energy. (p. 552)

physical change A change in a substance's physical properties but not in its chemical identity. (p. 147)

pitch The property of sound determined by the frequency of the sound waves producing it; highness or lowness of sound. (pp. 367–368)

plasma (PLAZ muh) The fourth phase of matter having unique properties and formed at very high temperatures. (p. 145)

polarized Referring to light waves that are parallel, usually as a result of passing through a special filter. (p. 410)

polyatomic ion A group of covalently bonded atoms that has an electric charge due to losing or gaining one or more electrons. (p. 480)

polymer (PAHL ih mur) A large molecule made of a chain of many smaller units connected by covalent bonds. (pp. 541, 609)

potential energy Energy due to the position of an object or the chemical bonds in a substance. Abbreviated: P.E. (p. 46)

power The rate at which work is done, measured in watts. Power = work/time. (p. 109)

pressure The force exerted on a surface. Pressure = force/area. (p. 85)

product A substance produced by a chemical reaction. (p. 495)

protein (PROH teen) An organic compound existing as a large, complex molecule made of amino acids. (p. 548)

proton A subatomic particle with a positive charge located in the nucleus of an atom. (p. 159)

pulley A simple machine made of a rope wrapped around a grooved wheel. (p. 119)

pupil The opening through which light enters the eye. (p. 437)

R **R-value** The measurement of a material's ability to stop the flow of heat. (p. 236)

radiation The transfer of energy by infrared rays. (p. 215)

radioactive decay The process by which an unstable nucleus of a radioactive element breaks down spontaneously. (p. 565)

radioactivity The release of particles and energy from the nucleus of an atom. (p. 561)

rarefaction (RAIR uh FAK shun) Part of a longitudinal wave where the particles of matter through which the wave is moving are spread apart. (p. 337)

reactant (ree AK tuhnt) The raw material in a chemical reaction; shown on the left side of a chemical equation. (pp. 494–495)

real image An image formed by converging light rays. (p. 442)

rectifier A vacuum tube diode that changes alternating current into direct current. (p. 310)

reflection The action of a wave when it bounces off a surface. Also, the image formed by light rays reflected off a surface. (pp. 349, 441)

refraction Bending of a wave caused by the change of speed that occurs when the wave moves from one medium to another. (pp. 351, 445)

refrigerant A chemical that evaporates at a low temperature and removes heat as it changes from a liquid to a gas; used in cooling systems. (p. 241)

renewable resource A natural resource that is replaced continuously by natural cycles or processes. (p. 596)

resistance The force opposing the flow of electric current. Abbreviated: R. (p. 271)

resonance (REZ uh nehnts) The vibration of an object at its natural frequency. (p. 378)

respiration The chemical process in living organisms during which oxygen reacts with glucose to produce carbon dioxide, water, and energy in the form of ATP. (pp. 554–555)

retina The inner layer of the back of the eye where light-sensitive cells are located. (p. 438)

S salt An ionic compound made of a metal and a nonmetal and formed when an acid and a base react. (p. 529)

saturated hydrocarbon Hydrocarbon in which all carbon atoms are joined by single covalent bonds. (p. 541)

saturated Referring to a solution that contains as much of the solute as can be dissolved at a given temperature and pressure. (pp. 520–521)

scientific notation The method of expressing a very large or very small number by multiplying a number between 1 and 10 by some power of 10. (p. 14)

sclera The visible white part of the eye surrounding the iris. (p. 437)

semiconductor Material whose electric conductivity is between that of a conductor and that of an insulator. (p. 312)

silt Very fine particles of earth material. (p. 522)

simple machine A machine that does work in one movement. (p. 116)

single-replacement reaction A chemical reaction in which atoms of one element replace atoms of another element in a compound, producing a different element and a different compound. (p. 501)

smog A type of air pollution consisting primarily of smoke and fog. (p. 623)

software Programs that instruct computer hardware to perform certain tasks. (p. 324)

solar cell A device containing a semiconductor that converts sunlight into electricity. (p. 590)

solid Matter having definite shape and a definite volume. (p. 141)

solubility The ability of a substance to dissolve in another substance. (p. 519)

solute The component of a solution that is dissolved in the solvent. (p. 515)

solution A mixture in which the components are evenly mixed so that every part of the mixture is the same as any other. Same as *homogeneous mixture*. (p. 515)

solvent A component of a solution in which the solute is dissolved. (p. 515)

sonar The technique of using ultrasonic waves to locate underwater objects. Acronym for **sound navigation and ranging**. (p. 400)

sonogram The image created by ultrasonic waves reflected off the soft tissue of living organism. (p. 399)

sound wave The longitudinal wave in matter that can be heard, produced by a vibrating object. (p. 359)

specific heat The amount of heat necessary to raise the temperature of 1 g of a substance 1°C. (p. 216)

speed The distance travelled in a given amount of time. (p. 34)

strong force A nuclear force that holds protons and neutrons together by holding their quarks together. (p. 78)

substituted hydrocarbon A hydrocarbon in which at least one hydrogen atom is replaced by another functional group. (p. 542)

supersaturated Referring to a solution that contains more solute than could normally be dissolved at a given temperature and pressure. (pp. 520–521)

suspension Mixture in which some particles are relatively large and will settle out when the mixture is not moving. (p. 522)

synthesis reaction A chemical reaction in which two substances combine to form a third, more complex substance. Also called combination or composition reaction. (p. 500)

T technology The use of scientific or technical knowledge to solve a problem or to achieve a practical purpose; applied science. (p. 21)

temperature The amount of heat energy in a substance, determined by the average kinetic energy of the molecules in the substance. (p. 209)

terminal velocity The maximum velocity of a falling object, occurring when the force of friction equals the force of gravity. (pp. 57-58)

thermal expansion An increase in the volume of a substance due to an increase in heat energy. (p. 225)

thermal pollution An increase in water temperature that harms living things. (p. 625)

thrust Force that moves an object forward. (pp. 98-99)

timbre (TIM bur) The quality of a sound determined by the combination of different frequencies of the sound waves that make up the sound. (p. 370)

transistor A semiconducting device that contains layered n-type and p-type semiconducting materials. (p. 313)

translucent (tranz LOOS uhnt) Referring to a material that transmits some light but scatters it so that a sharp image is not seen. (p. 423)

transmutation (trans myoo TAY shun) The process in which an element changes into a different element, such as by radioactive decay. (p. 567)

transparent Describing a material that transmits almost all the light rays that strike it. (p. 423)

transverse wave Wave in which matter moves at a right angle to the direction of the wave. (p. 336)

trough The lowest point of a transverse wave. (p. 336)

turbine A set of curved blades mounted on a long shaft that is turned by the flow of a fluid, such as steam. Used to generate electricity. (p. 247)

U ultrasound A sound with a wave frequency greater than those within the range of human hearing. (p. 398)

ultraviolet Relating to invisible electromagnetic waves with wavelengths shorter than visible violet light and longer than X-rays. (p. 420)

universal force One of the four forces common throughout the universe: gravitational, nuclear, electric, or magnetic. (p. 73)

universal solvent Water, so called because of its ability to dissolve many substances. (p. 517)

unsaturated Referring to a solution that contains less solute than can be dissolved at a given temperature and pressure. (pp. 520-521)

unsaturated hydrocarbon A hydrocarbon that contains at least one double or triple covalent bond in its chain of carbon atoms. (p. 541)

V vacuum tube An early electronic device that consists of a glass vacuum bulb, a filament, and a plate. Used to control electrons. (p. 310)

variable The factor that is changed in a controlled experiment. (p. 7)

velocity (veh LAHS uh tee) The speed and direction of movement. (p. 34)

virtual image An image, such as one seen in a plane mirror, formed by light rays that do not actually pass where the image appears. (p. 442)

volt The SI unit of voltage. Abbreviated: V. (p. 270)

voltage The amount of electric energy available to move a charge. (p. 270)

volume The amount of space occupied by an object or substance. (p. 12)

W watt The basic SI unit of power; one watt equals one joule per second. Abbreviated: W. (p. 109)

wave Disturbance that transfers energy through matter or space. (p. 335)

wavelength The distance between two like parts of a wave, such as crests. (p. 343)

weak force The nuclear force that holds together the particles within protons and neutrons. (p. 78)

work Force acting upon an object in the direction the object moves. Work = force x distance. (p. 107)

work input The amount of work put into a machine. (p. 114)

work output The amount of work produced by a machine. (p. 114)

X X-ray A high energy electromagnetic wave that can travel through matter and has a wavelength of .001 nm to 10 nm. (p. 420)