Glossary of Scientific Terms

abrasion: wearing away by scraping or rubbing; often refers to a kind of weathering **(189)**

absolute age: age in years of a geologic event, fossil, or rock, usually found by radioactive tests **(197)**

absolute magnitude: brightness that a star would have if it were 32.6 light-years from Earth **(246)**

abyssal hill: small hill rising from part of the deep ocean floor **(207)**

abyssal plain: flat area on deep ocean floor made up of thick layer of sediments **(207)**

acceleration: change in an object's speed or direction (its velocity) over time **(285)**

acid: any compound that produces hydrogen ions (H^+) in water, and reduces its pH to below 7 **(264)**

acid rain: rain that has a lower pH (is more acidic) than normal; caused by chemical air pollutants combining with water vapor in air; the most common pollutants are sulfur dioxide (SO_2) and nitrogen oxides (NO_x) **(351)**

active margin: a continental margin with plate boundaries near it **(207)**

adaptation: structure, behavior, or other trait in an organism that helps it to survive in its environment **(127)**

adrenal glands: glands that lie above the kidneys, and secrete a hormone (epinephrine) that helps the body to prepare itself for emergencies **(097)**

adrenaline: *See epinephrine* **(097)**

adult: an organism that is fully developed and (usually) is able to reproduce **(106)**

air mass: a large body of air that has about the same temperature and humidity throughout it **(221)**

air pollution: contamination of the air with substances that can be harmful to living things **(348)**

air pressure: a measure of the weight of the atmosphere per unit of area on Earth's surface; also called **barometric pressure (224)**

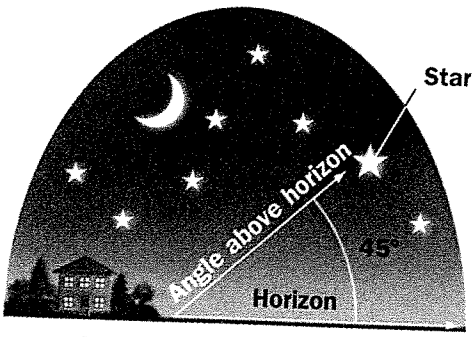
alcohol: any of several colorless, flammable liquids used as a fuel source; often made from plants **(328)**

algae: protists that are able to make their own food **(156)**

allele: one of a pair of genes that determine a specific trait **(122)**

alternating current (AC): flow of electricity in a conductor, in which electric charges change direction many times per second **(317)**

altitude: Astronomy: angular height of an object above the horizon; Geology: height above average sea level; *See diagram at elevation* **(172)**



Altitude of an object in sky

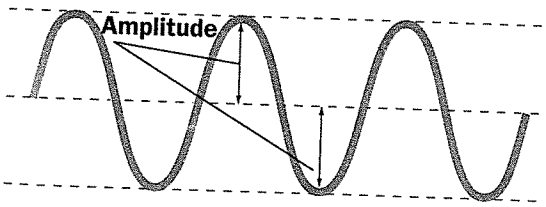
alveoli: tiny air sacs in the lungs where gases are exchanged; *See diagram at respiratory system* **(092)**

amino acids: compounds that are the building blocks of proteins **(079)**

ampere (A): unit of measurement for electric current **(317)**

amphibian: animal that lives both on land and in water; Amphibians begin life in water with gills, but have lungs and breathe air as adults. **(106)**

amplitude: total distance a wave moves (oscillates) from its resting position **(306, 313)**



Amplitude of a transverse wave

anaphase: stage of cell division during which the chromosome copies begin to separate **(081)**

anemometer: instrument used to measure wind speed **(225)**

antibody: protein made by the body that fights against a certain disease-causing substance **(098)**

antigen: pieces of destroyed pathogens; Antigens alert white blood cells to an invader's presence. **(098)**

anus: the opening at the end of the digestive system, where wastes are released **(089)**

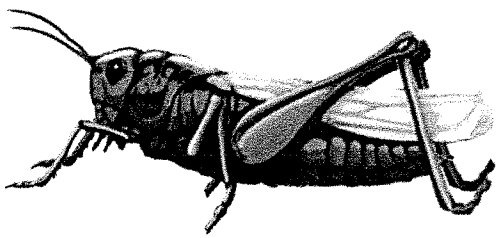
apparent magnitude: brightness of a star, planet, or other object, as it appears from Earth **(246)**

archaebacteria: kingdom of single-celled organisms that lack a nucleus and contain some unusual compounds. Most live in extreme environments, such as hot springs. **(157)**

Archimedes' principle: states that the buoyant force of a fluid on an object is equal to the weight of the fluid displaced by the object **(296)**

artery: a vessel in the circulatory system that carries blood away from the heart; *See diagram at circulatory system* **(093)**

arthropod: a phylum of invertebrates that have hard segmented body coverings (exoskeletons) and jointed legs, such as insects **(161)**



asexual reproduction: reproduction involving only one parent organism; also called **non-sexual reproduction (114)**

asteroids: objects of rock, metal, and ice that are smaller than planets and revolve around the Sun **(241)**

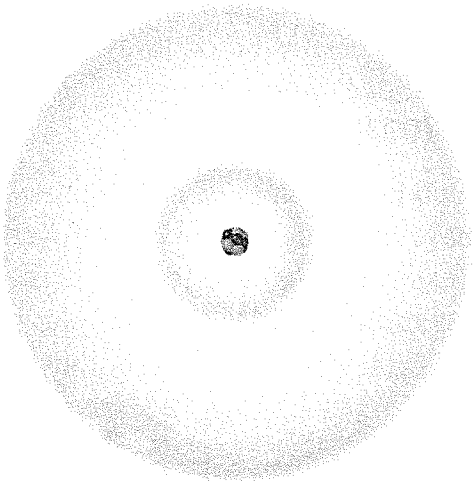
asthenosphere: layer in the upper part of Earth's mantle that is made of material that can be reshaped and deformed, and on which the continents move

astrolabe: instrument used to measure the angle of an object in the sky, above the horizon (its altitude)

astronomy: study of space, including stars, planets, and other objects in space, and their origins **(231)**

atmosphere: layers of air surrounding Earth **(213);** also, a measure of pressure exerted by the weight of Earth's atmosphere at sea level **(295)**

atom: smallest particle into which an element can be divided and still have the properties of that element **(255)**



Model of an atom

atomic mass: average mass of one atom of an element **(265)**

atomic number: number of protons in the nucleus of one atom of an element **(265)**

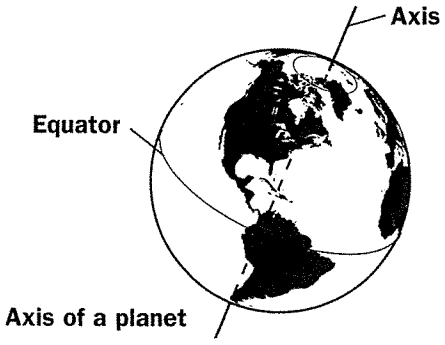
ATP: adenosine triphosphate, the major energy-carrying molecule of the cell **(079)**

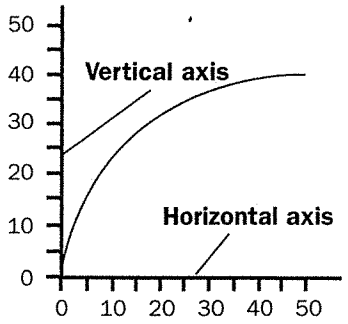
aurora: display of light in sky, usually at high latitudes; formed where particles from the sun enter Earth's atmosphere and magnetic field **(215)**

autotroph: an organism, such as a plant, that makes its own food **(159)**

autumnal equinox: *See equinox* **(234)**

axis: Earth Science: imaginary line passing through the center of a planet (such as Earth), that the planet spins around **(233)** Graphing: line on which a scale is drawn to show values for a variable **(390)**





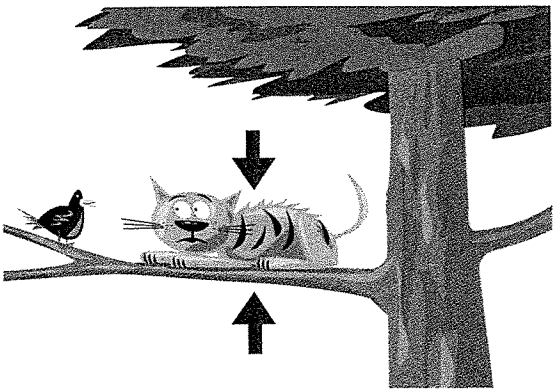
Graph axis

axon: long fiber branching from the central cell body of a nerve cell; *See diagram at neuron* **(095)**

B

bacteria: domain of single-celled organisms that lack a nucleus; The term also refers to organisms in the kingdom eubacteria. **(157)**

balanced forces: occur when the total of all forces on an object equals zero and the object's motion does not change; *See also unbalanced forces* **(281)**



Forces on the cat are balanced.

bar graph: graph that uses bars of different lengths to compare data **(391)**

barometric pressure: *See air pressure* **(224)**

base: Chemistry: any compound that produces hydroxide ions (OH^-) in water and raises its pH above 7 **(264)** Genetics: one of four molecules making up a strand of DNA **(115)**

beaker: a container, usually made of heat-resistant glass, that has a spout for pouring and marks for measurement **(047)**

Beaufort wind scale: a system for estimating wind speed based on observations **(225)**

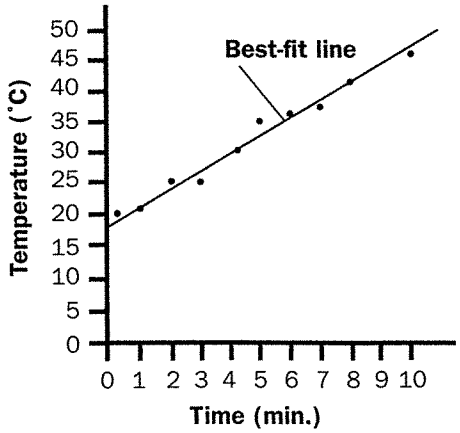
bedrock: solid rock that lies under layers of soil and sediment

behavior: an activity or action that generally helps an organism survive in its environment **(109)**

benthos: organisms living on the floor of a body of water **(210)**

Bernoulli's principle: states that the pressure that a moving fluid puts on a surface decreases the faster the fluid flows **(297)**

best-fit line: line on a graph that most closely fits a set of data points that share a trend **(398)**



bias: the influence of a person's beliefs or wishes on their opinions and interpretations **(368)**

bile: substance made by the liver that breaks down large fat molecules **(089)**

biodegradable: substance that will break down into simpler compounds when buried or exposed to sun, water, and air **(337)**

biodiversity: the variety of organisms in a specific environment, or on Earth as a whole **(124)**

biology: study of living things **(073)**

biomass: Ecology: total mass of living organisms in a certain area; Resources: matter formed by plants or animals that is used as a fuel, such as wood or dung **(328)**

biome: a large region of land with a distinct climate and certain types of plant and animal life **(141)**

biosphere: the part of the Earth that is able to support life **(141)**

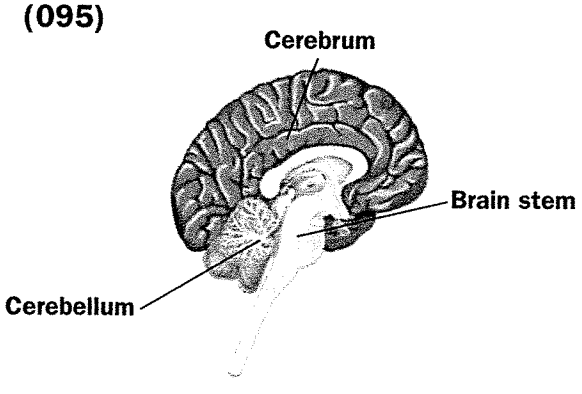
bladder: *See gall bladder* **(089)** *or urinary bladder* **(090)**

blood: a tissue made up of cells and pieces of cells carried in a liquid; transported throughout the body by the circulatory system **(093)**

blue-green algae: *See cyanobacteria* **(157)**

boiling point: temperature at which a substance changes from a liquid state to a gaseous (vapor) state; same as condensation point for that substance **(254)**

brain: organ that is the control center for actions, thoughts, and emotions **(095)**



Human brain

brain stem: structure of the brain that controls internal organs and basic body functions **(095)**

bronchi: two large tubes that branch off the trachea into the lungs; *See diagram at respiratory system* **(092)**

Bunsen burner: laboratory heat source that burns natural gas **(033)**

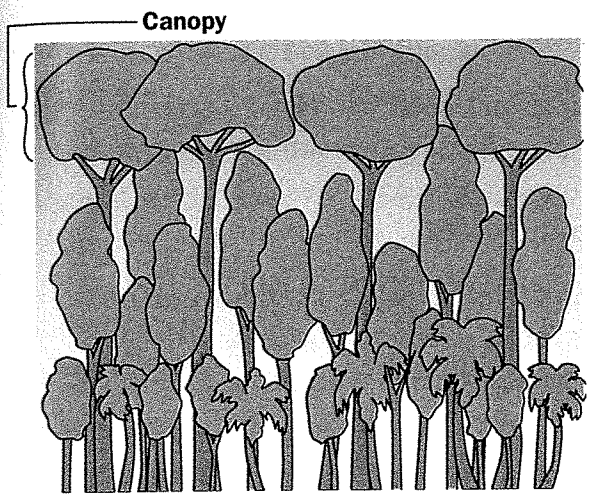
buoyancy: tendency of an object to float or rise in a fluid that is more dense than the object is **(296)**

buoyant force: upward force exerted on an object by a fluid, when the object is placed in the fluid **(296)**

C

calorie (cal): unit of thermal energy equal to amount of energy needed to raise the temperature of 1 g water (1 cm^3 or 1 mL) by 1°C; Kilocalorie (kcal or Cal) = 1000 calories, the unit used to measure energy stored in food; SI system uses joule (J) (1 cal = 4.184 joules)

canopy: the uppermost layer of a forest, at the tops of the trees **(145)**



capacity: amount that can be held by a container; for example, a 2-L bottle has a capacity of 2 liters **(059)**

capillary: smallest vessel in the circulatory system; site of nutrient and gas exchange between blood and body cells **(093)**

captive breeding: breeding of wild animals in a zoo, in such a way that the animals may be released into the wild and help prevent extinction of the species **(344)**

carbohydrate: molecule made up of carbon, hydrogen, and oxygen, which is the product of photosynthesis; sugars and starches are examples

carbon dioxide-oxygen cycle: the continual transfer of carbon dioxide and oxygen between living things and the environment **(138)**

cardiac muscle: heart muscle; It is involuntary (not consciously controlled), and keeps the heart beating. **(087)**

carnivore: an animal that feeds on other animals, such as a wolf **(133)**

cartilage: firm, flexible tissue that is part of the skeletal system; The nose and ears contain cartilage. **(086)**

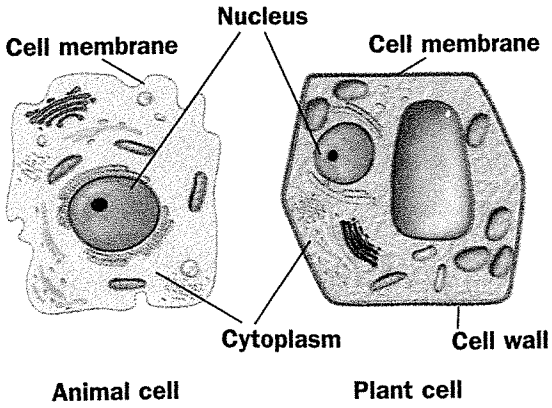
cartographer: person who makes maps **(167)**

cast: kind of fossil formed when sediments fill a hole left by an organism; *See diagram at mold* **(198)**

catalyst: substance that helps start or speed up a reaction between two other substances, without being changed by the reaction

caterpillar: the larval stage in the life cycle of certain insects **(106)**

cell: basic unit of structure and function in living things **(076)**



cell division: process by which cells divide to form new cells **(080)**

cell membrane: structure that surrounds the cytoplasm of the cell **(077, 078)**

cell wall: stiff outer barrier of a plant cell, outside the cell membrane, which is made mostly of cellulose **(078)**

cellular respiration: process in cells by which oxygen is chemically combined with food molecules and energy is released **(079, 105)**

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + ATP$$

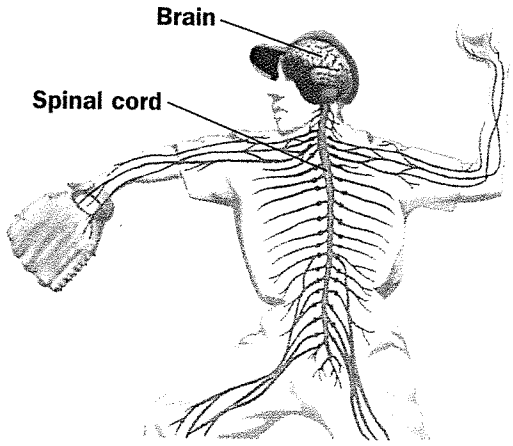
glucose (sugar) + oxygen ⟶ carbon dioxide + water + energy

Cellular respiration

Celsius (C): temperature scale in which the freezing point of water is 0° and the boiling point of water is 100° **(071)**

cementation: process that turns sediments into hard rock when a binding material, often calcite, filters into the sediment **(180)**

central nervous system: message system made up of the brain and spinal cord **(095)**



centripetal force: force that is directed toward the center of a circle, which keeps an object moving in a circle instead of flying away **(278)**

cerebellum: part of the brain that helps coordinate body movements; *See diagram at brain* **(095)**

cerebrum: part of the brain that is the control center of thoughts and voluntary actions; *See diagram at brain* **(095)**

chemical bond: force of attraction that holds together atoms in a compound; ionic and covalent bonds are examples **(263)**

chemical change: occurs when one or more substances are changed into new substances with different properties; cannot be undone by physical means **(252)**

chemical digestion: process that breaks large food molecules into smaller molecules that can be taken in by cells **(089)**

chemical energy: energy stored in chemical bonds **(300)**

chemical equation: a way of writing changes in the arrangement of atoms during a chemical reaction, using chemical symbols **(270)**

$$2H_2 + O_2 \longrightarrow 2H_2O$$

Reactant + Reactant ⟶ (Yields) Product

Chemical equation

chemical family: *See group* **(265)**

chemical formula: a way of describing the number of atoms that make up one molecule of a compound **(267)**

H_2O — Water

CO_2 — Carbon dioxide

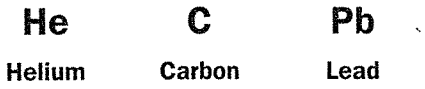
Chemical formulas

chemical property: characteristics of a substance that describe its tendency to combine with other substances and forms new ones; for example, iron changing to rust by combining with oxygen **(251)**

chemical reaction: change that takes place when two or more substances (reactants) interact to form new substances (products); *See also chemical equation* **(269)**

chemical sedimentary rock: rock formed when a body of mineral-rich water evaporates and the dissolved minerals crystallize and fall to the bottom **(180)**

chemical symbol: one- or two-letter code that stands for an element; Many symbols are abbreviations of the element's name, which may be English, Latin, or Greek in origin. **(265)**



Chemical symbols

chemical weathering: wearing away of rocks by chemical processes, such as oxidation or dissolving **(190)**

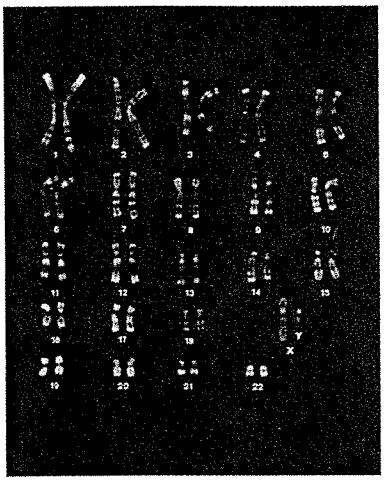
chemistry: the study of the structure, properties, and interactions of matter

chlorofluorocarbons (CFCs): substances that were formerly used in spray cans, refrigerators, and air conditioners; Evidence suggests that CFCs cause a loss of ozone in the upper atmosphere. **(350)**

chlorophyll: green pigment in plants that captures the energy of sunlight for use in photosynthesis **(079, 107)**

chloroplast: a structure in a plant cell that contains chlorophyll; Sugar molecules are made in chloroplasts through the process of photosynthesis. **(078)**

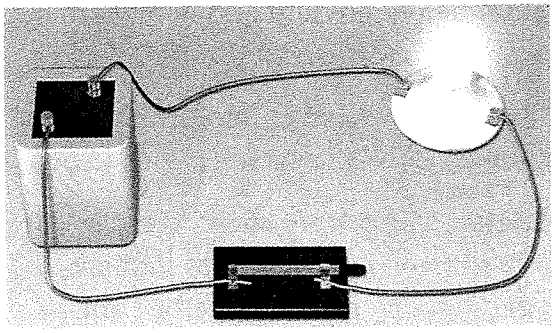
chromosome: a structure located in the nucleus of a cell, made of DNA, that contains the genetic information needed to carry out cell functions and make new cells **(116)**



Chromosomes

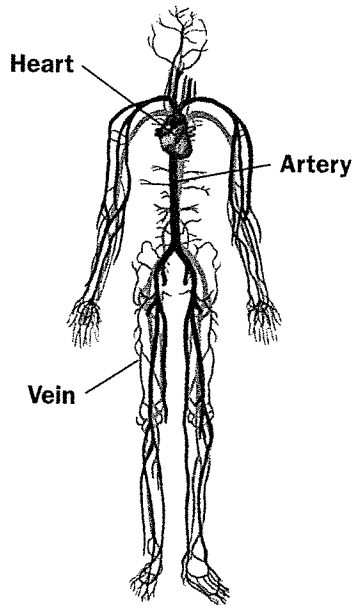
circle graph: *See pie chart* **(393)**

circuit: path that electric current flows through; a closed circuit has no breaks; an open circuit has a break and current cannot flow through it. **(318)**

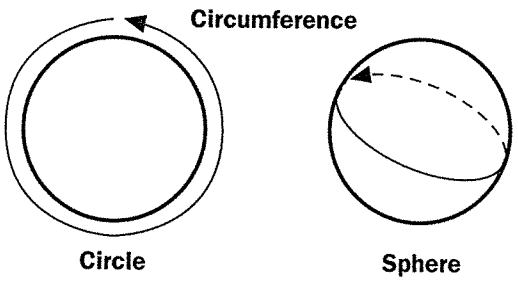


Circuit

circulatory system: organ system that transports needed substances throughout the body and carries away wastes **(093)**



circumference: distance around a circle or sphere



cirro-, cirrus: very high wispy clouds made of ice crystals **(223)**

class: division of organism classification below phylum and above order, as in the class *Insecta* (insects) **(151)**

classify: to organize into groups based on similar characteristics **(150)**

clastic sedimentary rock: rock formed from rock particles that are cemented and pushed together, for example sandstone and shale **(180)**

cleavage: Biology: division of a fertilized egg into additional cells; Geology: splitting of minerals along flat surfaces where bonds between atoms are weak **(179)**

climate: the general pattern of weather in a particular part of the world over a long period of time **(141, 227)**

climax community: dominant community of plants and animals that come to live in an area; *See ecological succession* **(140)**

cloning: process of using a cell or tissue from an organism to produce a new organism with an identical genotype; done in a laboratory **(120)**

cloud: group of tiny liquid water droplets hanging in the air **(223)**

coal: solid fossil fuel, formed deep within Earth over millions of years **(325)**

coefficient: in a chemical equation, the number placed in front of a chemical formula to balance the equation **(267)**

cold front: leading edge of a cold air mass that is pushing a warm air mass **(222)**

colloid: mixture in which small clumps of molecules of one substance are evenly spread throughout another substance and do not settle out

colonize: migration of a species into a new area; *See ecological succession* **(140)**

color: light of various wavelengths; The eyes see each wavelength of light as a different color. **(309, 311)**

coma: Astronomy: mass of cloud-like material around the center of a comet **(242)**

combustion: rapid oxidation; also called **burning**

comet: solar system object made mostly of ice, which follows a long, narrow orbit around the sun; A comet comes near the sun only occasionally. **(242)**

Comet

commensalism: relationship between species in which one species is helped and the other is unaffected **(132)**

community: all of the populations sharing a specific area or region; for example, all the organisms in a lake **(130)**

compaction: process by which sediments are reduced in size or volume by pressure of rock or soil lying above them **(180)**

competition: in an ecosystem, occurs when more than one individual or population tries to make use of the same limited resource **(132)**

complete metamorphosis: describes the life cycle of an organism whose form changes substantially at each stage of its life cycle **(106)**

compound: matter made of two or more elements; The elements in a compound are chemically bonded, cannot be separated by physical means, and a compound has properties that are different from the elements that make it up. **(262)**

compression: *See longitudinal wave* **(307)**

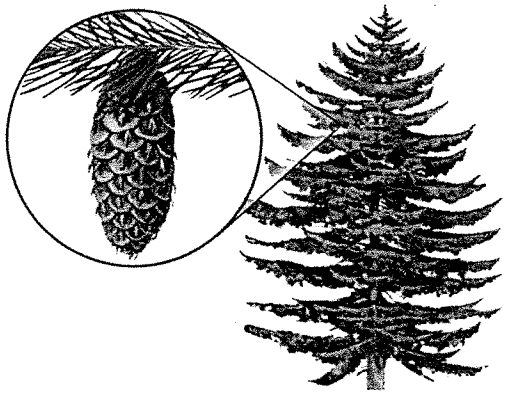
condensation: process in which matter changes from a gaseous state (vapor) to a liquid state; also, matter (especially water) that has condensed on a cold surface, such as water on the outside of a cold glass **(216)**

condensation point: temperature at which a substance changes from a gaseous (vapor) state to a liquid state; same as boiling point for that substance **(254)**

conduction: transfer of heat from a warmer substance to a cooler substance through direct contact **(304)**

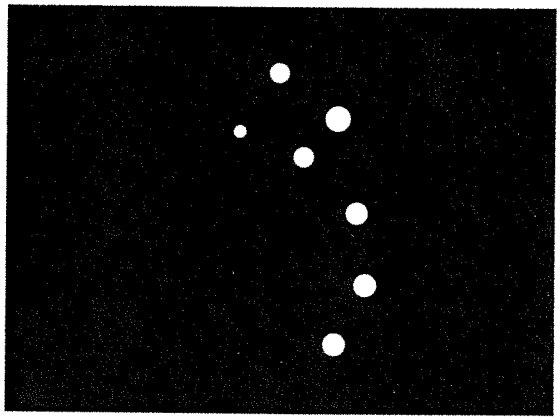
conductor: substance that conducts heat readily; also a substance that allows an electric current to pass through it **(317)**

conifer, coniferous tree: tree that produces seeds in cones and has needle-like leaves **(143)**



conservation: the wise use and protection of natural resources **(332)**

constellation: an apparent pattern of stars in the sky, such as the Little Dipper (Ursa minor) **(248)**



consumer: an organism that feeds on other organisms **(133)**

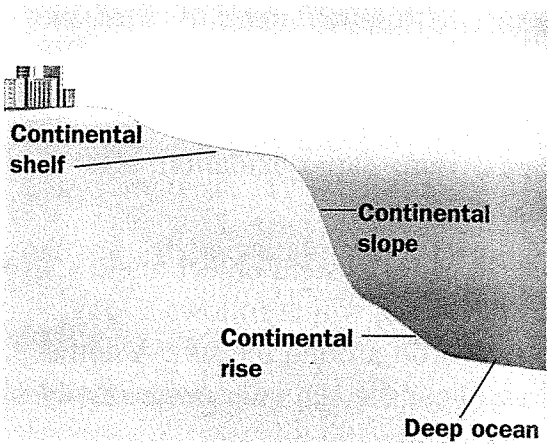
consumption: the use of a resource **(334)**

continent: any of Earth's seven large land masses

continental crust: rocky material that makes up continents; It is less dense and contains a greater amount of lighter-colored minerals than oceanic crust. **(183)**

continental drift: hypothesis that continents were once part of a single landmass that broke apart and moved to their present positions; led to the theory of plate tectonics **(182)**

continental margin: portion of the seafloor extending from the shoreline to the edge of the deep ocean **(207)**



Continental margin

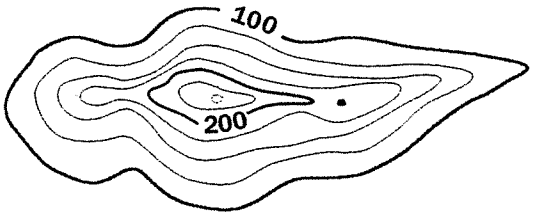
continental polar: cold, dry air mass that forms over Canada and moves south **(221)**

continental tropical: hot, dry air mass that forms over Mexico and moves north **(221)**

contour interval: difference in elevation between any two contour lines on a topographic map **(173)**

contour line: on a map, line that connects points of equal elevation above sea level **(173)**

Countour interval 25 feet



Contour lines

control: factor in an experiment that is kept the same **(008)**

convection: transfer of thermal energy in a fluid (liquid or gas), in which warmer fluid rises and cooler fluid sinks in a **convection current (304)**

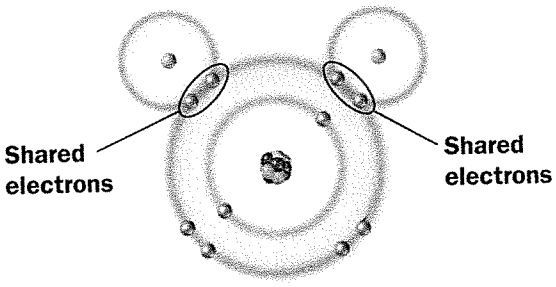
convergent boundary: formed where two sections of Earth's crust are colliding **(184)**

coprolite: fossilized animal dung **(198)**

coral reef: warm ocean ecosystem based on tiny animals called coral, which build a rock-like structure (reef) that shelters other organisms **(149)**

Coriolis effect: effect that Earth's rotation has on the path of air and water moving at or above its surface, causing the fluid's path to curve **(205)**

covalent bond: chemical bond in which atoms share one or more electrons; compounds formed this way are called **covalent compounds (263, 264)**



H_2O: A covalent compound

crater: bowl-shaped hollow in the ground, caused by a volcano or by a meteor strike **(239)**

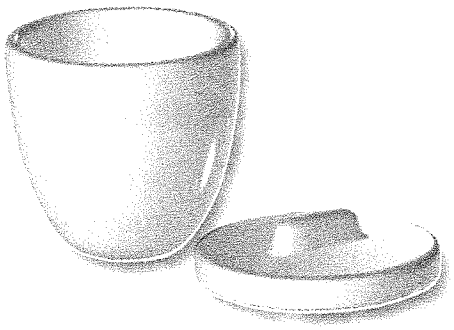
Meteor crater, Arizona

creep: a type of erosion in which soil and sediments move slowly downhill

crest: *See transverse wave* **(307)**

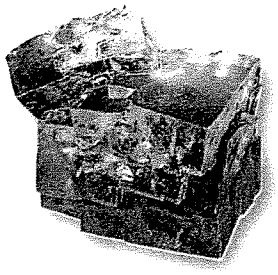
cross-cutting relationships: principle that states that when a rock formed from magma cuts through another rock, the rock formed from magma is younger than all the rocks it cuts through **(196)**

crucible: small porcelain pot used for heating substances **(030)**



crust: outermost, rocky layer of Earth **(177)**

crystal: solid made up of molecules arranged in a regular, repeating pattern



Halite crystal

crystal structure: how the particles in a mineral or chemical are arranged **(179)**

cumulo-, cumulus: thick clouds piled up in masses **(223)**

current electricity: the flow of electric charges through a conductor **(317)**

cyanobacteria: bacteria that make their own food through photosynthesis; also called **blue-green bacteria (157)**

cytoplasm: gel-like fluid that takes up most of the space inside a cell **(077, 078)**

D

data: collected information, the results of an experiment or other investigation; **quantitative data** include numbers, **qualitative data** are descriptive **(009, 386)**

day: time needed for Earth to complete one rotation around its axis (24 hours); also, the daylight period between sunrise and sunset **(233)**

decibel (dB): unit of measurement for the loudness of sound **(313)**

deciduous tree: tree that drops its leaves at the end of the growing season **(144)**

Deciduous tree in summer

Deciduous tree in winter

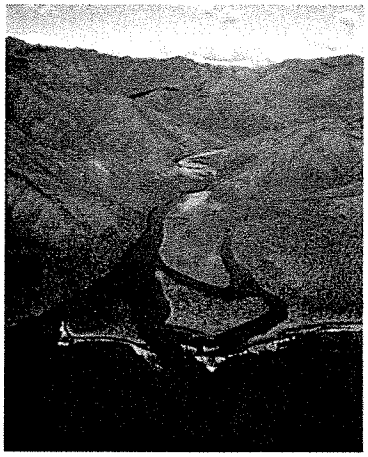
decimal: the base-10 number system; a **decimal fraction** is any number less than 1 that is shown using a base-ten system, such as 0.25, instead of using stacked whole numbers, such as $\frac{1}{4}$ **(378)**

decomposer: simple organism, such as bacteria or fungus, that breaks down dead organisms and waste, returning important nutrients to the environment **(133)**

decomposition: describes the process in which fungi and bacteria break down dead plant and animal materials and animal wastes, and release nutrients back into the environment **(138)**

deep-sea trench: long, narrow, extremely deep areas of world's oceans, that are formed where one lithospheric plate moves under another **(207)**

delta: a fan-shaped sediment deposit formed at the mouth of a river **(192)**



dendrite: short extension of the nerve cell body that receives stimuli from the axons; *See diagram at neuron* **(095)**

density: amount of mass (g) in a given volume (cm^3) of a substance or object; found by dividing the mass of the object by its volume **(068)**

dependent variable: factor whose value is the result you are testing; also called **responding variable (396)**

deposition: process by which wind, water, and gravity leave eroded sediments in new locations **(192)**

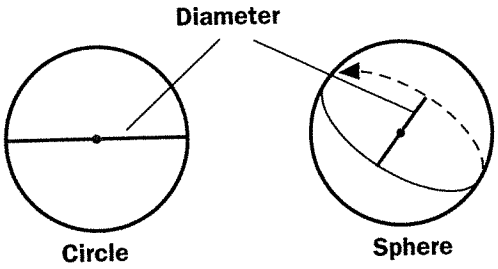
desert: dry climate that receives an average of less than 25 cm of rainfall per year **(147, 230)**

dew: water vapor from the atmosphere that has condensed into liquid water droplets on a surface **(226)**

dew point: air temperature at which dew will form under certain conditions **(226)**

diabetes (mellitus): condition in which the pancreas does not produce enough insulin to control blood sugar levels **(097)**

diameter: line segment passing through the center of a circle or sphere



diaphragm: Human Body: large domed muscle that separates chest and abdomen and plays a major role in breathing; *See diagram at respiratory system* **(092);** Also, device that adjusts the amount of light entering a microscope **(049)**

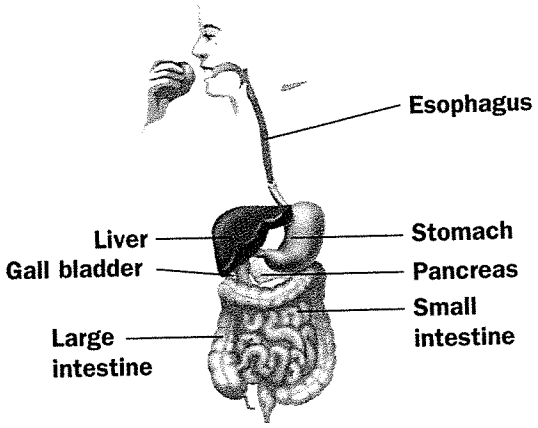
dichotomous key: a system used for identifying plants, animals, rocks, or minerals, that is made up of a series of paired descriptions to choose between **(164)**

diffraction: bending of a wave through an opening or around the edge of an object

diffusion: Chemistry: movement of a molecule from an area where it is in higher concentration to an area where it is in lower concentration; Physics: scattering of light

digestion: process of breaking down food into a form the body can use; *See chemical digestion and mechanical digestion* **(089)**

digestive system: organ system that breaks down food into substances the body can use, and absorbs these substances **(089)**



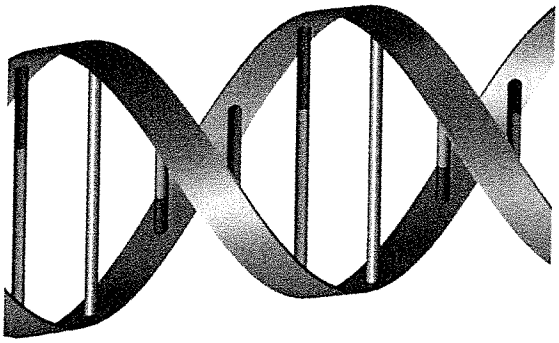
direct current (DC): flow of electricity through a conductor, in which electric charges move in only one direction **(317)**

displace, displacement: one substance or object moving another substance or object, or taking its place **(062)**

divergent boundary: forms where lithospheric plates are moving away from each other **(184)**

divide: ridge that separates two drainage basins **(193)**

DNA: deoxyribonucleic acid; the material found in a cell's nucleus, that determines the genetic traits of the organism **(115)**



Model of DNA structure

doldrums: low air pressure band near the equator where there is little wind **(217)**

domain: largest grouping in the classification of organisms, above kingdom **(151)**

dominant: in a pair of alleles, the one that, if present, determines the trait **(122)**

Doppler effect: change in the apparent frequency of a wave, because either the source of the wave is moving toward or away from the observer, or the observer is moving toward or away from the source of the wave

double-pan balance: kind of laboratory balance, used with standard masses to measure mass **(065)**

drainage basin: area of land that drains water from higher land to lower land and into a stream; also called **watershed (193)**

dune: mound of sand that was deposited by wind

dung: dried animal feces; used as fuel in some parts of the world **(328)**; *See also coprolite* **(198)**

earthquake: energy travelling as waves passing through Earth, caused by a sudden shift along a fault line, or by volcanic activity **(186)**

echo: sound waves reflected off a surface

eclipse: when one solar system object passes between the Sun and another object, casting a shadow **(236)**

ecological succession: process by which one community of organisms slowly replaces another in an area; *See climax community, colonize* **(140)**

ecology: study of interactions of organisms with each other and their environment **(129)**

ecosystem: all the living populations in an area along with the nonliving parts of that environment **(129)**

efficiency: comparison of amount of energy used per amount of work done

egg: female sex cell; also an object that contains an animal developing from a fertilized sex cell (such as a bird or insect) **(101, 106, 114)**

El Niño: unusually warm ocean current that occurs in the eastern Pacific near the equator, and shifts ocean current patterns **(229)**

lectric charge: a property of the articles in an atom; may be positive protons), negative (electrons), or neutral (neutrons) **(315)**

lectric circuit: *See circuit* **(318)**

lectric current: the amount of lectric charge that moves past a ertain point each second; measured n amperes (A) **(317)**

lectric force: the attractive or repulsive force between charged objects **315)**

lectrical energy: form of energy hat consists of a flow of electric harges through a conductor **(300)**

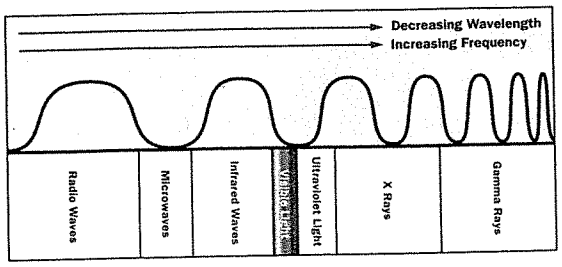
electricity: general term for interaction of electric charges **(314)**

electrolyte: substance that produces ions and conducts electricity when it is dissolved in water

electromagnet: magnet made by passing an electric current through a wire wrapped around an iron rod **(321)**

electromagnetic induction: the process in which electric current is generated by a changing magnetic field **(321)**

electromagnetic spectrum: full range of electromagnetic waves **(309)**



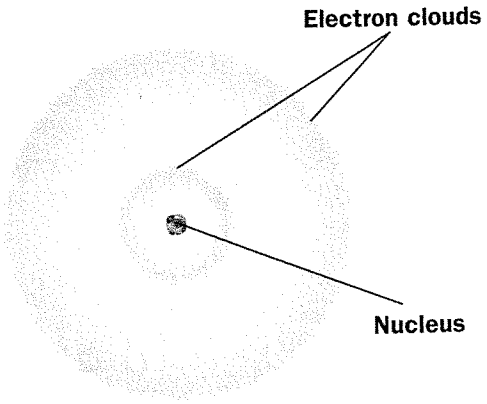
Electromagnetic spectrum

electromagnetic wave: form of energy that can travel through empty space as well as through matter; includes visible light, radio waves, X rays, and many other wavelengths **(305)**

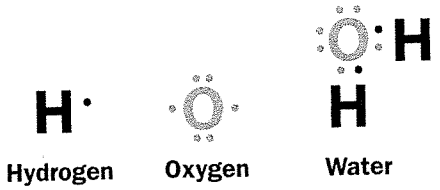
electromagnetism: magnetic force caused by electric charges in motion **(321)**

electron: negatively charged particle found outside the nucleus of an atom **(256)**

electron cloud: in the electron cloud model of the atom, region around the nucleus where an electron may be found **(256)**



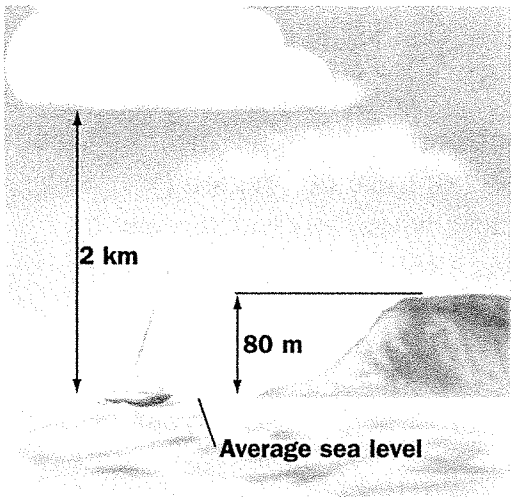
electron-dot diagram: way of using dots to show arrangement of outermost electrons in atoms; also used to show bonds between atoms **(268)**



electronic balance: kind of laboratory balance used to measure mass **(066)**

elements: substances that are the building blocks of all matter; An element is made up of one kind of atom. **(260)**

elevation: height above average (mean) sea level; also called **altitude (172)**



Elevation

embryo: an early stage of a developing organism; in humans, this is 2–8 weeks of development **(102)**

endangered species: an organism that is in danger of extinction **(344)**

endocrine system: system of organs that controls body activities through chemical messengers (hormones) **(097)**

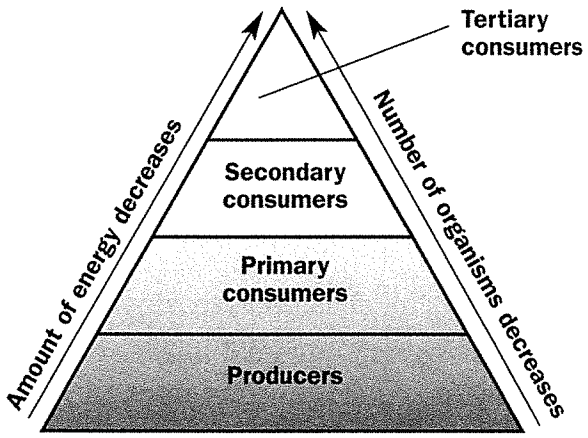
endoplasmic reticulum: structure in a cell that is involved in making proteins and transporting materials **(077, 078)**

endothermic: Biology: animal that keeps a constant body temperature, sometimes called **warm-blooded** or **homeothermic;** Chemistry: chemical reaction in which energy is absorbed

energy: ability to do work **(299)**

energy levels: the amount of energy carried by an electron in an atom; determines the electron's average distance from the nucleus **(256)**

energy pyramid: diagram that demonstrates the flow of energy through a food chain **(137)**



Energy pyramid

energy resources: resources that provide energy; include fossil fuels, biomass, geothermal energy, solar energy, hydroelectric energy, nuclear energy, and wind energy **(324)**

environment: surroundings and conditions in which an organism lives

enzyme: a protein in the body that helps control a chemical reaction, such as digestion **(079, 089)**

on: largest division of geologic me, lasting many hundreds of illions of years **(200)**

picenter: point on Earth's surface irectly above the location (focus) of n earthquake **(186)**

pidermis: outer layer of a plant stem r of an animal (part of its skin)

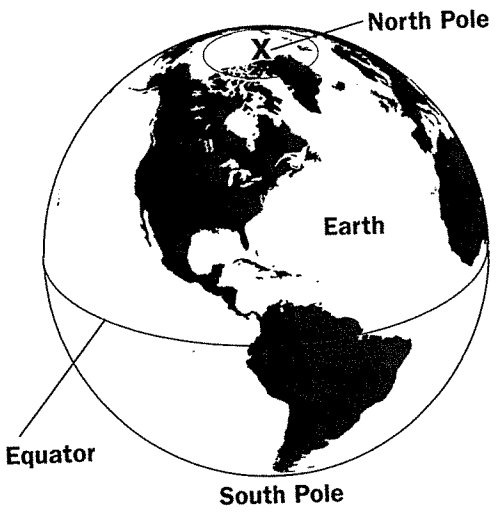
piglottis: flap of tissue at the top of he trachea, that prevents food from ntering the lungs **(089)**

epinephrine: hormone that helps to prepare the body for emergency situations by increasing heart rate, blood pressure, and blood sugar levels; also called **adrenaline (097)**

epoch: smallest division of geologic time; lasts several million years **(200)**

equal-area projection: a map showing land masses with correct areas but distorted shapes **(168)**

equator: an imaginary line around the middle of Earth, halfway between the two poles **(169)**



equinox: one of two days in the year when the hours of daylight equal the hours of darkness over Earth as a whole; **vernal equinox** marks the beginning of spring; **autumnal equinox** marks the beginning of autumn, or fall **(234)**

era: division of geologic time lasting several hundreds of millions of years; shorter than an eon, longer than a period **(200)**

erosion: movement of sediment by wind, water, ice, or gravity **(192)**

esophagus: tube that carries food from the mouth to the stomach; *See diagram at digestive system* **(089)**

estimate: an approximation or educated guess at a quantity, based on facts; also, the act of estimating **(053)**

estuary: regions where a river flows into the ocean, and fresh river water mixes with salty ocean water **(148)**

eubacteria: kingdom of single-celled organisms that lack a nucleus and live in a variety of environments **(157)**

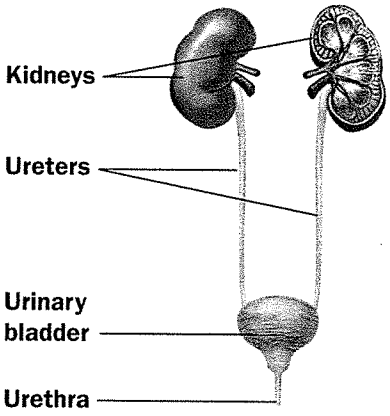
eukaryote: organism made up of cells that have a membrane-bound nucleus and other organelles **(160)**

evaporation: change of matter from a liquid state to a gaseous state (vapor) **(216, 254)**

evolution: theory, based on scientific evidence, that describes how organisms change over many generations **(126)**

excrete: to eliminate waste from an organ or body; The waste itself is called an **excretion.**

excretory system: organ system that removes wastes from the body; The urinary system is part of the excretory system. **(090)**



Urinary system

exoskeleton: a firm, supportive covering on the outside of certain organisms, including insects **(161)**

exosphere: outermost layer of Earth's atmosphere **(215)**

exothermic: Biology: animal whose body temperature changes with the temperature of its surroundings; sometimes called **cold-blooded** or **poikilothermic;** Chemistry: chemical reaction in which energy is given off, usually as thermal energy

experiment: series of steps that, under controlled conditions, produces data that test a hypothesis or prediction **(002, 008)**

extinct: condition in which there are no more living members of a species **(128, 340)**

extrapolation: estimate of a unknown value beyond a data set, made by assuming that unknown values follow the same trend as known values **(400)**

extrusive: igneous rock formed by lava cooling quickly at or near Earth's surface **(180)**

F

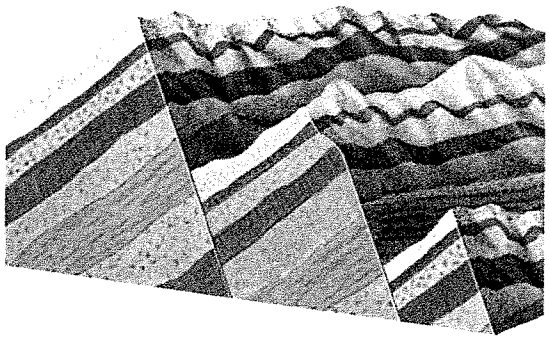
Fahrenheit (F): temperature scale commonly used in the United States, in which the freezing point of water is 32° and the boiling point is 212° **(071)**

family: Biology: division of organism classification below order and above genus, as in *Felidae* (cats) **(151);** Chemistry: *See group* **(265)**

fat: kind of organic compound that makes up part of a cell membrane, stores excess food energy for an organism, helps insulate an organism, and has many other roles

fault: Geology: crack within Earth's rocky crust, where rock has been fractured, and where rocks move past each other **(186);** Electricity: defect in an electrical circuit

fault-block mountain: mountains formed when rocks move along faults, leaving blocks of crust at different elevations **(187)**



feces: solid waste eliminated by the body **(089)**

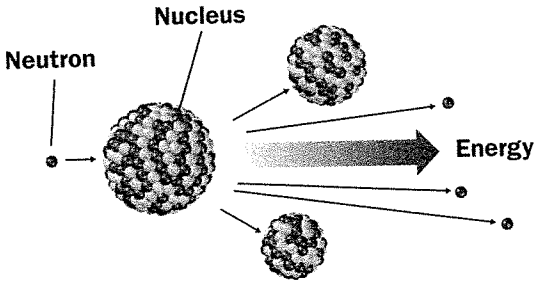
fertilization: union of a sperm cell with an egg cell **(099, 114)**

fetus: a developing mammal, from the time its major organs are formed until birth; in humans, this is from 8 weeks to about 40 weeks **(102)**

field of view: area that is seen through a hand lens, microscope, or telescope **(050)**

filter paper: special paper used to separate solids from liquids **(048)**

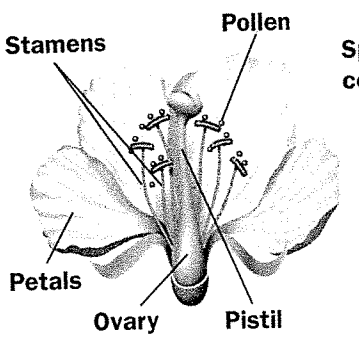
fission: Biology: process in single-cell organisms, in which one cell splits into two or more cells; Chemistry/Physics: splitting of the nucleus of an atom **(327)**



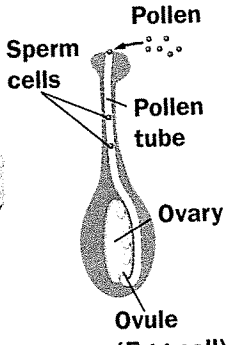
Fission of an atom

flask: a narrow-necked glass container **(047)**

flower: reproductive organ of a flowering plant **(108)**



Parts of a flower

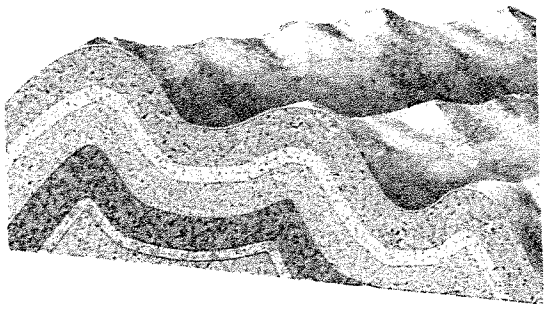


Fertilization

fluid: any material, liquid or gas, that can flow **(295)**

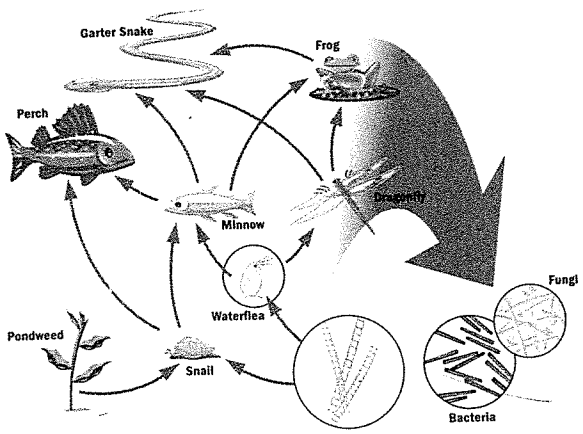
focus: Geology: point within the Earth where an earthquake took place **(186);** Optics: to adjust lenses of an instrument so that the image is clear and sharp **(049)**

folded mountain: mountains formed by the bending of rocks **(187)**



food chain: path of food energy from the sun to the producer to a series of consumers, in an ecosystem **(134)**

food web: in an ecosystem, arrangement of several overlapping food chains **(135)**



force: a push or a pull **(275)**

fossil: remains, impression, track, or other evidence of ancient organisms **(198)**

fossil fuels: fuels such as coal, oil, and natural gas; formed over millions of years from the remains of ancient plants and animals **(325)**

fracture: tendency of a mineral or rock to break in a certain shape that is not along a crystal plane **(179)**

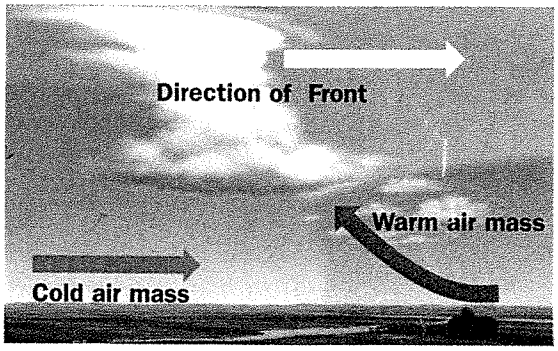
fraternal twins: individuals born at the same time to the same mother, who developed from two different fertilized egg cells **(119)**

freezing point: temperature at which a substance changes from a liquid state to a solid state; same as melting point for that substance **(254)**

frequency: Physics: number of wave vibrations (oscillations) produced in one second, measured in hertz (Hz) **(306);** Statistics: number of times a value occurs in a data set **(384)**

friction: force that resists the motion of two surfaces that are touching each other **(279)**

front: place where two air masses of different temperatures and pressures meet **(222)**



Cross-section of a cold front

fulcrum: point around which a lever turns; *See diagram at lever* **(292)**

fungi: single- or many-celled organisms that have cells walls, do not have chlorophyll, take food from the environment, and reproduce by budding or by spores **(155)**

funnel: cone-shaped object used to catch poured material and direct it into another container **(048)**

fusion: the combining of nuclei of lighter elements to form nuclei of heavier elements, such as hydrogen nuclei fusing to form helium nuclei; also called **nuclear fusion (245)**

G

galaxy: group of millions of stars; Earth is part of the Milky Way galaxy **(247)**

gall bladder: part of the digestive system; a sac that stores bile **(089)**

gas: matter that has no definite volume or shape, such as air **(253)**

gas giant: one of the large planets made mostly of gases; *See also outer planet* **(240)**

gasohol: gasoline with some amount of alcohol added; used as a fuel source **(328)**

gene: segment of DNA, found on a chromosome, that determines the inheritance of a particular trait **(116)**

generator: machine that converts mechanical energy into electrical energy **(328)**

genetic variation: differences in traits among organisms of the same species **(127)**

genetics: the study of how traits are passed from parent to offspring **(112)**

genome: all the genes that an organism has **(117)**

genotype: the set of genes carried by an organism *See also phenotype* **(123)**

genus: division of organism classification below family and above species, as in *Felis* (genus that includes house cats); *See also scientific name* **(151)**

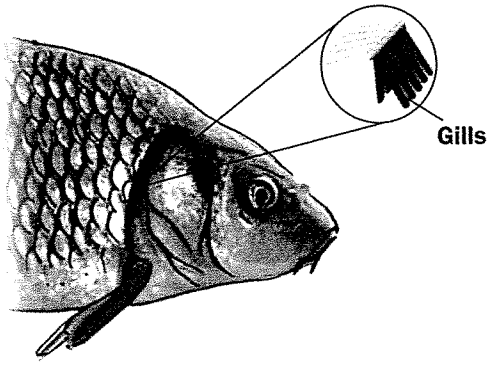
geology: study of Earth's structure, composition, forces, history, and future **(175)**

geothermal energy: energy obtained from thermal energy inside Earth **(326)**

geotropism: *See gravitropism* **(111)**

germination: process in which a plant begins to sprout or grow **(108)**

gills: organs that take in oxygen that is dissolved in water **(106)**



glacier: large mass of ice and snow that exists year-round and is involved in erosion **(192)**

glands: specialized organs that make substances that control and regulate body processes **(097)**

global warming: an increase in the world's average temperature, possibly caused in part by fossil fuel use **(349)**

global wind: a wind that blows steadily in the same direction across thousands of kilometers **(217)**

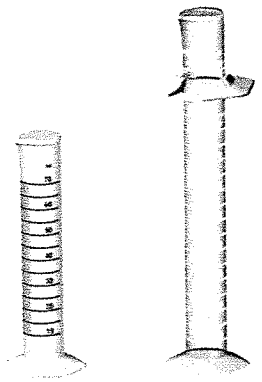
globe: a spherical (ball-shaped) map of Earth **(233)**

glucagon: substance made by the pancreas that causes blood sugar levels to rise **(097)**

glucose: simple sugar made by plants through the process of photosynthesis **(079)**

Golgi body: cell structure that helps package and distribute products within the cell **(077, 078)**

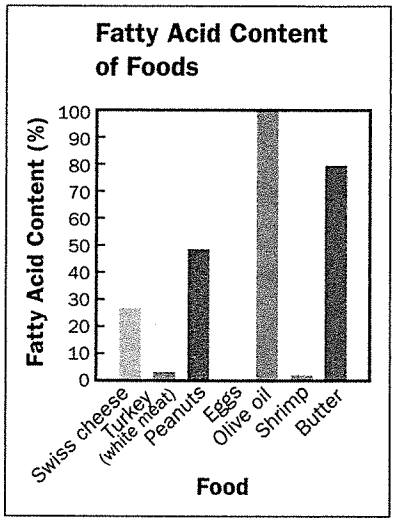
graduated cylinder: glass container with markings, used to measure volume of liquids **(060)**



Graduated cylinders

gram (g): unit of mass used in the SI (metric) system **(063)**

graph: picture that shows relationships between sets of data **(390)**



A bar graph

grassland: large land region in which the main types of plants are grasses **(146)**

gravitropism: growth of a plant in response to gravity; also called **geotropism (111)**

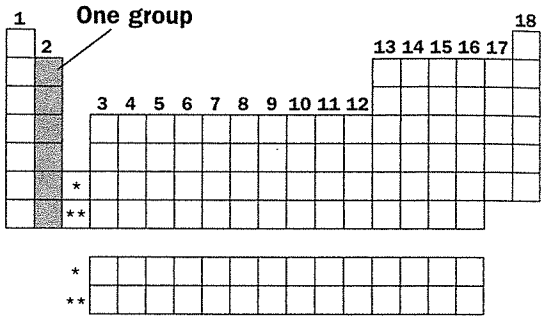
gravity: force of attraction between any two objects; *See law of universal gravitation* **(276)**

greenhouse effect: trapping of thermal energy in atmosphere when solar energy that was absorbed by Earth is re-radiated into atmosphere; also refers to global warming caused by an increase in gases (such as CO_2) that trap re-radiated energy **(349)**

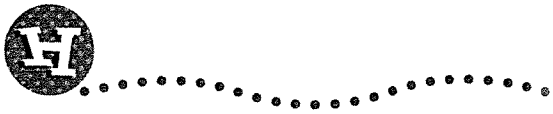
ground-fault circuit interrupter: electrical outlet that stops current flowing if there is a ground (or short) in the circuit **(032)**

groundwater: water that collects in cracks and spaces in the rocks and sediments beneath Earth's surface; *See diagram at water table* **(353)**

group: column of elements in the periodic table, in which elements have certain properties in common; also called **chemical family (265)**



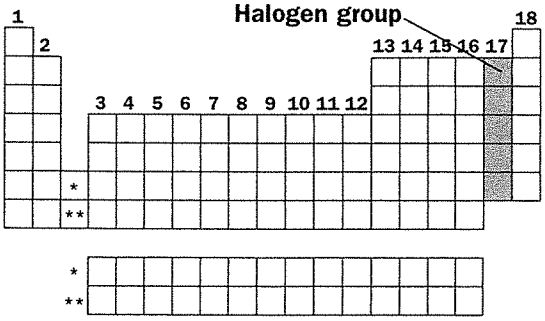
guyot: a smooth, flat-topped mountain on the ocean floor **(207)**



habitat: the place in an ecosystem where an organism lives **(131)**

half-life: amount of time needed for half of the radioactive atoms in a sample to decay to another form **(197)**

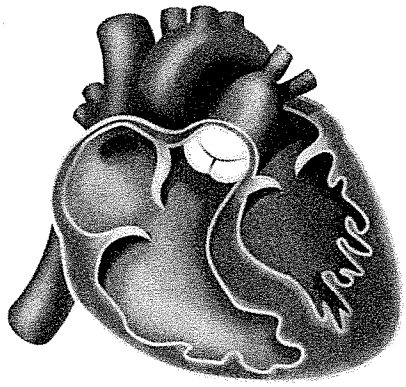
halogens: group of elements in the periodic table that are highly reactive nonmetals, including fluorine, chlorine, bromine, iodine, and astatine



hardness: Geology: relative ability of a solid, such as a mineral, to resist scratching **(179)**; Hydrology: measure of the total dissolved solids in water

hazardous wastes: waste products that contain materials that may be harmful to living things; also called **toxic waste (045, 347)**

heart: part of the circulatory system; organ that pumps blood throughout the body **(093)**



heat: transfer of thermal energy between substances that are at different temperatures; Also **thermal energy (302)**

heat energy: *See thermal energy* **(300)**

hemisphere: one-half of a sphere; Biology: the left or right half of the brain **(095);** Earth Science: half of Earth, divided at the equator (northern and southern hemispheres) or at the prime meridian and international date line (eastern and western hemispheres) **(169)**

herbaceous: plants with green fleshy stems rather than woody stems **(162)**

herbivore: an animal that feeds only on plants, such as a deer **(133)**

heredity: passing of traits from one generation to another **(121)**

hertz (Hz): measurement of wave frequency equal to vibrations per second **(306)**

heterotroph: an organism that obtains the energy it needs by feeding on other organisms **(159)**

hibernation: a deep sleep in which body systems reduce to minimal levels; Hibernation helps some animal species survive winter. **(110)**

hierarchy: graded system in which the most general or largest group or idea is at the top, and the most specific or smallest group or idea is at the bottom **(151)**

high: an area of higher air pressure, generally associated with clear weather **(224)**

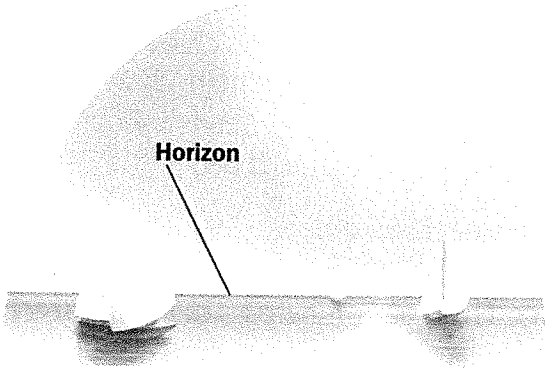
histogram: kind of bar graph used to show the frequency of values within a set of data **(392)**

homeostasis: keeping conditions constant inside the body, as in keeping a steady body temperature **(084)**

homeothermic: *See endothermic*

homologous: corresponding in structure; In chromosome pairs, homologous chromosomes carry slightly different version of the same genetic information. **(114)**

horizon: the line where Earth and sky appear to meet; layers of soil with distinct properties **(191);** line of separation between distinct time periods in a geologic record



Horizon: where Earth and sky appear to meet

Soil horizons

horizontal: a surface or line that lies flat, side-to-side instead of up and down

horizontal axis: horizontal line marked with a scale that is used to place data points on a graph; sometimes called the x-axis **(390)**

hormone: a chemical released by a gland; controls a specific body function **(097)**

horse latitudes: latitudes between 30°–35°N and S of the equator, where winds are light or absent **(217)**

host: organism that supports a parasite **(132)**

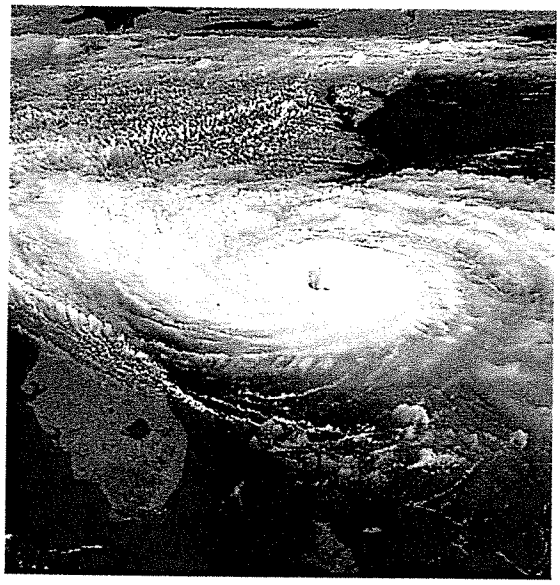
hot spot: a place that is not at a plate boundary where magma rises to the surface; The Hawaiian islands and features in Yellowstone Park formed over hot spots.

Human Genome project: project to map the genes and DNA base pairs on each of the 23 pairs of human chromosomes **(118)**

humidity: amount of water vapor in the air; *See also relative humidity* **(226)**

humus: material in the soil that formed from decayed plants and animals **(191)**

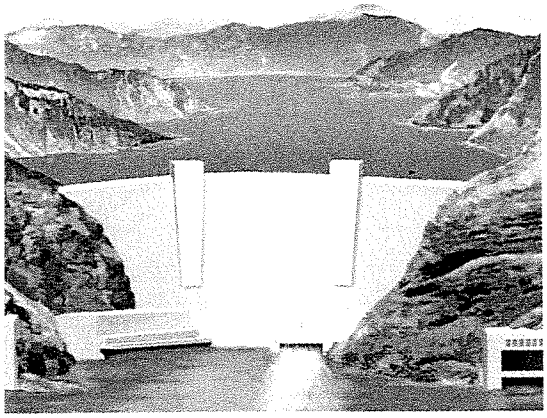
hurricane: a huge, slowly-spinning tropical storm that forms over water and has winds of at least 119 km/h (74 mph)



Hurricane

hybrid: in genetics, an organism that carries both a dominant and recessive allele for the same trait **(122)**

ıydroelectric energy: electricity ;enerated using the power of falling vater to turn turbines, usually ıssociated with dams **(328)**



Hydroelectric dam

ıypothesis: an idea that can be :ested by experiment or observation (006)

I

ice wedging: breaking apart of rock when water in cracks turns to ice and expands **(189)**

identical twins: two individuals born to the same mother at the same time, who developed from a single fertilized egg **(119)**

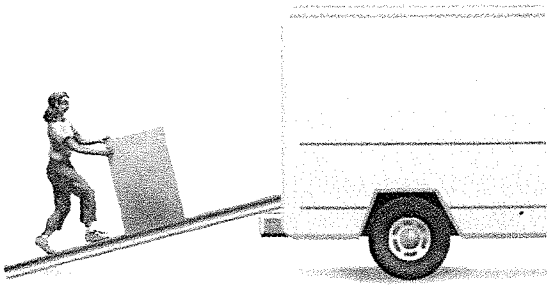
igneous rock: one of the three main kinds of rock, made from cooled magma **(180)**

immune system: system that protects the body against disease **(098)**

imprint: fossil formed from an impression of an organism left in sediment before it hardens **(198)**

incinerator: a furnace made to burn trash **(346)**

inclined plane: simple machine that consists of a flat, sloping surface (ramp); *See also screw and wedge* **(289)**



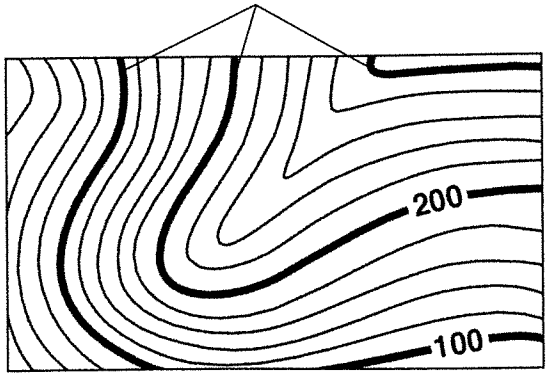
Inclined plane

incomplete metamorphosis: describes the life cycle of an organism, such as a grasshopper, whose form does not change substantially through its life stages; *See also complete metamorphosis* **(106)**

independent variable: factor that affects the value of the dependent variable; in an experiment, you control the value of the independent variable; also called **causal variable (396)**

index contour: on a map, a contour line that is darker than nearby lines and has its elevation labeled **(173)**

Index contours



indicator: substance that changes color when it comes in contact with an acid or a base; Indicators are used to identify acidic and basic substances. **(264)**

inertia: an object's tendency to resist a change in motion **(284)**

inference: an explanation that is based on available evidence but is not a direct observation **(013)**

informed consent: describing an experiment and its potential risks and benefits, and asking permission, before allowing a person to participate **(361)**

innate behavior: inborn behavior that does not need to be learned **(110)**

inner core: innermost part of Earth, made of solid iron and nickel **(177)**

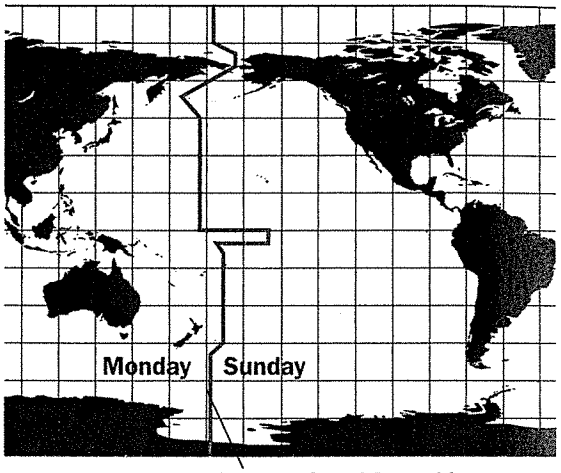
inner planet: one of the four planets nearest the Sun: Mercury, Venus, Earth, and Mars; also called **terrestrial planet (240)**

inorganic: Chemistry: matter that does not contain the element carbon; Life, Earth Science: matter that does not come from living things

insulator: a substance that does not transfer heat readily; also a substance that does not allow an electric current to pass through it **(317)**

insulin: substance made by the pancreas that reduces blood sugar levels **(097)**

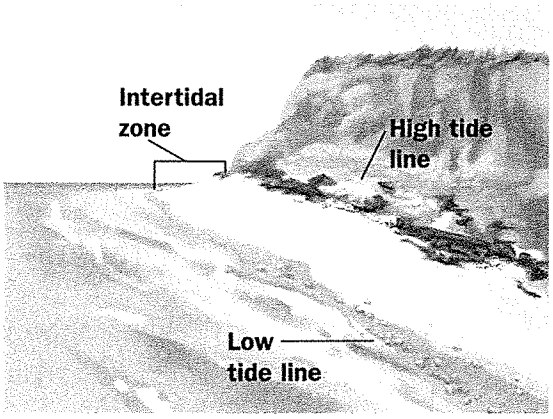
international date line: an imaginary line on Earth at about the 180° meridian, through the Pacific Ocean; crossing the line changes the date **(169)**



interphase: the stage before cell division begins, when the chromosomes of the cell make exact copies of themselves **(081)**

interpolation: estimate of an unknown or missing value within a data set that is made by assuming unknown values follow the same trends as known values **(400)**

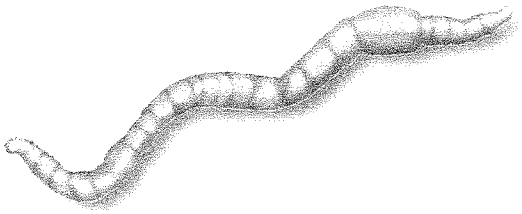
intertidal zone: shoreline areas covered by water at high tide and not covered at low tide **(149, 209)**



ntestine: *See large intestine, small ntestine* **(089)**

ntrusive: igneous rock formed by nagma cooling slowly beneath Earth's surface **(180)**

nvertebrate: an animal without a backbone **(161)**

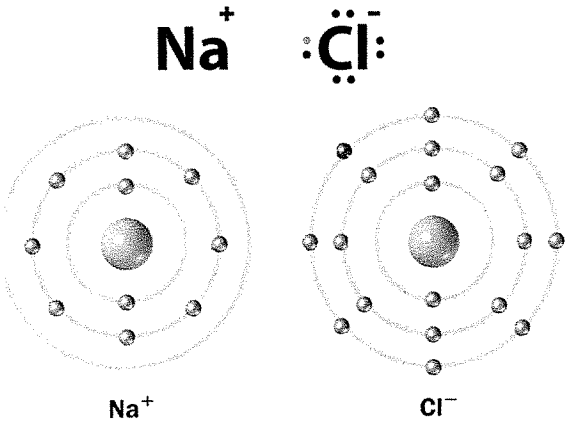


An earthworm is an example of an invertebrate.

involuntary muscle: smooth and cardiac muscle; not under conscious control **(087)**

ion: atom or molecule that has an overall electric charge due to loss or gain of electrons **(263)**

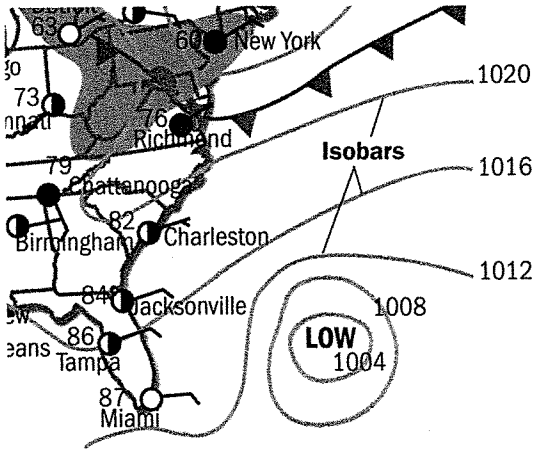
ionic bond: chemical bond in which one or more electrons from one atom are transferred to another atom; compounds formed this way are called **ionic compounds (263, 264)**



NaCl: An ionic compound

ionosphere: high layer of Earth's atmosphere, above 100 kilometers

isobar: line on a weather map that connects points of equal air pressure **(221)**



isotherm: line on a weather map that connects points that have equal air temperature

isotope: atoms of the same element with different numbers of neutrons in the nucleus, and thus different atomic masses; for example, carbon-12 and carbon-14 **(256)**

jet stream: narrow stream of high-speed wind high in the atmosphere, generally moving west to east in the Northern Hemisphere **(217)**

joint: Human Body: place where two or more bones meet **(086);** Geology: cracks in bedrock along which no movement has taken place

joules (J): SI unit of work and energy equal to 1 Newton-meter (1 N · m) **(287)**

K

Kelvin: SI temperature scale; begins at the lowest possible temperature, at which no thermal energy can be measured (absolute zero, -273°C)

keyword: term used to find information during a search of a database or the Internet **(422)**

kidney: organ in the urinary system that filters waste from the blood **(090)**

kinetic energy: energy an object or particle has because it is moving **(300)**

kingdom: second largest grouping in organism classification, as in the animal kingdom **(151)**

L

lab report: written record of a scientific investigation **(015)**

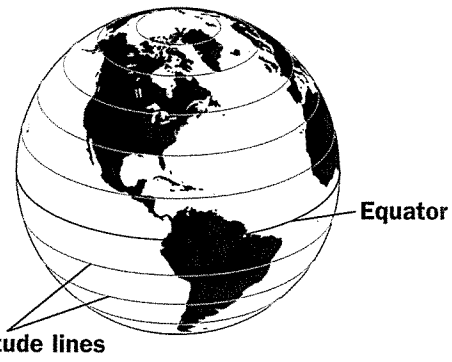
landfills: areas where solid waste (trash) is buried, in such a way that pollutants do not leak out **(346)**

landslide: form of erosion in which a large amount of the land surface suddenly moves downhill

large intestine: part of the digestive system where water is absorbed from solid waste **(089)**

larva: an early life stage of an animal, such as an ant or butterfly, that undergoes complete metamorphosis **(106)**

latitude lines: system of imaginary circles on Earth's surface that are used to describe position north and south of the equator; also called **parallels** **(169)**



lava: molten rock material pushed up from a volcano or crack in the Earth; magma that has reached the surface **(180)**

law: a scientific explanation that describes how some part of the world or universe acts under certain conditions; also called **scientific law (002)**

law of conservation of energy: states that energy cannot be created or destroyed, it can only change form or be transferred **(300)**

law of conservation of mass: states that matter can neither be created nor destroyed, it can only change form **(270)**

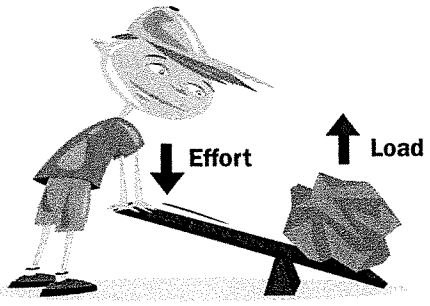
law of electric charges: states that like charges repel and unlike charges attract **(315)**

law of reflection: states that a wave bounces off a surface at the same angle that it hits the surface **(311)**

law of universal gravitation: states that the force of gravity between two objects increases as the mass of the objects increases, and as the distance between them decreases **(276)**

lens: curved, transparent piece of glass or plastic that bends light rays to form an image

lever: simple machine made of a long rigid bar that rests on and turns around a support called a fulcrum **(292)**



lichen: a fungus and a photosynthetic alga (or a cyanobacterium) living in a cooperative relationship **(140)**

life cycle: all stages in the life of an organism **(106)**

lift: upward force on an object due to differences in fluid pressure above and below it; *See Bernoulli's principle* **(297)**

ligament: connective tissue that holds bones together at many joints **(086)**

light: a type of energy that humans can see; part of the electromagnetic spectrum; also called **visible spectrum (308)**

light-year: distance light travels in a vacuum in one year, equal to 9.46×10^{12} kilometers **(245)**

limiting factor: a condition or resource that keeps a population at a certain size, such as the amount of water available **(131)**

liquid: matter that has a definite volume but not a definite shape; for example, water **(253)**

liter (L): unit of liquid volume used with the SI (metric) system **(059)**

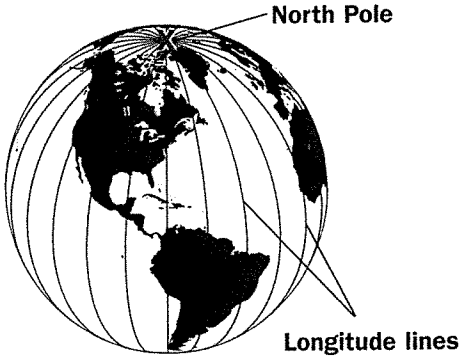
lithosphere: outermost layer of Earth's surface, which is rocky and solid; includes the crust and the rigid part of the upper mantle **(183)**

lithospheric plate: one of the pieces of Earth's rocky crust that rests and moves on the semi-liquid mantle **(183)**

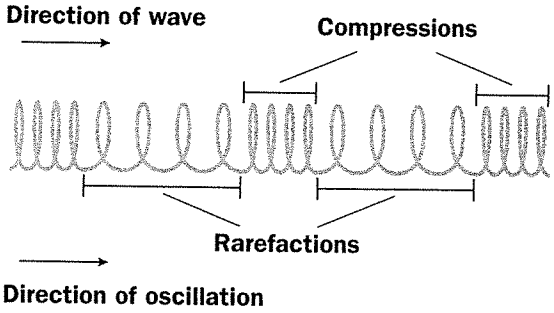
liver: organ in the digestive system that produces bile and enzymes, breaks down toxins and wastes, and has many other functions **(089)**

loess: thick layer of silt that was probably deposited by wind, not water

longitude lines: system of imaginary half-circles on Earth's surface that end at the poles, used to describe position east and west, with 0° at the prime meridian; also called **meridians (169)**



longitudinal wave: a wave that oscillates back and forth parallel to the direction it is traveling; where the wave pushes matter closer together is a **compression;** where the wave pushes matter farther apart is a **rarefaction (307)**



low: area of lower air pressure, generally associated with wet or overcast weather **(224)**

lunar eclipse: occurs when the moon passes through Earth's shadow **(236)**

lungs: pair of organs in respiratory system, where carbon dioxide and oxygen are exchanged; *See diagram at respiratory system* **(092)**

luster: how the surface of a mineral appears when it reflects light **(179)**

lymph node: lumps of tissue in which pathogens are filtered out of the bloodstream **(098)**

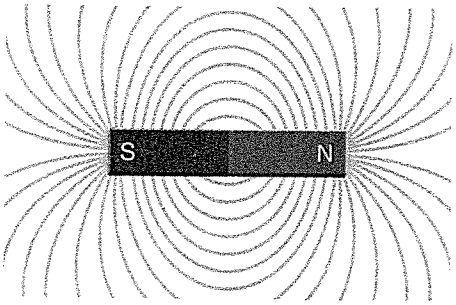
machine: *See simple machine* **(288)**

macrophage: type of white blood cell that attacks and engulfs pathogens **(098)**

magma: molten rock that makes up Earth's mantle and becomes igneous rock when it cools **(180)**

magnet: object that attracts iron **(320)**

magnetic field: region of magnetic force around a magnet **(320)**



Magnetic field lines

magnetic force: the attractive or repulsive force that acts between magnetic materials **(320)**

magnification: power of a magnifying lens or set of lenses; also, total enlargement of an image seen through those lenses **(051)**

magnitude: strength or intensity of a property or event, such as the brightness of a star or planet **(246),** or the strength of an earthquake **(186)**

mammal: animals that have fur or hair, usually give birth to live young, and can nurse their young with milk **(106)**

mantle: a layer of Earth's surface, lying just below the crust and above the inner core **(177)**

map: Earth Science: flat picture of part or all of the surface of Earth or another planet **(166);** Genetics: to determine the sequence of DNA base pairs on a chromosome **(118)**

map legend: list or explanation of symbols on a map; also called **map key (171)**

map scale: way of showing how distances on a map relate to distances on Earth's surface **(170)**

Map scales

map symbol: small drawings on a map that represent natural or human-made features **(171)**

maria: large, dark, and generally smooth areas on Earth's moon **(239)**

maritime polar: cool, moist air mass that forms over an ocean near a polar area **(221)**

maritime tropical: warm, humid air mass that forms over an ocean near tropical and subtropical areas **(221)**

mass: amount of matter in something; measured in grams (g) **(063)**

mass extinction: event in geologic history when many species of organisms died out over a short period of time **(128)**

material resources: natural resources that are used to make things, such as water, minerals, petroleum, and wood; sometimes called **raw materials (323)**

matter: the material that all objects and substances are made of; anything that has mass and takes up space **(250)**

mean: sum of all values in a data set, divided by number of values in the data set; sometimes called **average (384)**

mean sea level: average sea level, defined as an altitude of 0 **(172)**

measurement: a number and a unit that define a quantity, such as length, volume, or mass **(053)**

mechanical advantage: a description of how many times a simple machine multiplies the force put into it; It is found by dividing the output force (F_{out}) by the input force (F_{in}). **(288)**

mechanical digestion: process of breaking food into smaller pieces by chewing and mashing **(089)**

mechanical energy: energy an object has because of its motion or position **(300)**

mechanical wave: energy that travels through matter; examples include sound, ocean waves, and earthquake waves **(305)**

mechanical weathering: breaking up of rock by physical forces, such as the action of wind and moving water **(189)**

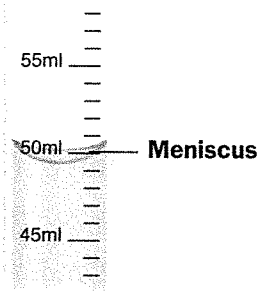
median: middle value in a data set, when the values are arranged in order from least to greatest **(384)**

medium: matter that a wave travels through

meiosis: cell division that produces sex cells (eggs or sperm), which have only half the chromosomes of the parent cell **(114)**

melting point: temperature at which a substance changes from solid state to liquid state; same as **freezing point** for that substance **(254)**

meniscus: curved surface of a liquid, such as water, where it meets the sides of its container **(060)**



menstruation: in females, the monthly shedding of the uterine lining if no pregnancy occurs **(101)**

menstrual cycle: in females, monthly process that releases an egg and prepares the uterus for pregnancy **(101)**

Mercator projection: map showing continents in correct shapes but incorrect areas **(168)**

meridian: *See longitude line* **(169)**

mesosphere: a layer of Earth's atmosphere located between 50–90 kilometers above the surface **(215)**

metabolism: cellular processes of making, storing, and transporting chemicals **(079)**; also, the sum of all these processes in an organism **(105)**

metals: elements, usually solid, with a shiny surface; metals conduct electricity and thermal energy well; examples include gold, iron, lead, copper, and silver **(331)**

metamorphic rock: rock that has been changed over time by high pressures and temperatures inside Earth's crust **(180)**

metamorphosis: *See complete metamorphosis, incomplete metamorphosis* **(106)**

metaphase: stage of cell division during which the chromosome copies line up in the center of the cell **(081)**

meteor: a piece of rock from space that enters Earth's atmosphere and burns, creating a bright streak of light across the sky; **meteorite** is a piece of that rock that lands on Earth **(243)**

meteorology: study of Earth's atmosphere **(212)**

meter (m): base unit for length in the SI (metric) system of measurement **(058)**

meter stick: a rod or stick one meter in length, used for measuring **(058)**

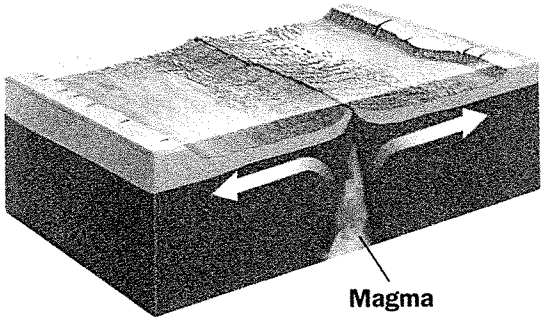
methane: flammable gas that forms from decaying organic matter; used as a fuel source **(328)**

metric system: *See SI system* **(055)**

microscope: an instrument that makes small objects appear larger **(049)**

microscopic: object or organism too small to be seen without a microscope **(076)**

mid-ocean ridge: undersea mountain range that forms where two parts of Earth's crust are pushing apart (diverging plate boundary) **(184, 207)**



Mid-ocean ridge

migration: seasonal movement of animals from one place to another **(110)**

millibar: a unit of air pressure **(224)**

mineral: element or compound, formed by nature but not formed by living things, that has a specific crystal structure and physical and chemical properties **(179)**

mitochondria: structures in the cell that transform the energy in food into a form cells can use to carry out their activities **(077, 078)**

mitosis: during cell division, the process in which the material from the cell nucleus divides **(080)**

mixture: a combination of two or more substances that have not combined chemically and that can be separated by physical means **(271)**

mode: the value occurring most frequently in a data set **(384)**

model: *See scientific model* **(013)**

Moho: boundary between Earth's crust and mantle (short for Mohorovičić discontinuity)

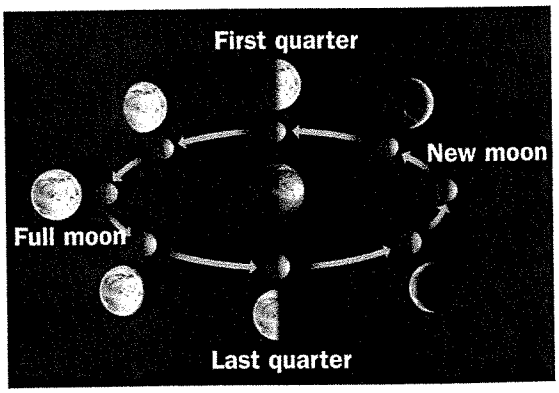
Mohs' scale: a system listing ten minerals that the hardness of other minerals can be compared with **(179)**

mold: Biology: kind of fungus made up of threadlike branches that give the mold a fuzzy appearance; Geology: a kind of fossil, a space in a sedimentary rock that is shaped like a living thing that was once there; *See also cast* **(198)**

molecule: smallest particle of a substance that still has the properties of that substance **(261)**

moon: a natural object that revolves around a planet **(232)**

moon phases: regular changes in the Moon's appearance, as seen from Earth; *See also waning, waxing* **(235)**



mouth: Biology: opening that animals use to take in food **(089);** Geology: opening where one body of water enters a larger body, such as a river entering an ocean

multicellular: made up of more than one cell **(076)**

muscular system: all the muscles of the body, especially those involved in movement **(087)**

mutation: a random change in a gene **(127)**

mutualism: relationship between two species in which both species benefit **(132)**

natural gas: a fossil fuel; flammable, odorless gas (mostly methane) found in Earth's crust **(325)**

natural resources: resources that are used by humans, such as minerals, water, fossil fuels, and food sources **(323)**

natural selection: process by which organisms change over time as those with traits best suited to an environment pass their traits to the next generation **(127)**

neap tides: tides that are least extreme; happen twice a month, at first and last quarter moon phases

nebula: cloud of gas and dust in space, in which stars form

nekton: organisms living in water that swim freely and can swim against the current, such as fish **(210)**

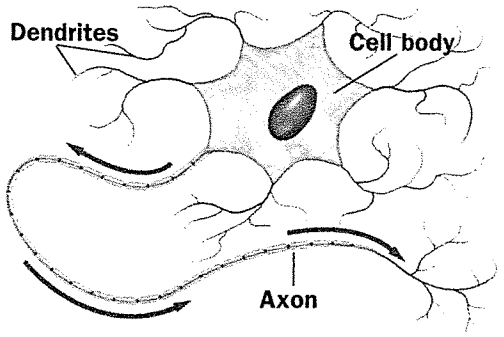
nephrons: tiny filters in the kidney that remove liquid wastes from blood **(090)**

neritic zone: area of sea floor reaching from the shore to the edge of the continental shelf, to a depth of about 200 meters **(210)**

nervous system: system of organs and tissues that controls and coordinates the body's activities; *See diagram at central nervous system* **(095)**

net force: sum of all forces acting on an object **(280)**

neuron: nerve cell; sends messages through the nervous system **(095)**



neutron: in an atom, particle with a neutral charge; located in the nucleus **(256)**

newton (N): SI unit of force **(275)**

Newton's laws of motion: three laws, developed by Isaac Newton, that explain the motions of objects **(283)**

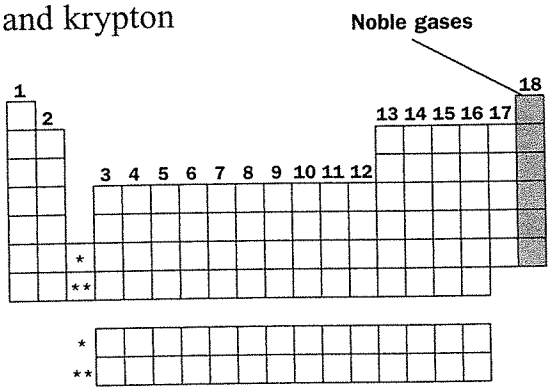
niche: role that a species plays in a living community or ecosystem **(131)**

nimbo-, nimbus: any cloud that can produce precipitation **(223)**

nitrogen cycle: in the environment, the movement of nitrogen between the living and non-living parts of an ecosystem **(139)**

nitrogen fixation: transformation of nitrogen in the air into nitrogen compounds; carried out by certain bacteria **(139)**

noble gases: group of elements in the periodic table that generally do not react with other elements, and which are all gases; examples include neon and krypton

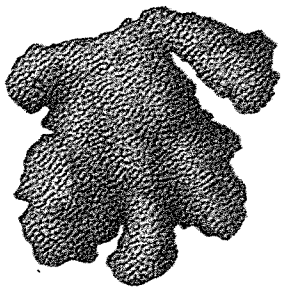


nocturnal: describes an animal that is mainly active at night; for example, a bat **(147)**

nonrenewable resources: natural resources that cannot be replaced once used, such as oil, coal, natural gas, and minerals **(323)**

non-sexual reproduction: *See asexual reproduction* **(114)**

nonvascular plant: a plant that does not have specialized tissue for moving water and food throughout the plant **(162)**



Liverwort, a nonvascular plant

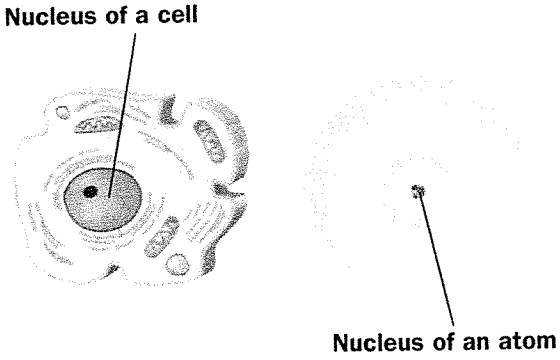
northern hemisphere: the half of Earth north of the equator

nuclear energy: energy contained in the center, or nucleus, of an atom **(327)**

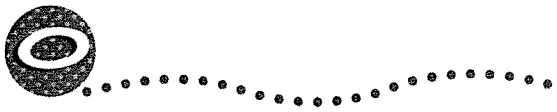
nuclear membrane: structure that surrounds and protects the nucleus of a cell; also called **nuclear envelope** **(077, 078)**

nucleolus: small, round structure in the nucleus of a cell that helps direct how proteins are put together **(077, 078)**

nucleus: Biology: structure near the center of a cell that contains the cell's DNA **(077, 078);** Chemistry: center of an atom, made up of protons and neutrons **(256)**



nutrient: substance that an organism needs in order to survive and grow



occluded front: formed in the atmosphere when a cold front overtakes a warm front, capturing the warm air mass between the two cold air masses **(222)**

ocean current: flow of water within the ocean that moves in a regular pattern **(203)**

oceanic crust: portion of Earth's outer crust that lies beneath the oceans; It is thinner, denser, and has darker-colored minerals than continental crust **(183)**

oceanography: study of the physical properties of oceans and seas **(201)**

ohm (Ω): unit of electrical resistance **(319)**

Ohm's law: an equation that describes the relationship among current, voltage, and resistance in an electric circuit: $I = \frac{V}{R}$ **(319)**

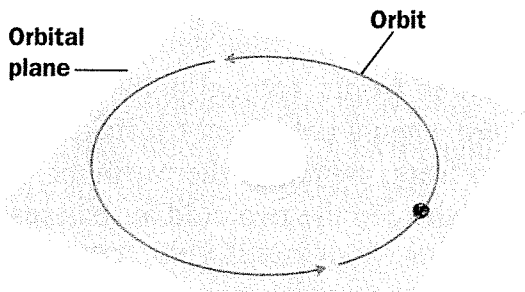
omnivore: an animal that feeds on both plants and animals; for example, a raccoon **(133)**

opaque: describes matter that light does not pass through **(311)**

open-ocean zone: ocean life zone reaching from the continental slope to the deepest plains and trenches **(149, 211)**

orbit: path an object in space follows as it revolves around another object, such as Earth around the sun or a satellite around Earth **(234)**

orbital plane: imaginary surface that contains an object's orbit **(233)**



order: division of organism classification below class and above family, as in Carnivora, mammals that feed on other animals **(151)**

organ: in an organism, structure made of two or more different tissues which has a specialized function; for example, the lungs **(082)**

organ system: group of organs that work together to do a specific job for an organism, such as the digestive system **(082)**

organelles: structures in the cytoplasm of a cell that carry out cell activities **(077, 078)**

organic: Chemistry: compound that contains the element carbon; Life, Earth Science: material made of or by living things or once-living things **(180)**

organism: a living thing **(074)**

oscillate: to vibrate or swing back and forth, or up and down, from one extreme limit to another

osmosis: diffusion of water across a membrane, such as a cell membrane

outer core: layer inside Earth, between the mantle and inner core, which has some properties of a liquid **(177)**

outer planet: any planet beyond the asteroid belt; includes Jupiter, Saturn, Uranus, Neptune, and Pluto **(240)**

ovary: female sex organ in which egg cells are produced **(097)**

ovulation: release of a mature egg cell from the ovaries of a female animal **(101)**

ozone: form of oxygen that has three atoms in one molecule (O_3) **(214)**

ozone layer: region in Earth's upper atmosphere that blocks part of the sun's ultraviolet radiation **(350)**

P

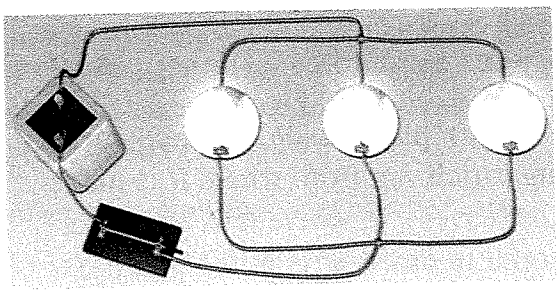
pancreas: organ of the digestive system and endocrine system; makes enzymes that help in the breakdown of carbohydrates, and that help regulate blood sugar levels **(089, 097)**

Pangaea: ancient land mass believed to have broken up to form today's continents **(182, 199)**

parallel: General: lines that never touch each other; Earth Science: *See latitude line* **(169)**

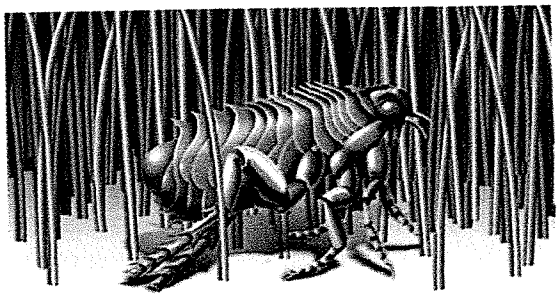
Parallel lines

parallel circuit: circuit in which each load forms a separate circuit with the energy source; If one load stops working, the other loads keep working. **(318)**



Parallel circuit

parasite: organism, such as a tick, that feeds on cells, tissues, or fluids of another living organism (the host) **(132)**



A flea is a parasite.

parasitism: relationship between species in which one species (parasite) benefits and the other (host) is harmed but not usually killed **(132)**

parathyroid glands: glands that produce hormones that control calcium levels in the blood **(097)**

part per thousand (ppt): way of describing how much of a substance is present in a mixture if the mixture is divided into 1000 parts, for example 35 parts per thousand salt in ocean water **(383)**

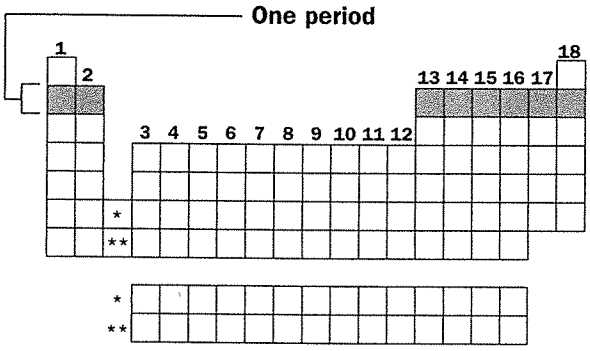
passive margin: continental margin without a plate boundary near it **(207)**

pathogen: agent of disease, such as a virus, bacteria, or fungus **(098)**

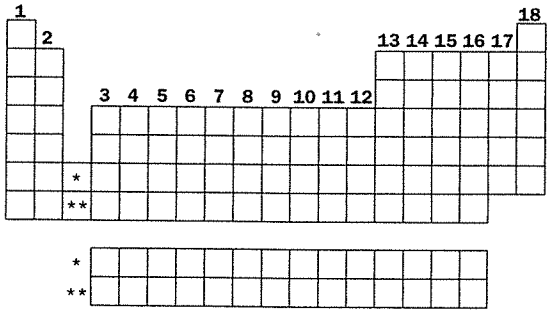
peat: partially decayed plant matter that forms a thick mat; used as a fuel **(328)**

percent: parts out of a hundred equal parts **(383)**

period: Chemistry: a row of elements in the periodic table arranged by atomic number **(265);** Geology: unit of geologic time lasting tens of millions of years, part of an era, and longer than an epoch **(200)**



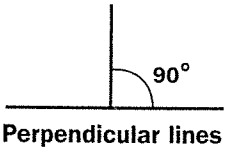
periodic table of elements: a chart where all elements are organized into periods and groups according to their properties **(265)**



permafrost: layer of earth in the tundra biome that is frozen to a depth of about 1 meter year-round **(142)**

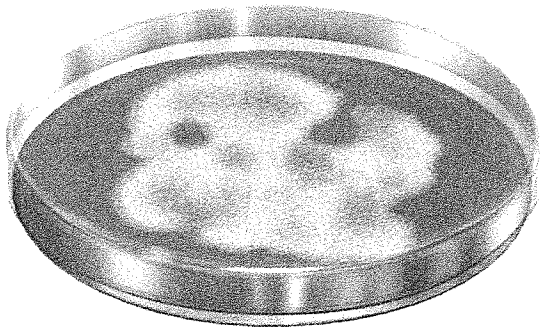
permeability: description of how well a rock or sediment lets water pass through

perpendicular: lines that are at right angles (90°) to each other



Perpendicular lines

petri dish: small covered dish used to grow bacteria and molds in the laboratory



petrified fossil: remains of living things that have been replaced by minerals and thus turned to stone **(198)**

petroleum: fossil fuel and material resource that formed deep in the Earth over millions of years from remains of ancient plants and animals; It is refined into products such as gasoline. **(325)**

pH scale: scale ranging from 0–14, used to describe how acidic (<7) or basic (>7) a substance is **(264)**

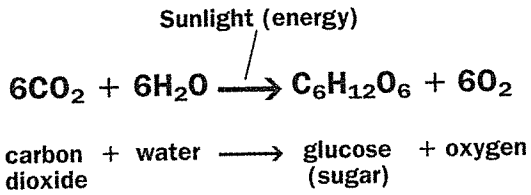
phase: Chemistry: *See state of matter* **(253);** Astronomy: *See moon phases* **(235)**

phenotype: the physical appearance of an organism; *See also genotype* **(123)**

phloem: plant tissue that transports sugar-rich sap from where it is made (the leaves), to where it is used and stored in other parts of the plant; *See diagram at vascular plant* **(162)**

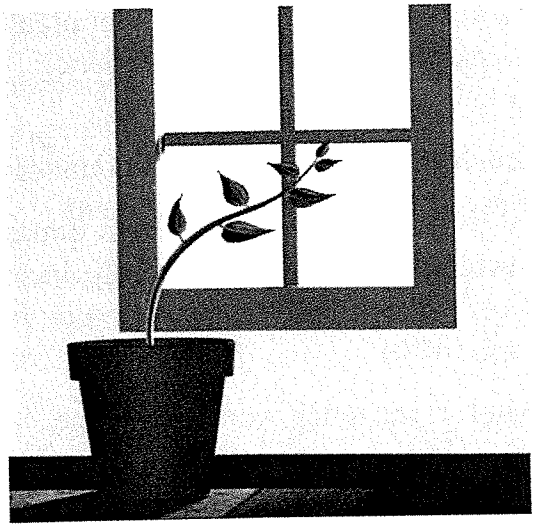
photon: theoretical packet of light energy that behaves as a particle

photosynthesis: chemical process by which plants use light energy to make sugar from water and carbon dioxide **(079, 107)**



Photosynthesis

phototropism: change in growth of a plant in response to light **(111)**



photovoltaic cells: devices used to convert sunlight to electricity; also called **solar cells (328)**

phylum: first division of organism classification below kingdom, as in Arthropoda **(151)**

physical change: occurs when one or more physical properties of a substance are changed; many physical changes can be undone by physical means **(252)**

physical map: map showing the land features of an area, such as rivers, lakes, mountains; *See also relief map*

physical property: property of matter that can be observed without changing the composition or identity of the matter **(251)**

physical science: study of matter and energy **(249)**

physical weathering: *See mechanical weathering* **(189)**

physics: study of energy, forces, and motion

physiology: study of all the internal functions of an organism **(104)**

pictogram: kind of graph that shows statistical information using pictures **(392)**

pie chart: a graph in the shape of a circle, where the size of each slice indicates a percent of the whole; also called a **circle graph (393)**

pioneer species: first organisms to live in an area **(140)**

pistil: female reproductive structure of a flowering plant; *See diagram at flower* **(114)**

pitch: how high or low a sound is; determined by the sound wave's frequency **(313)**

pituitary gland: gland that makes substances that control other glands and that affect growth, metabolism, and development of sex organs **(097)**

placenta: in most mammals, organ responsible for the exchange of nutrients and waste materials between the mother and the developing fetus **(102)**

plankton: tiny plants and animals that live near the surface of water and cannot swim against the current **(149, 210)**

plasma: Human Body: the liquid part of blood that supports the other parts **(093);** Physics: the fourth state of matter, like a gas but consisting of charged particles (ions and electrons) and found mostly in stars **(253)**

plastics: chemical compounds that can be easily shaped into many different products, often made from refined petroleum **(331)**

plate boundary: the region where two lithospheric plates meet **(184)**

plate tectonics: theory that describes and explains the way that continents separated into today's land masses from one large ancestral land mass (Pangaea); also, the study of lithospheric plates, their movements, and Earth features that they affect **(182)**

platelets: cell pieces that help blood to clot where there is an injury **(093)**

plutonic: Refers to igneous activity beneath Earth's surface; *See also intrusive* **(180)**

polar: Earth Science: refers to the North or South Pole; Physical Science: refers to a material, such as a magnet or molecule, that has opposing forces on either side or end

polarized: describes light in which all waves are traveling the same direction and vibrating in parallel planes; Light is polarized by passing it through certain materials.

pollen: particles that carry male genetic material, from seed plants **(114)**

pollination: the transfer of pollen from the male part of a plant (stamen) to the female part (pistil) **(114)**

pollution: any change in the environment that is harmful to organisms **(348)**

population: Ecology: all the members of a species living in a particular area at a particular time **(130);** Statistics: the total group being analyzed

porosity: a measure of the amount of empty space in a rock or sediment

potential energy: stored energy an object has because of its position or shape **(300)**

power: how much work a machine can do in a unit of time; also, the numerical product of current and voltage in an electric circuit

precipitation: water falling from clouds in any form, such as snow, ice, raindrops, or drizzle **(216)**

predation: relationship between species in which one species (prey) acts as a food source for another species (predator) **(132)**

predator: animal, such as a lion, that kills and eats other animals (prey) **(132)**

prediction: a guess about what will happen under certain conditions, that

is based on observation and research **(002)**

pregnancy: period of time during which a female carries a developing fetus, until birth **(102)**

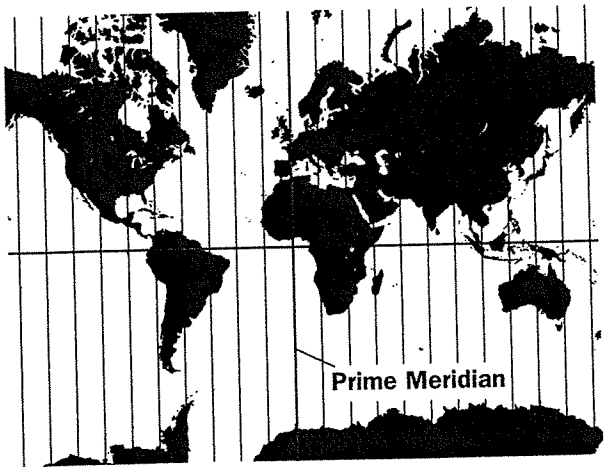
pressure: amount of force exerted on a given area by an object or substance; SI unit is the pascal (Pa) **(295)**

prevailing wind: a mid-latitude global wind that blows mostly in one direction **(217)**

prey: organism that is killed and eaten by another organism (predator) **(132)**

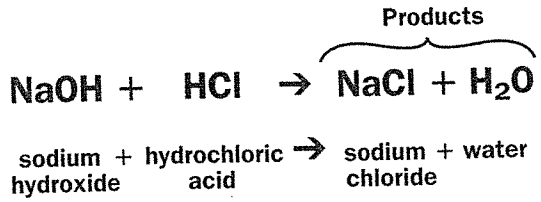
primary consumer: in a food chain, organism that eats plants, such as a rabbit **(134)**

prime meridian: longitude line of 0° that all other longitudes are measured by; passes through western Europe and Africa **(169)**



producer: organism that makes its own food, such as a plant or a photosynthetic alga **(133)**

product: compound or element that is the result of a chemical reaction **(269)**



projection: any process used to transfer a spherical map (globe) to a flat map; also the map made by such a process **(168)**

prokaryote: one-celled organism that does not have a membrane-bound nucleus or organelles; includes all archaebacteria and eubacteria **(160)**

property: characteristic of a material that helps to identify or classify matter **(251)**

prophase: stage of cell division during which the genetic material shortens and thickens in the nucleus **(081)**

proteins: a class of organic compounds found in living things that are essential for life **(079)**

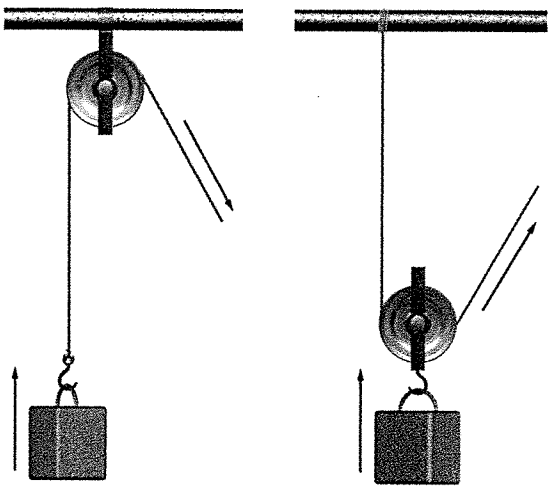
protists: one-celled or simple many-celled organisms, such as amoebas and algae **(156)**

proton: positively-charged particle located in the nucleus of an atom **(256)**

psychrometer: instrument used to measure moisture in the atmosphere **(226)**

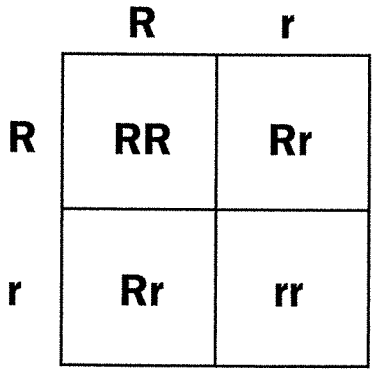
puberty: stage of human development during which the body develops characteristics of a mature man or woman **(097)**

pulley: simple machine consisting of one or more wheels with a rope wrapped around them **(294)**



Fixed pulley Movable pulley

Punnett square: in genetics, table used to predict what traits offspring will have, based on what traits the parents have **(123)**



Punnett square

pupa: stage in the life cycle of a metamorphic insect during which it changes from its larval to its adult form **(106)**

pure: in genetics: refers to an organism that carries two dominant or two recessive alleles for a given trait **(122)**

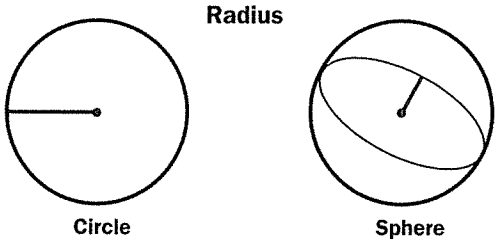
pyroclastic: ash, rocks, and similar solid material shot out from a volcano

radar: the use of reflected radio waves to determine the distance of an object and the direction it is moving **(219)**

radiation: transfer of energy in the form of electromagnetic waves **(304);** also high energy particles and rays emitted from the nuclei of radioactive elements **(197, 327)**

radioactive: element that gives off high-energy rays or particles **(197, 327)**

radius: distance from the center of a circle or sphere to its perimeter or surface



range: difference between the smallest and largest values in a data set **(384)**

rarefaction: *See longitudinal wave* **(307)**

rate: a comparison of a quantity to a unit of time, expressed as a fraction, such as 40 km/h **(381)**

ratio: relationship between two values that have the same unit **(382)**

reactant: compound or element that changes during a chemical reaction **(269)**

Reactants

$$NaOH + HCl \rightarrow NaCl + H_2O$$

sodium hydroxide + hydrochloric acid → sodium chloride + water

reaction: *See chemical reaction* **(269)**

real image: image made by a lens which can be projected onto a screen

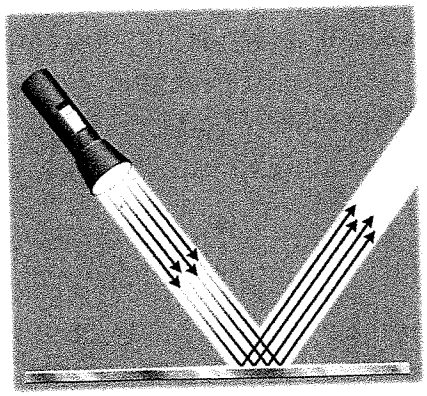
recessive: in a pair of alleles, the one that is masked if a dominant allele is present **(122)**

rectum: final section of the large intestine, ending in the anus **(089)**

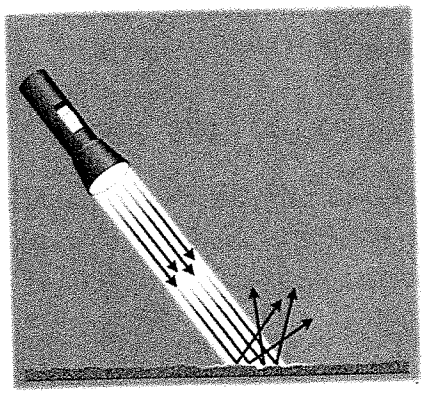
red blood cell: cell that carries oxygen through the body **(093)**

refine: in petroleum processing, to separate petroleum into different substances **(325)**

reflection: bouncing back of a wave from a surface; in light, reflection from a smooth surface is **specular** reflection, from a rough surface is **diffuse** reflection **(311)**



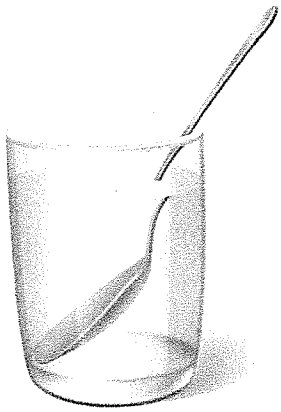
Specular reflection



Diffuse reflection

reflex: an animal's automatic response to a stimulus, such as jerking away from a hot surface **(095)**

refraction: bending of a wave as it moves across the boundary between one medium and another **(311)**



Refraction of light

relative age: method of describing the age of one object or event compared to another object or event **(197)**

relative humidity: amount of water vapor in the air compared to the amount in saturated air at the same temperature, reported as a percentage **(226)**

relief map: a physical map showing vertical features with a drawing, such as shaded mountains; *See also physical map*

renewable resources: natural resources that can be renewed or replaced by nature, such as food crops and solar energy **(323, 328)**

reproduce: to make more individuals of the same species from a parent organism or organisms **(113)**

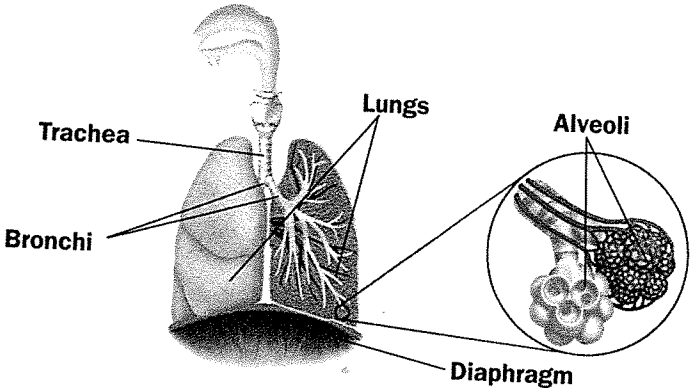
reproductive system: organ system involved in creating a new organism **(099)**

reserves: supply of an energy resource, such as coal, petroleum, or natural gas **(325)**

resistance: measure of how much a material opposes the flow of electric current through it, measured in ohms (Ω) **(319)**

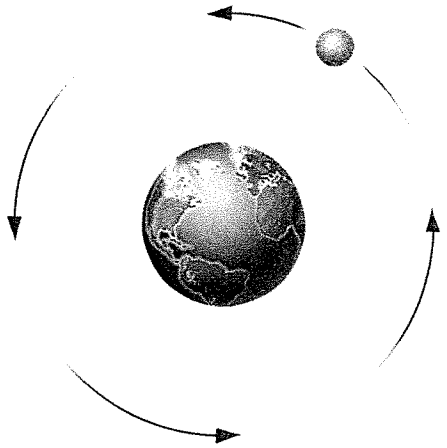
respiration: *See cellular respiration* **(079)**

respiratory system: organ system that takes oxygen into the body and releases carbon dioxide and water **(092)**



Respiratory system

revolution: one orbit of an object in space around another object in space, such as the moon around Earth **(234)**



ribosome: structure in a cell where proteins are put together **(077, 078)**

Richter scale: way of measuring the severity of earthquakes, based on the energy released **(186)**

rift valley: valley that forms on land at a place where two plates are moving apart

Ring of Fire: string of volcanoes around the rim of the Pacific Ocean, resulting from plate boundary activity **(185)**

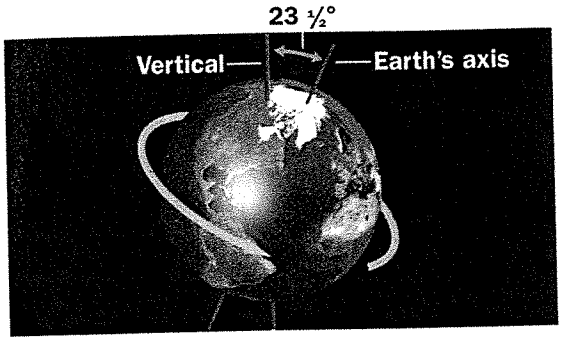
ring stand: piece of equipment used in laboratories to support beakers and other equipment **(034)**

risk-benefit analysis: identifying the possible negative (risk) and positive (benefit) results of a technology, before deciding to use it **(371)**

rock: hard and compact mixture of minerals that formed naturally **(180)**

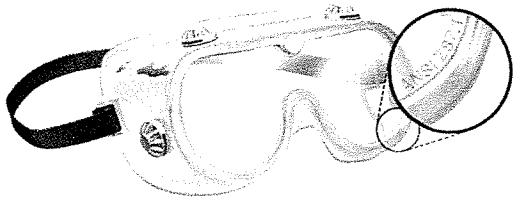
rock cycle: process by which rocks, over geologic ages, can be changed into different kinds of rock **(180)**

rotation: spinning of a planet, moon, sun, or other object, around its axis **(233)**



Rotation

safety goggles: safety equipment worn to protect the eyes from splashes and flying objects **(023)**



salinity: amount of dissolved solids in a solution, such as ocean water, usually measured as percent (%) or part per thousand (ppt) **(202)**

salt: ionic compound resulting from the reaction of an acid and a base, for example sodium chloride (NaCl), potassium nitrate (KNO_3)

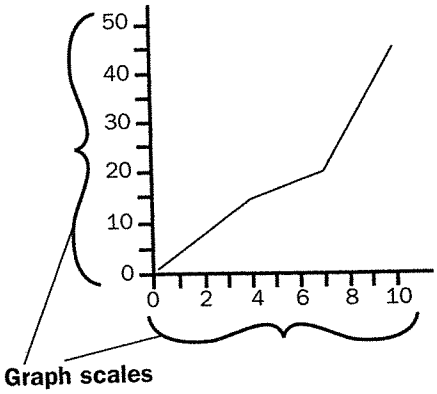
sanctuary: *See wildlife preserve* **(344)**

satellite: object that revolves around a larger object in space; The moon is a natural satellite of Earth; the Hubble Space Telescope is an artificial satellite. **(239)**

saturated: containing as much of something as possible under certain conditions, for example: saturated air **(226),** saturated solution, saturated fat

savanna: biome consisting of a grassland with scattered trees **(146, 230)**

scale: Graphing: series of equally-spaced marks that stand for equal intervals; Earth Science: *See map scale* **(170)**



Graph scales

scavenger: organism, such as a vulture, that feeds on dead or decaying organisms **(133)**

scientific ethics: study of the impact of technology and science on human society **(358)**

scientific inquiry: efforts to understand and explain the natural world through observation and experiment **(002)**

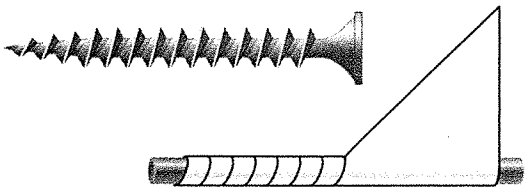
scientific law: *See law* **(002)**

scientific model: simplified version of some part of the natural world that helps explain how it functions **(013)**

scientific name: the genus and species name of an organism; for example *Aplodontia rufa,* mountain beaver **(151)**

scientific notation: a way of writing extremely large or extremely small numbers; uses a number between 1–10 multiplied by a power of 10, such as 9.8×10^6, or 3.2×10^{-4} **(377)**

screw: a simple machine consisting of an inclined plane wrapped around a cylinder **(291)**



seamount: mountain that lies completely below the sea **(207)**

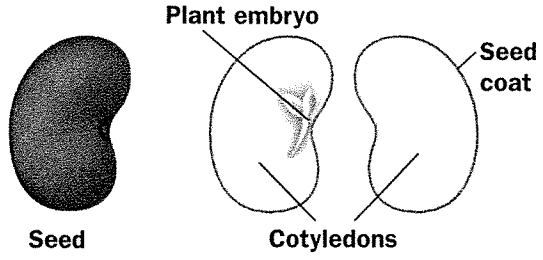
second (s): unit of time equal to $\frac{1}{60}$ of a minute **(070)**

secondary consumer: in a food chain, an organism that feeds on plant-eaters; also called a **predator** **(134)**

sediment: small pieces of material that have broken off of rocks and have been deposited by water, wind, or ice **(180)**

sedimentary rock: rock formed when sediment is pressed and cemented together naturally, over millions of years **(180)**

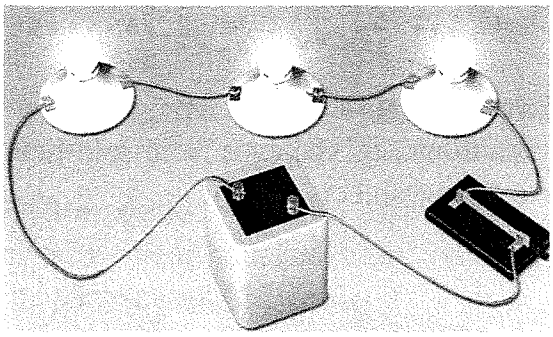
seed: structure able to sprout and develop into a plant; made of a plant embryo and its food supply **(108)**



seismic wave: a wave of energy passing through Earth, caused by an earthquake; includes P-waves, S-waves, and L-waves **(186)**

sense organs: organs that gather information about the surrounding environment, including the eyes, ears, nose, mouth, and skin **(096)**

series circuit: circuit in which loads are arranged such that current must pass through each load to complete the circuit **(318)**



Series circuit

sexual reproduction: process in which two parents contribute genes to form a new individual **(099, 114)**

SI system: system of measurement based on metric system that is used worldwide by scientists; includes meter, liter, and gram **(055)**

side effect: an unintended response caused by a medicine **(371)**

simple machine: a device that makes work easier by changing the size or direction of the force applied to it **(288)**

skeletal muscle: muscle that moves parts of the body and is under conscious control of the organism **(087)**

skeletal system: bones and cartilage (skeleton) that support a vertebrate's body **(086)**

small intestine: organ in the digestive system that completes digestion and absorbs nutrients **(089)**

smooth muscle: muscle found in many organs which is not under conscious control of the organism **(087)**

soil: mixture of rock, mineral particles, and organic matter that forms at Earth's surface **(191)**

solar eclipse: occurs when the moon passes between Earth and the sun, blocking the sun's light from Earth **(236)**

solar energy: energy from the sun in the form of heat and light **(328)**

solar system: the sun, its planets, and all other objects in orbit around the sun or planets **(238)**

solar wind: movement of charged particles from the sun through space **(242)**

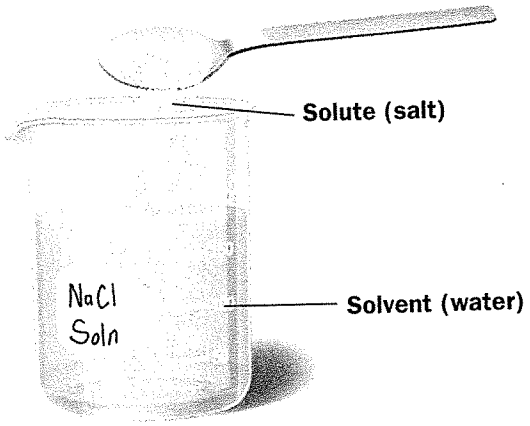
solid: matter that has a definite shape and volume, such as a rock **(253)**

solstice: one of two days in the year when hours of daylight and hours of darkness are at their greatest and least; **summer solstice** marks the beginning of summer and the longest period of daylight; **winter solstice** marks the beginning of winter and the shortest period of daylight **(234)**

solubility: ability of a substance to dissolve in another substance, such as sugar dissolving in water; also, a measure of the amount of a substance that will dissolve in a certain volume of water **(273)**

solute: *See solution* **(272)**

solution: mixture in which the molecules of one substance, known as the **solute,** are dissolved in another substance, known as the **solvent;** The solute is present in a smaller quantity than the solvent. **(271, 272)**



Solution: After salt dissolves, a solution exists

solvent: *See solution* **(272)**

sound: energy that travels through matter as mechanical waves, and can be heard by the ear **(312)**

southern hemisphere: the half of Earth south of the equator

species: group of organisms that can mate and produce offspring that in turn can produce more offspring **(130);** also, most specific division of organism classification, below genus **(151);** *See also scientific name*

specific gravity: the density of a substance compared to the density of water **(179)**

specific heat: thermal energy needed to change the temperature of 1 g of a substance by 1°C

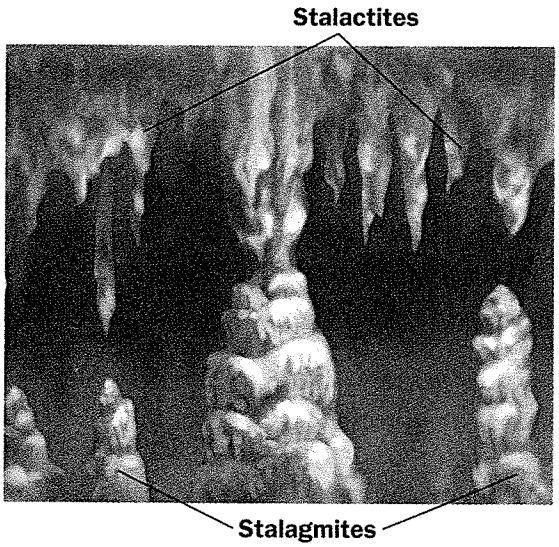
speed: distance traveled by an object in a given amount of time **(284)**

sperm: male sex cell, produced in the testes **(099, 114)**

spinal cord: bundle of nerves that goes from the brain stem down the center of the backbone **(095)**

spring tide: tides that are most extreme; occur twice a month, at full and new moon phases

stalactite: mineral deposit that hangs down from the roof of a cave **(190)**



stalagmite: mineral deposit sticking up from the floor of a cave **(190)**

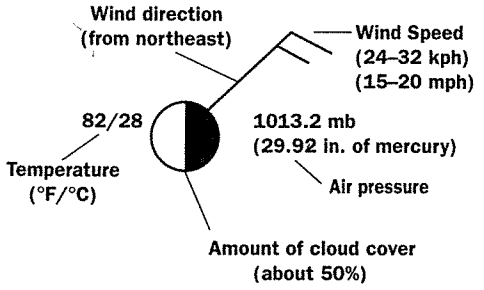
stamen: male reproductive structures of a flowering plant, which produce pollen; *See diagram at flower* **(114)**

star: huge object in space made up of gas and giving off light and heat from nuclear reactions; the sun is a star **(245)**

states of matter: the forms matter can take, as in liquid, solid, or gas; also called **phases of matter (253)**

static electricity: electricity in which electric charges build up on an object; the movement of the charge off the object is **electric discharge** or **static discharge (316)**

station model: a shorthand way of recording weather at a particular weather station, on a map **(219)**



stationary front: boundary between two air masses where the masses are not moving **(222)**

steroid: a type of hormone that controls many body systems **(097)**

stimulus: anything that an organism can sense; usually refers to a change that causes an organism to do something in response; plural is **stimuli (109)**

stirring rod: glass rod used in the lab to stir solutions **(048)**

stomach: part of the digestive system, where food is stored and partially digested before it enters the small intestine **(089)**

stopper: rubber or cork plug used to seal test tubes and flasks **(047)**

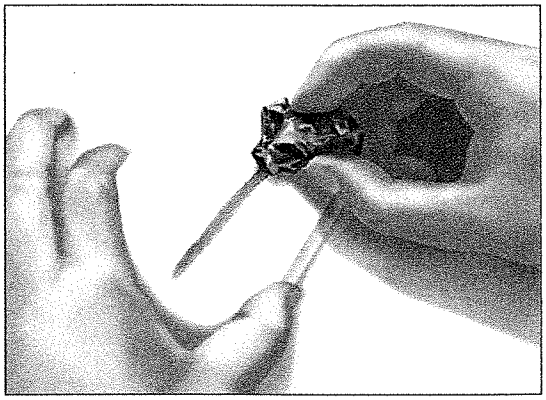
stopwatch: kind of watch used to measure how long events last, in minutes or seconds **(070)**

strata: layers of sedimentary rock

stratosphere: a layer of Earth's atmosphere reaching from 16–50 kilometers above the surface **(215)**

stratus: clouds in layers with a flat base, usually at low altitudes **(223)**

streak: the color of a mineral in powder form, seen by rubbing the mineral on a streak plate; This property is used to help identify a mineral. **(179)**



strike-slip fault: *See transform boundary* **(184)**

subduction: the process in which one lithospheric plate slides under another; occurs at converging plate boundaries **(184)**

sublimation: change from the solid state to the gaseous state, without first passing through the liquid state

submarine canyon: steep-sided valley cut into a continental shelf, often offshore from a major river **(207)**

subsoil: layer of soil below the topsoil **(191)**

subsurface current: an ocean current flowing beneath the surface, caused mainly by differences in water density **(206)**

succession: *See ecological succession* **(140)**

summer solstice: *See solstice* **(234)**

superposition: principle that states that in a series of sedimentary rock layers, the oldest are on the bottom and the youngest are on top, unless the layers have been overturned **(195)**

surface current: ocean current flowing at the surface, caused mainly by winds **(204)**

suspension: mixture in which particles of one substance are spread throughout another substance, and the particles are large enough to settle out **(271)**

symbiosis: a close relationship between two species **(132)**

taiga: a conifer forest biome located south of the tundra **(143, 230)**

taxonomic tree: a branching diagram showing the evolutionary relationships among groups of organisms **(163)**

technology: the use of scientific knowledge and processes to solve practical problems **(354)**

tectonic plate: *See lithospheric plate* **(183)**

telophase: final stage of cell division, during which the cell divides in half **(081)**

temperate: a mid-latitude (30–40°N or S) climate; Most temperate climates have seasons. **(230)**

temperature: measure of the average kinetic energy of the particles in a substance; measured in degrees Celsius (°C) or degrees Fahrenheit (°F) **(071, 302)**

tendon: connective tissue that attaches skeletal muscle to bone **(087)**

terminal speed: speed of an object that is falling through air when it has stopped accelerating; also called **terminal velocity (285)**

terrarium: closed container where plants and sometimes animals are kept, which is self-supporting as long as it has a source of light energy **(413)**

terrestrial planets: rocky planets in the inner solar system: Mercury, Venus, Earth, and Mars; also called **inner planets (240)**

tertiary consumer: in an ecosystem, a predator that feeds on other predators **(134)**

test tube: long, round, narrow glass container, sealed at one end, used in laboratories **(047)**

testable question: question that can be tested by experiment or observation **(416)**

testes: male reproductive organs that produce sperm **(097, 099)**

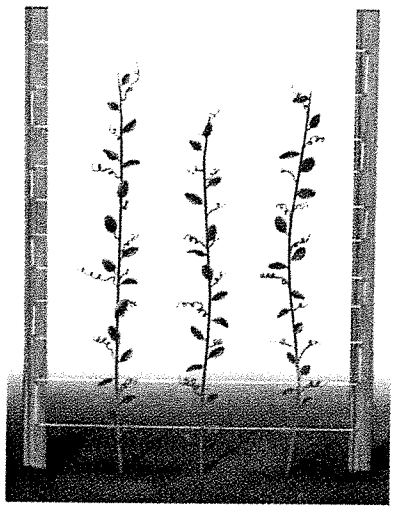
theory: an idea that is the best explanation of many observations and helps make new predictions **(002)**

thermal energy: total kinetic energy contained in all the particles of a substance; also called **heat energy (301)**

thermometer: device used to measure temperature **(072)**

thermosphere: layer of Earth's atmosphere above ionosphere and below exosphere, between 90–300 kilometers **(215)**

thigmotropism: plant growth in response to touch **(111)**

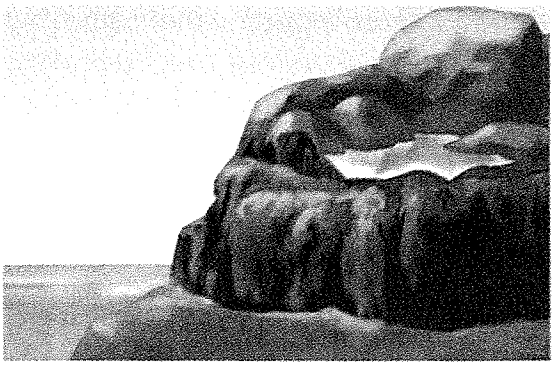


threatened species: species that may become endangered if numbers continue to shrink **(344)**

thymus gland: gland that is involved in development of the immune system **(097)**

thyroid gland: gland that functions in making hormones that control chemical processes in the body **(097)**

tide: daily rise and fall of the oceans, caused mainly by the gravitational pull of the moon **(237)**



Low tide

High tide

tissue: in plants and animals, a group of cells that work together to do a specific job **(082)**

topographic map: map that shows the shape and elevation of the land surface using contour lines, and shows other land features using symbols and colors **(172)**

topography: features of a land area caused by differences in elevation; also called **relief (173)**

topsoil: upper layer of soil, often the richest in plant nutrients **(191)**

tornado: small, destructive, whirling, fast-moving storm that forms over land

toxic: refers to the effects of a poison or toxin

toxic waste: *See hazardous waste* **(347)**

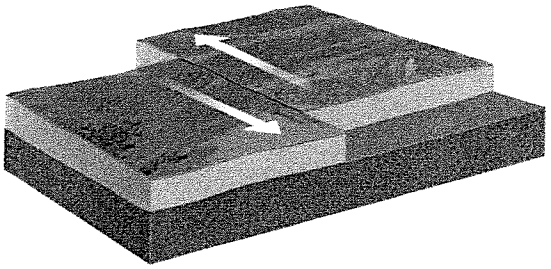
trace fossil: mark or track of an ancient animal preserved in sedimentary rock **(198)**

trachea: part of the respiratory system, the windpipe; *See diagram at respiratory system* **(092)**

trade wind: global wind that blows nearly all the time in tropical areas **(217)**

tradeoff: accepting the drawbacks of a technology because of its benefits **(369)**

transform boundary: boundary between two lithospheric plates where the plates are sliding past each other **(184)**



transformer: device used to change the voltage of an alternating current

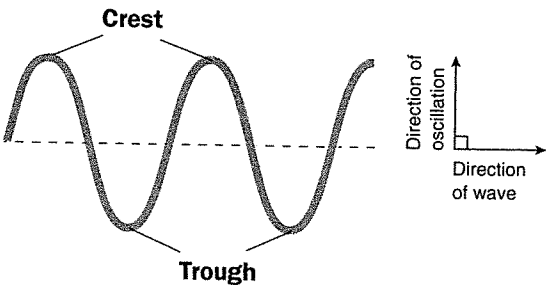
translucent: describes matter that allows some, but not all, of the light that hits it to pass through, and that scatters some light **(311)**

transmission: passage of light through matter **(311);** also, sending of information or energy from one point to another

transparent: describes matter that allows light to pass through it easily **(311)**

transpiration: loss of water through a plant's leaves **(216)**

transverse wave: a wave that oscillates perpendicular to the direction it is traveling; highest point of wave is the **crest** and lowest point is the **trough (307)**



trend line: *See best-fit line* **(398)**

trial: one set of measurements or observations in an experiment **(009)**

triple-beam balance: laboratory scale with three bars that is used to measure mass **(064)**

tripod: a three-legged stand; some kinds are for laboratory use, others are for use in the field **(034)**

tropism: plant growth in response to a stimulus, such as phototropism, growing toward light **(111)**

troposphere: lowest layer of Earth's atmosphere, from the surface up to 16 kilometers; nearly all weather takes place here **(215)**

trough: *See transverse wave* **(307)**

trundle wheel: device for measuring distance consisting of a wheel that clicks when rolled forward a certain distance **(058)**

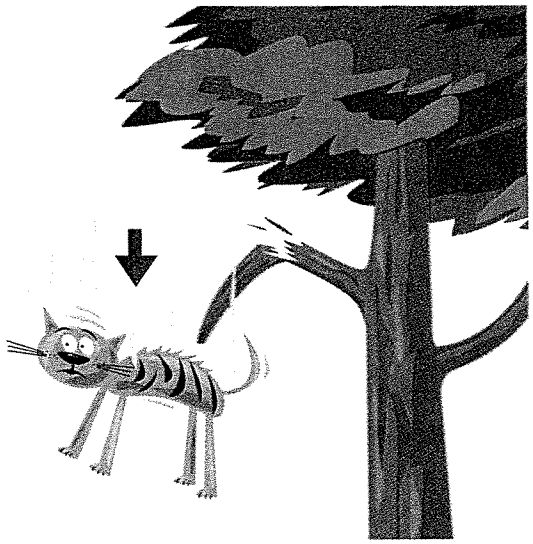
tsunami: a giant, dangerous ocean wave triggered by an earthquake, landslide, or volcanic eruption; sometimes called a **tidal wave,** but it has nothing to do with tides

tundra: a cold, dry, mostly treeless land biome located at high altitudes or at high latitudes **(142, 230)**

turbine: a machine that converts the mechanical energy of wind, moving water, or steam to electrical energy by using a generator **(328)**

ultraviolet radiation (UV): part of the electromagnetic spectrum, which is invisible to humans **(309, 350)**

unbalanced forces: occur when the net force on an object does not equal zero; results in the object changing its motion **(282)**



Forces on the cat are unbalanced.

unconformity: a place where rock layers are missing in the geologic record **(196)**

unicellular: made up of only one cell **(076)**

uniformitarianism: principle that states that the geologic processes of today were also operating in the past **(195)**

uplift: pushing up of Earth's crust by forces within Earth, such as the action of two lithospheric plates moving toward each other **(187)**

upwelling: subsurface ocean current that brings nutrient-rich water from the ocean bottom to the surface

ureter: in the urinary system, tube that passes urine from the kidney to the urinary bladder **(090)**

urethra: in the urinary system, tube that passes urine from the bladder to outside the body **(090)**

urinary bladder: in the urinary system, saclike structure that stores urine until it can be released **(090)**

urinary system: organ system that filters, stores, and releases waste products from the blood (urine); *See diagram at excretory system* **(090)**

urine: liquid waste filtered from the blood **(090)**

uterus: organ in a female mammal in which fertilized eggs develop into young **(101)**

vacuole: in a cell, fluid-filled structure that holds waste products or substances needed by the cell **(077, 078)**

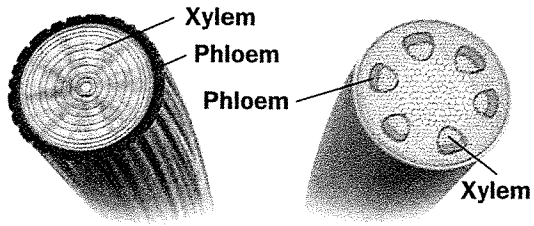
valence electrons: electrons in the outermost energy level of an atom; in large part, they determine an element's chemical properties **(268)**

vaporization: change of matter from a liquid state to a gaseous (vapor) state; may occur at the boiling point, or at the surface of the liquid below the boiling point **(254)**

variable: In experiments: a condition that is changed in order to find out the effect of that change **(008);** In mathematics: part of an equation that can have different values, as opposed to a constant, which always has the same value

varieties: animals of the same species but with distinctly different traits, such as size and color; Dog breeds are different varieties of *Canis familiaris.* **(151)**

vascular plant: a plant that has specialized tissues for moving food and water throughout the plant **(162)**

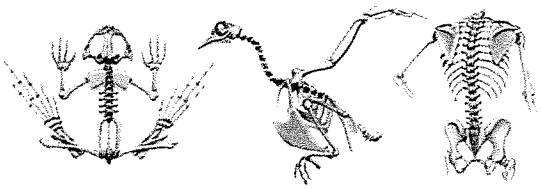


vein: in the circulatory system, vessel that carries blood toward the heart; *See diagram at circulatory system* **(093)**

velocity: an object's speed and direction at a given instant **(284)**

vernal equinox: *See equinox* **(234)**

vertebrate: an animal with a backbone **(161)**



Examples of vertebrate skeletons

vertical: a line or surface that is up and down, not side to side

vertical axis: a vertical line marked with a scale that is used to place data points on a graph; sometimes called the y-axis **(390)**

villi: tiny fingerlike structures that line the small intestine and absorb digested food **(089)**

virtual image: image made by a lens or mirror which cannot be projected onto a screen

visible spectrum: *See light* **(308)**

vitreous: describes a mineral with a glassy luster **(179)**

volcanic: *See extrusive* **(180)**

volcano: hill or mountain formed by material that erupts onto Earth's surface; caused by action of magma below surface **(187)**

voltage: potential difference between positively-charged and negatively-charged terminals of a battery, or between any two points in a circuit; measured in **volts (V) (318)**

volume: amount of space an object or substance takes up; measured in liters (L) or cubic centimeters (cm^3); *See also capacity* **(059)**

voluntary muscle: skeletal muscle that is under conscious control of the organism **(087)**

waft: to fan fumes from a chemical toward the face **(037)**

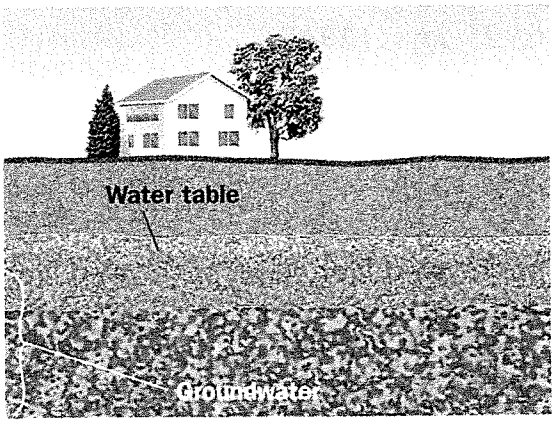
waning: moon phases from full moon to new moon, as the lit surface seen from Earth grows smaller **(235)**

warm front: leading edge of a warm air mass moving in to replace a cold air mass **(222)**

waste: trash; also any leftover, unusable material from the laboratory or from manufacturing or mining

water cycle: cycle in which water moves through the environment, through the processes of evaporation, condensation, and precipitation **(216)**

water table: beneath Earth's surface, the upper limit of soil that is saturated with groundwater



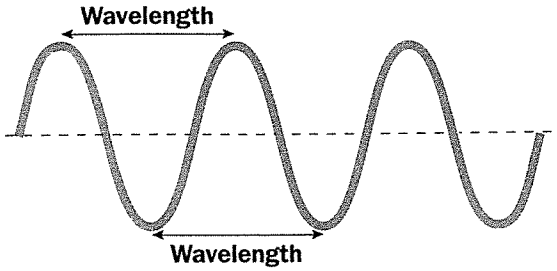
watershed: *See drainage basin* **(193)**

watt (W): unit of power, equal to one joule per second (1 J/s)

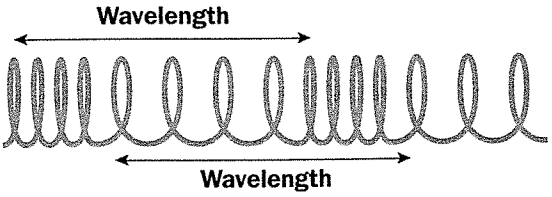
wave: a back-and-forth motion that travels from one place to another **(305)**

wave speed: distance a wave travels in a given amount of time **(306)**

wavelength: distance from any point on one wave to a corresponding point on the next wave, such as crest to crest or compression to compression **(306)**



Wavelength of a transverse wave



Wavelength of a longitudinal wave

waxing: moon phases from new moon to full moon, as the lit surface seen from Earth grows larger **(235)**

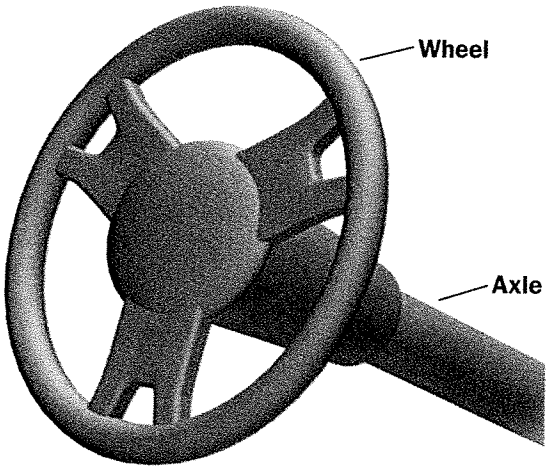
weather: conditions in the atmosphere, including humidity, cloud cover, temperature, wind, and precipitation **(218)**

weathering: process by which water, wind, and ice wear down rocks and other exposed surfaces; includes chemical and mechanical weathering **(188)**

wedge: simple machine consisting of an inclined plane that moves **(290)**

weight: a measure of the force of gravity on an object **(276)**

wheel and axle: simple machine made of a shaft (the axle) inserted though the middle of a circle (the wheel) **(293)**



white blood cell: cell carried in the blood that helps fight infectious disease **(098)**

wildlife preserve: special area set aside as a habitat for wild animals and plants; also called **wildlife sanctuary (344)**

wind: movement of the air caused by differences in air pressure **(225)**

wind vane: device used to observe wind direction; also called **weather vane (225)**

winter solstice: *See solstice* **(234)**

woody plant: plant with stiff, sturdy stems, usually covered with bark **(162)**

work: occurs when a force is used to move an object through a distance; measured in **joules (J) (287)**

xylem: plant tissue that transports water from the roots up the stem to the branches and leaves; *See diagram at vascular plant* **(162)**

year: period of time in which Earth makes one revolution around the sun (365.25 days) **(234)**

zygote: a fertilized egg cell **(102, 114)**