Glossary

How to Use This Glossary

This Glossary provides the definitions of the key terms that are shown in boldface type in the text. (Instructional boldfaced words such as "observe" and "explain" are not included.) The Glossary entries also show the sections where you can find the boldfaced words. A pronunciation guide, using the key below, appears in square brackets after selected words.

a = mask, back
ae = same, day
ah = car, farther
aw = dawn, hot
e = met, less
ee = leaf, clean
ih = idea, life
i = simple, this
oh = home, loan
oo = food, boot
u = wonder, Sun
uh = taken, travel
uhr = insert, turn

A

acetate a type of plastic used in photographic film and overhead transparencies (7.1)

action-at-a-distance forces forces that can have an effect on an object without touching it (7.2)

alkali metals Group 1 metallic elements (lithium, sodium, potassium, rubidium, cesium, francium); all are strongly reactive, soft, low-density metals (2.2)

alkaline earth metals Group 2 elements (beryllium, magnesium, calcium, strontium, barium, radium); all are reactive, soft, low-density metals (2.2)

ammeter a device used to measure the current in a circuit (8.2)

amperes (A) unit for measuring electric current; very small currents are measured in milliamperes (mA); 1 A = 1000 mA (8.2)

artificial insemination (AI) a reproductive technology that includes collecting sperm from a male and injecting it into a female; widely used to breed farm animals, especially dairy cattle (6.3)

asexual reproduction reproduction that requires only one parent and produces offspring that are genetic copies of the parent (5.2)

assisted reproductive technologies technologies that are used to achieve fertilization and pregnancy; most assisted reproductive technologies include removing egg cells from a woman's body, fertilizing them, and placing the embryos in the uterus (6.3)

asteroids small rocky bodies in our solar system, most of which orbit the Sun between Mars and Jupiter (11.2)

astronomers people who study objects in space (10.1)

astronomical unit (AU) a measurement equal to the average distance between the Sun and Earth, about 150 million km (11.2)

atom the smallest particle of an element that retains the properties of that element (1.3, 7.1)

atomic mass the mass of an average atom of an element (2.2)

atomic mass unit (amu) the unit of measurement for atomic mass

atomic number the number of protons in each atom of an element (2.2)

axis an imaginary line through Earth, extending from the North Pole to the South Pole; Earth spins on its axis at a speed of 1670 km/h, or 0.5 km/s (11.2)

axis tilt the tilt of Earth on its axis, 23.5° from the flat plane of Earth's orbit (12.1)

B

battery a combination of electrochemical cells connected together (or a single electrochemical cell) that produces a potential difference (8.1)

Big Bang theory the theory that proposes that the universe formed approximately 13.7 billion years ago when an unimaginably tiny volume of space suddenly and rapidly expanded to immense size (10.1)

binary fission a form of asexual reproduction in which a single parent cell replicates its genetic material and divides into two equal parts (5.2)

black hole a large sphere of incredibly tightly packed material with an extraordinary amount of gravitational pull created when a star collapses into itself; called "black" because nothing, not even light, can escape the powerful gravitational field (11.1)

blastula [BLAS-chuh-luh] a hollow ball of cells about 1.5 mm in diameter that forms after the second week of embryonic development (6.2)

Bohr model diagram of the atom that describes the arrangement of subatomic particles: neutrons and protons in the nucleus and electrons in electron shells (2.3)

boiling the change of state from a liquid to a gas (1.2)

boiling point the temperature at which a liquid changes into a gas (1.2)

budding a form of asexual reproduction in which areas of an individual may undergo repeated mitosis and cell division and can develop into an identical organism (5.2)

C

cancer the result of uncontrolled cell division (5.1)

celestial bodies all the objects in space, including the Sun, the Moon, planets, and stars (10.1)

cell cycle the three stages of the life of a cell, which include interphase, mitosis, and cytokinesis (5.1)

cell membrane a thin, protective covering that separates the inside of a cell from its external environment and controls the flow of materials into and out of the cell (4.1)

cell wall a tough, rigid structure that surrounds the cell membrane of plant cells (4.1)

centromere the structure that joins two sister chromatids together (5.1)

charging by conduction process of transferring charge between objects by touching or rubbing (7.2)

charging by induction process of rearranging electrons on a neutral object by bringing a charged object close to it (7.2)

chemical bonds links between two or more atoms that hold the atoms together (3.1)

chemical change a change in matter in which chemical bonds are formed and broken and which produces at least one new substance (1.2)

chemical family groups of elements arranged in vertical columns in the periodic table that have similar physical and chemical properties (e.g., alkali metals, alkaline earth metals, halogens, noble gases) (2.2)

chemical formula symbols that show the elements in a compound and their ratios (3.2)

chemical name name of a compound that indicates the elements in it (3.2)

chemical properties characteristics that describe a substance's ability to react chemically with other substances to form new products (e.g., flammability) (2.2)

chemical symbol international symbols for each element consisting of one or two letters, such as O for oxygen and Na for sodium. The first letter is always capitalized. Second letters are never capitalized. (2.1)

chemistry the study of matter, including facts and observations about matter, laws that summarize patterns of behaviour in matter, and theories that explain the patterns (1.2)

chloroplasts organelles in plant cells that trap the energy from the Sun and make glucose as an energy source for the plant (4.1)

chromatin a substance within the nucleus that contains DNA and proteins (4.1)

chromosome a threadlike structure in a cell nucleus that carries genes (4.1)

chromosphere the 3000 km thick layer of atmosphere beneath the Sun's corona, composed of hot (6000–20 000°C), low-density gas (11.2)

circuit diagram a drawing using symbols to represent the different components of a circuit (8.2)

clone an identical genetic copy of an organism's parent (5.2)

comet a small body made up of rocky material and ice that occurs in the Kuiper Belt and the Oort Cloud; when a comet is bumped into the inner solar system, the Sun's light may make the comet's tail visible from Earth (11.2)

compound a pure substance made up of two or more elements that have been chemically combined (1.2)

conclusion an explanation of the results of an experiment as it applies to the hypothesis being tested (Science Skill 2)

condensation change of state from a gas to a liquid (1.2)

conductivity ability to conduct electricity or heat (1.2)

conductors materials that allow electrons to move freely on and though them (7.1)

constellations distinctive patterns in the night sky formed by groups of stars; the patterns often look like familiar objects, such as animals (12.1)

contact forces forces that have an effect only on objects that they touch (7.2)

control in a scientific experiment, a standard to which the results are compared; often necessary in order to draw a valid conclusion; ensures a fair test (Science Skill 2)

Copernicus, Nicolaus Polish astronomer (1473–1543) who first proposed the heliocentric model of the solar system (12.1)

corona the outermost part of the Sun's atmosphere, a layer of gas that can reach more than 3 000 000°C (11.2)

cosmological red shift wavelengths of radiated light that are being constantly stretched (lengthened) as the light crosses the expanding universe (10.1)

coulomb (C) the unit of electric charge, named after the French physicist Charles Coulomb; one coulomb is the amount of charge passing a point in one second when one ampere of current is flowing (7.1)

covalent compounds compounds, such as water, in which two atoms share a pair of electrons (3.1)

crossing over an event in meiosis I in which sister chromatids exchange DNA; results in variation in gametes (6.1)

current electricity the continuous flow of charge in a complete circuit (8.2)

cytokinesis [SIH-toh-ki-NEE-sus] the final stage of the cell cycle, which separates the two nuclei and cell contents into two daughter cells (5.1)

cytoplasm [SIH-toh-pla-zuhm] a jelly-like substance within a cell containing organelles, water, and other life-supporting materials (4.1)

D

density ratio of a material's mass to its volume; usually measured in kg/cm^3 (1.2)

deoxyribonucleic acid (DNA) [dee-AHK-si-rih-boh-nyoo-KLAE-ik] a biological molecule found in the cell nucleus that carries genetic information; composed of sugar, phosphate, and four different bases (guanine, cytosine, adenine, and thymine) passed on from generation to generation during reproduction (4.1)

deposition change of state from a gas to a solid (1.2)

differentiation in humans, the process in which cell layers will eventually form the organs and tissues of a baby (6.2)

diploid number two sets of chromosomes ($2n$); the diploid number for a human cell is 46 (2×23) (6.1)

Doppler effect the change in wavelengths of electromagnetic radiation or sound that occurs because of the movement of the source relative to an observer (11.1)

E

eclipse the total or partial overshadowing of one celestial body by another (12.1)

ectoderm the outside layer of the gastrula; cells in this layer will form skin and the nervous system (6.2)

electric circuit a complete pathway that allows electrons to flow (8.2)

electric current the amount of charge passing a point in a conductor every second (8.2)

electric force a push or pull between charged objects (7.2)

electric load any device that transforms electrical energy into other forms of energy, such as a light bulb, buzzer, heater, and motor (8.2)

electric potential energy electric energy stored in a battery (8.1)

electrical power the rate of change in electrical energy (9.2)

electrical resistance the ratio of voltage to current (8.3)

electrochemical cells electrodes in electrolytes that convert chemical energy into electrical energy stored in charges; also called batteries (8.1)

electrodes two terminals in a battery or other electricity source; usually made of two different metals but can be a metal and another material (8.1)

electrolyte substance that conducts an electric current. In a dry cell, the electrolyte is a moist paste; in a wet cell, the electrolyte is a fluid. (8.1)

electromagnetic radiation energy that is carried, or radiated, in the form of waves that range in length from short to long; types include X rays, ultraviolet radiation, visible light, microwaves, and radio waves (10.1)

electron shells regions surrounding the nucleus of an atom in which electrons move (2.3)

electrons negatively charged particles surrounding the atomic nucleus (1.3, 7.1)

element a pure substance that cannot be broken down or separated into simpler substances (1.2)

elliptical galaxy one of three basic galaxy shapes; a galaxy that ranges in shape from a perfect sphere to an elongated but flattened ellipse and contains some of the oldest stars in the universe (10.2)

embryo [EM-bree-oh] the stage of a multicellular organism that develops from a zygote (6.1)

embryonic development [em-bree-AH-nik] early development of a multicellular organism following fertilization (6.2)

embryonic stem cells cells that can become any one of a sexually reproducing organism's body cells (5.2)

endoderm the inner layer of the gastrula; cells in this layer will form the lungs, liver, and the lining of the digestive system (6.2)

endoplasmic reticulum [en-doh-PLAZ-mik re-TIK-yoo-lum] a network of membrane-covered channels within a cell that transport materials (4.1)

estimating making an informed judgement about a measurement (Science Skill 7)

endothermic characterized by an overall absorption of energy; used to describe a chemical reaction. The prefix "endo-" means entering. (3.3)

energy the ability to do work (8.1)

enzymes proteins that help speed chemical reactions within cells (4.1)

ethics the set of moral principles and values that guides a person's actions and helps him or her decide what is right and what is wrong (12.3)

exothermic characterized by a release of heat, light, and sound through electrical or other means; used to describe a chemical reaction. The prefix "exo-" means leaving. (3.3)

external fertilization fertilization in which a sperm cell and an egg cell unite outside the bodies of the parents (6.2)

F

fair test an investigation (experiment) carried out under strictly controlled conditions to ensure accuracy and reliability of results. In a fair test, all variables are controlled except the one variable under investigation. (Science Skill 2)

fertilization the process during which an egg cell is penetrated by a sperm cell and the haploid genetic information of both male and female gametes combines (6.1)

fetus the stage of a multicellular organism that develops from an embryo (6.2)

force a push or a pull exerted on an object (7.2)

fragmentation a form of asexual reproduction in which each fragment of an organism develops into a clone of its parent (5.2)

freezing solidification; change of state from a liquid to a solid (1.2)

fusion the process in which the nuclei of atoms fuse together to form larger single atoms, creating an enormous amount of energy (11.1)

G

galaxy an enormous collection of gases, dust, and billions of stars held together by gravity (Getting Started, Unit 4)

Galileo [GA-lih-LAY-oh] Italian physicist and astronomer (1564–1642) whose use of the early telescope allowed him to make many observations that confirmed Copernicus's model of a heliocentric solar system (12.1)

gametes specialized cells necessary for reproduction; in animals, male gametes are called sperm cells and female gametes are called egg cells (6.1)

gastrula [GAS-truh-luh] the stage of a developing embryo in which the cells of the blastula organize into three layers (6.2)

gene segment of DNA located at a specific place on a chromosome, each contain information to produce proteins (4.1)

gene mutation a change in the specific order of the A, G, C, and T bases that make up a particular gene (4.2)

gene therapy techniques developed to alter mutated genes in order to make them function normally (4.2)

genetic diversity inherited genetic differences in a species that give many organisms a survival advantage (6.1)

geocentric model a model of celestial motion in which Earth is the centre of the universe (12.1)

geosynchronous orbit [gee-oh-SIN-chron-uhs] the orbit of a satellite that is moving at the same speed and direction as Earth's rotation, with the result that the satellite stays stationary above a fixed point on Earth (12.3)

Golgi body [GOHL-jee] an organelle that sorts and packages proteins for transport (4.1)

grounding connecting a conductor so that electric charge flows into Earth's surface (7.1)

H

halogens Group 17 non-metallic elements (fluorine, chlorine, bromine, iodine, astatine) (2.2)

haploid number each set of inherited chromosomes, half the diploid number (n); humans inherit one set of 23 chromosomes from their female parent and one set of 23 chromosomes from their male parent (6.1)

hazard symbols warnings printed on containers to indicate that either the container or the product is dangerous (1.1)

heliocentric model a model of celestial motion in which Earth and all the planets revolve around the Sun (12.1)

holistic a belief that all the individual parts of something are interconnected to form the whole thing; for example, a holistic world view considers all aspects of the physical and spiritual universe to be connected to form the whole universe (12.2)

homologous chromosomes [huh-MAH-luh-gus] a pair of matching chromosomes (6.1)

hormones substances, such as proteins, released from specific glands to control particular cellular activities such as growth (4.1)

hypothesis [hih-PAW-thuh-sis] a testable proposal used to explain an observation or to predict the outcome of an experiment; often expressed in the form of an "If ..., then ..." statement (Science Skill 2)

I

in vitro fertilization (IVF) technology used to treat specific fertility problems by fertilizing an egg cell in a petri dish; "in vitro" means in glass (6.3)

independent assortment an event in meiosis I in which homologous pairs of chromosomes separate and sort themselves into daughter cells; a shuffling of genes that contributes to variation and genetic diversity (6.1)

insulators materials, such as glass, plastics, ceramics, and dry wood, that do not allow electrons to move easily on or through them (7.1)

internal fertilization fertilization in which sperm cells are deposited inside the female's body where they meet egg cells (6.2)

interphase the first and longest stage of the cell cycle, in which cells carry out life functions and cells that divide prepare for cell division (5.1)

interstellar matter the material that fills space, made up of gas (mostly hydrogen) and dust (11.1)

ion an electrically charged atom (2.2)

ion charge electrical charge that forms on an atom when it gains or loses electrons (2.2)

ionic compounds compounds, such as table salt, in which oppositely charged ions come together because of mutual attraction (3.1)

ionic lattice repeating pattern of positive and negative ions forming an ionic compound (3.1)

irregular galaxy one of three basic galaxy shapes; a galaxy that has neither spiral arms nor an obvious central core, made up of a mix of newly forming stars and old stars (10.2)

J

joule (J) the unit for measuring energy, named for the English scientist James Prescott Joule (9.2)

junction point the location where a circuit divides into multiple paths or where multiple paths combine (9.1)

K

karyotype a photomicrograph that shows the number of chromosomes a person has, as well as their size and shape, prepared by cutting and pasting chromosomes taken from body cells during mitosis; used to diagnose genetic disorders (6.1)

Kepler, Johannes German mathematician and astronomer (1571–1630) who determined that the planets in our solar system orbit the Sun in elliptical paths (12.1)

kilowatt-hour (kW·h) the product of power, in kilowatts, and time, in hours (9.2)

kinetic energy energy a moving object has because of its motion; depends on mass and speed of object and the temperature (2.1, 8.1)

kinetic molecular theory an explanation of the behaviour of particles of matter (1.2)

L

laws of static charge physical laws that state that like charges repel, opposite charges attract, and neutral objects and charged objects attract each other (7.2)

light-year the distance that light, which moves at 300 000 km/s, travels in a year; equals about 9.5 trillion km (11.3)

line of best fit on a graph, a smooth curve (or straight line) that has the general shape outlined by plotted points; shows the trend of the data (Science Skill 5)

lunar eclipse an overshadowing of the Moon that occurs when Earth lies directly between the Moon and the Sun during a full moon phase (12.1)

lunar month a measurement of time from one new moon (or one full moon) to the next, equal to about 29.5 days (12.2)

M

manipulated variable in an experiment, a factor that is selected or adjusted to see what effect the change will have on the responding variable (Science Skill 2)

mass the amount of matter in a substance or an object; the more matter, the greater the mass; usually measured in kilograms (kg) (1.2)

mating the process by which gametes arrive in the same place at the same time (6.2)

matter anything that has mass and volume (1.2)

meiosis [mih-OH-sus] the process that produces gametes with half the number of chromosomes as body cells (6.1)

melting the change of state from a solid to a liquid (1.2)

melting point the temperature at which a solid begins to liquefy (1.2)

mesoderm the middle layer of the gastrula; cells in this layer will form the kidneys, skeleton, muscles, blood vessels, and reproductive organs (6.2)

metalloids elements that share some properties with metals and some properties with non-metals (2.2)

metals elements that are typically hard, shiny, malleable, ductile, and good conductors of heat and electricity (2.2)

meteorites meteoroids that are large enough not to burn up entirely as they pass through Earth's atmosphere and so reach Earth's surface (12.1)

meteoroids rocky chunks broken off asteroids or planets, which float through space (12.1)

meteors meteoroids that burn up as they pass through Earth's atmosphere (12.1)

mitochondria [mih-toh-KAWN-dree-uh] organelles that change glucose into usable energy for use in the cell (singular: mitochondrion) (4.1)

mitosis [mih-TOH-sus] the second, and shortest, stage of the cell cycle; the process in which the duplicated contents of the cell's nucleus divides into two equal parts (5.1)

molecule a group of atoms in which the atoms are bound together by the sharing of one or more pairs of electrons (3.1)

model a verbal, mathematical, or visual representation of a scientific structure or process, which allows scientists to construct and test inferences and theories (e.g., the particle theory of matter) (Science Skill 2)

moons celestial bodies that orbit a planet (11.2)

morula [MOHR-yuh-luh] a ball of cells of about 0.2 mm in diameter that forms after the first week of embryonic development (6.2)

multiple ion charge a characteristic of elements that can form ions in more than one way (2.2)

multivalent metals metals that can form an ion in more than one way, resulting in ions with different charges. The prefix "multi-" means many. (3.2)

mutagens substances or factors that can cause mutations in DNA (4.2)

N

nebula a cloud of gas and dust in space (10.2)

negative mutation a mutation that harms an organism or reduces the probability that organisms with the mutation can produce offspring or survive in their environment (4.2)

neutral the uncharged state of a particle or object; occurs when the positive charge in the nucleus is exactly balanced by the negative charge of the electrons (7.1)

neutral mutation a mutation that does not affect the organism or does not increase or decrease the survival rate of the organism (4.2)

neutron uncharged particle in the atomic nucleus (1.3)

noble gases Group 18 elements (helium, neon, argon, krypton, xenon, radon) (2.2)

non-metals elements that are typically not shiny, malleable, or ductile and that are poor conductors of heat and electricity. Non-metals are usually gases or brittle solids at room temperature. (2.2)

nuclear membrane the thin outer membrane that surrounds the cell nucleus; separates the contents of the nucleus from the cytoplasm (4.1)

nuclear pores openings in the nuclear membrane that allow only certain materials into and out of the nucleus (4.1)

nucleolus a membrane-free organelle that floats in the interior of the nucleus and makes ribosomes (4.1)

nucleus in chemistry, the positively charged centre of an atom, which contains protons and neutrons (plural: nuclei) (1.3, 7.1); in biology, an organelle that controls all the activities within a cell (4.1)

O

ohm (Ω) the unit of measurement for electrical resistance (8.3)

ohmmeter a device that measures resistance (8.3)

Ohm's law the mathematical relationship comparing voltage (V), current (I), and resistance (R), written as $R=V/I$ (8.3)

optical telescope reflecting or refracting telescope used to focus light from distant objects (12.3)

organelle a specialized cell part in which specific functions are carried out to ensure a cell's survival (4.1)

ovules the female plant structures that contain the egg cells (6.2)

P

parallax the apparent shift of an object against a stationary background caused by the change in position of the observer (11.3)

parallel circuit a closed loop that has several paths for current to travel (9.1)

period horizontal row in the periodic table (2.2)

periodic table organized list in which elements are arranged in rows and columns according to their atomic number and their patterns of similar properties (2.2)

phases changing appearances of the Moon as the Moon orbits Earth and the Sun lights the lunar body from different angles (12.1)

photosphere the thin outer layer of the Sun where hot gas rises to the surface, cools, and then sinks back into deeper layers; reaches temperatures of about 5800°C (11.2)

physical change a change in matter in which the appearance may change but no chemical bonds are broken or made and no new substance is formed (1.2)

physical property a characteristic of matter that you can observe or measure, such as state, colour, or density (1.2)

planet a celestial body that orbits one or more stars, is large enough that its own gravity holds it in a spherical shape, and is the only body occupying the orbital path (11.2)

pollen plant structures called grains that carry the sperm cells in a protective case to the ovules (6.2)

pollen tube a structure that delivers sperm cells to egg cells in plants; formed after pollen lands on the female part of a plant (6.2)

pollination the transfer of male gametes in pollen from the male reproductive part of a plant to the female reproductive part of a plant (6.2)

polyatomic ion a molecular ion composed of more than one type of atom joined by covalent bonds. The prefix "poly-" means many. (3.1)

positive mutation a mutation that benefits an organism (4.2)

potential difference the amount of electric potential energy per one coulomb of charge at one point in a circuit compared to the potential energy per coulomb of charge at another point in the circuit; also called voltage (8.1)

potential energy energy stored in an object (8.1)

power the rate of change in energy; also the rate at which work is done or energy is transformed (9.2)

power rating a measurement of how much electrical energy an electrical device consumes for every second it is in use (9.2)

prediction a forecast about what you expect to observe when you do an investigation (Science Skill 2)

probe a space vehicle carrying scientific instruments and sent to fly past, orbit, or land on a celestial body to collect data (12.3)

products new substances formed in a chemical reaction (3.3)

proteins essential materials required for the cell to carry out the activities necessary for its survival (4.1)

proton positively charged particle in the atomic nucleus (1.3, 7.1)

prototype a full-size trial model of a device based on an original design (Science Skill 3)

Ptolemy [TOL-uh-mee] Greek mathematician, geographer, and astronomer (c. 90–168) whose extensive work supported the geocentric model of the solar system. That model was widely accepted until Copernicus's heliocentric model emerged. (12.1)

pure substance a material that contains only one kind of particle (e.g., gold, water, oxygen). There are two kinds of pure substances: elements and compounds. (1.2)

R

radio telescope a large receiver that collects radio waves (which have longer wavelengths than visible light) and therefore can detect objects that are invisible to optical telescopes (12.3)

reactants substances that react in a chemical reaction (3.3)

red shift a shifting of light from an object toward the red (longer wavelength) end of the spectrum as the object moves away from Earth (10.2)

replication the process during which the cell copies the 3 billion base pairs of DNA information in the nucleus (5.1)

resistance the property of any material that slows down the flow of electrons and converts electrical energy into other forms of energy (8.3)

resistor an electrical component with a set amount of resistance that slows down current and transforms electrical energy into other forms of energy (8.3)

responding variable in an experiment, the factor that changes in response to a change in the manipulated variable (Science Skill 2)

revolution the motion of Earth as it orbits the Sun at 30 km/s; one full revolution takes almost a year (11.2)

ribosome [RIH-buh-sohm] an organelle without a membrane that produces proteins (4.1)

Roman numerals numerals based on those used by the ancient Romans (3.2)

rotation the motion of Earth as it spins on its axis from west to east at 1670 km/h; one full rotation takes almost a day (11.2)

rover a small, sophisticated, robotic probe designed to land on a planet, explore and test the surface, and send information back to Earth (12.3)

S

satellite an electronic device put in orbit around Earth to relay information (12.3)

series circuit a circuit that has only one path for current to travel (9.1)

sexual reproduction reproduction that requires two parents and produces offspring that are genetically different from each other, from either parent, and from any other member of their species (6.1)

sister chromatids formed when DNA replicates during interphase and joined together by a centromere (5.1)

solar eclipse an overshadowing of Earth that occurs when the Moon is between the Sun and Earth and the Moon blocks the Sun's light (12.1)

solar flares extremely violent eruptions of gas from the Sun's surface that can last for a few hours and heat gases to 11 000 000°C (11.2)

solar prominences large loops of super-hot gas that extend out from the Sun's surface (11.2)

solar system a group of planets circling one or more stars (11.2)

solar wind streams of high-energy particles ejected by the Sun; when some of these particles enter Earth's atmosphere they cause the auroras, or the northern and southern lights (11.2)

solidification change of state from a liquid to a solid; commonly called freezing (1.2)

spectroscope an optical instrument that acts like a prism to separate light into its basic component colours (10.1)

spectrum the band of rainbow colours created when white light passes through a prism; each colour of the spectrum represents different wavelengths of light (plural: spectra) (10.1)

spindle fibres tiny tube-like structures made of protein to which chromosomes attach during cell division (5.1)

spinoff technology technology that was originally invented and designed for use in one way (for example, space exploration) but has been adapted for other everyday uses as well (12.3)

spiral galaxy one of three basic galaxy shapes; a galaxy with many long "arms" spiralling out from a centre core made up of stars that formed long ago (10.2)

spores reproductive cells that grow into new individuals by mitosis (5.2)

star a celestial body of hot gases with a core like a furnace that makes its own thermal energy (Getting Started, Unit 4)

star clusters distinct formations of stars in a galaxy; the two types are open clusters and globular clusters (10.2)

state a property of a substance describing it as a solid, a liquid, or a gas (1.2)

static charge an electric charge that can be collected and held very nearly fixed in one place (7.1)

stem cells cells that have the potential to become many different types of cells; two types of stem cells are embryonic stem cells and adult stem cells (5.2)

subatomic particles particles such as protons, neutrons, and electrons that are smaller than atoms. The prefix "sub-" means below. (1.3)

sublimation change of state from a solid to a gas (1.2)

sunspots dark patches on the Sun's surface that are slightly cooler, about 3500°C, than surrounding areas (11.2)

supernova a dramatic, massive explosion that occurs when a large, high mass star collapses in on itself (11.1)

syndrome a particular disease or disorder with a specific group of symptoms that occur together (6.1)

T

technology the application of scientific knowledge and everyday experience in solving practical problems by designing and developing devices, materials, systems, and processes (Science Skill 3)

terminals the positive and negative end points of a battery (8.1)

terraforming the idea that an extraterrestrial (non-Earth) environment, such as Mars, could be transformed into an Earth-like biosphere that humans could inhabit (12.3)

theory an explanation of an event that has been supported by consistent, repeated experimental results and has therefore been accepted by most scientists (Science Skill 2)

triangulation a technique for determining the distance to a visible object by creating an imaginary triangle between the observer and the object and then calculating the distance (11.3)

V

vacuoles [VAC-yoo-ohlz] membrane-covered storage containers within cells (4.1)

valence electrons electrons in the outer shell of an atom, which determine its ability to combine with another atom (2.3)

valence shell the outermost electron shell (2.3)

Van de Graaff generator a device that uses friction to produce a large static charge on a metal dome (7.1)

variable a factor that can influence the outcome of an experiment (Science Skill 2)

vegetative reproduction reproduction in which special cells, usually in plant stems and plant roots, divide repeatedly to form structures that will eventually develop into a plant identical to the parent (5.2)

vesicles membrane-covered sacs that form off the ends of the endoplasmic reticulum and the Golgi body and that transport proteins, nutrients, and water into, out of, and around the inside of the cell (4.1)

volt (V) the unit of potential difference; one volt causes a current of one ampere to flow through a conductor with a resistance of one ohm (Ω) (8.1)

voltage the amount of electric potential energy per one coulomb of charge at one point in a circuit compared to the potential energy per coulomb of charge at another point in the circuit; also called potential difference (8.1)

voltmeter a device that measures the amount of potential difference between two points in an electric circuit (8.1)

volume the amount of space taken up by a substance or object, usually measured in litres (L) or cubic centimetres (cm^3) (1.2)

W

watt (W) one joule of energy transformed in one second, named in honour of Scottish inventor James Watt (9.2)

Western science science that is based on the physical realm of the world and which involves the study of phenomena that can be physically observed, measured, documented, and tested (12.2)

Workplace Hazardous Materials Information System (WHMIS) system of eight warning symbols used throughout Canada to provide safety information about chemicals (1.1)

Z

zygote [ZIH-guht] the new diploid (Zn) cell formed by the process of fertilization, which receives half its chromosomes from its female parent and half from its male parent (6.1)