

# Glossary

A glossary is an alphabetical list of important words found in the sections in this book. Use this glossary just as you would use a dictionary: to find out the meaning of unfamiliar words. This glossary gives the meaning that applies to the words as they are used in the sections of this book. As with any subject, science has its own vocabulary. The study of science is more meaningful if you know the language of science.

## A

- absolute dating** – a method of estimating the age of a rock sample in years.
- active transport** – a process that allows molecules to move across the cell membrane from lower to higher concentrations.
- adaptation** – an inherited trait that helps an organism survive.
- adrenal glands** – produce epinephrine, a hormone that prepares the body for stress.
- aerobic bacteria** – bacteria that use oxygen for cellular respiration.
- algae** – photosynthetic protists that are plant-like in many ways.
- alleles** – different forms of a gene.
- alveoli** – tiny, sac-like structures of the lungs that are surrounded by capillaries where gas exchange takes place.
- amniotic egg** – an egg that is surrounded by a shell to prevent it from drying out.
- amoebas** – a group of protozoans that move by means of pseudopods.
- anaerobic bacteria** – bacteria that do not require oxygen to survive.
- ancestor** – an organism from which others have descended.

- angiosperms** – vascular, seed-producing plants whose seeds are enclosed in a fruit.
- antibodies** – proteins that bind to viruses and prevent them from infecting cells.
- appendicular skeleton** – the bones of the limbs, including the bones of the pectoral and pelvic girdles.
- area** – a measurement of how much surface something has.
- arteries** – blood vessels that carry blood away from the heart.
- asexual reproduction** – a type of reproduction that requires only one parent.
- asymmetrical** – organisms that do not have symmetry.
- atom** – the smallest particle of an element that keeps the chemical identity of that element.
- ATP** – a molecule that stores and transfers energy within the cells.
- axial skeleton** – forms the axis of the body and includes the skull, vertebral column, ribs, and sternum.

## B

- bacteria** – organisms that consist of a single, prokaryotic cell.
- ball and socket joint** – joints that allow movement in all directions.

**base sequence** – the order of base pairs along a gene.

**bilateral symmetry** – a body plan that consists of two similar halves.

**biology** – the study of life.

**blood** – a circulating connective tissue made of plasma, cells, and platelets.

**blood pressure** – a measure of the force of the blood pushing against the walls of the arteries.

**bone marrow** – a thick, jelly-like layer of bone that makes blood cells or stores fat.

## C

**cancellous bone** – the layers of bone that have many open spaces like a sponge.

**capillaries** – the smallest blood vessels where the exchange of materials with cells takes place.

**carbohydrates** – energy-rich compounds such as sugars and starches made from carbon, hydrogen, and oxygen.

**cell** – the smallest unit of a living thing.

**cell cycle** – the period of time from the beginning of one cell division to the beginning of the next.

**cell differentiation** – the process of cell specialization.

**cell division** – the process of one cell dividing into two daughter cells.

**cell membrane** – a separating barrier that controls movement of materials into and out of the cell.

**cell theory** – a theory that explains the relationship between cells and living things.

**cell wall** – the outer layer of a plant cell that is made from cellulose and makes plant cells rigid.

**cellular respiration** – the process in which the chemical bonds of energy-rich molecules are converted into a form of energy that cells can use.

**central nervous system** – the control center of the body that includes the brain and spinal cord.

**cerebellum** – the part of the brain that keeps the body in balance.

**cerebrum** – the part of the brain that controls voluntary movements, the senses, and thought.

**chemical reaction** – a process that rearranges the atoms of one or more substances into one or more new substances.

**chlorophyll** – the main pigment used in photosynthesis that absorbs blue and red light and reflects green light.

**chloroplast** – an organelle that converts light energy into chemical energy in the form of molecules.

**chromosome** – a structure made of DNA and protein in the nucleus of a eukaryotic cell.

**ciliates** – a group of protozoans that move by waving tiny, hair-like organelles called cilia.

**circulatory system** – the body system that circulates blood throughout the body and delivers essential substances to cells and removes wastes.

**cladogram** – a tree-like diagram that displays evolutionary relationships among living species and their ancestors.

**cochlea** – a spiral-shaped, fluid-filled cavity of the inner ear that contains nerve endings essential to hearing.

**codominance** – when an organism that has both alleles of a gene displays both phenotypes at the same time.

**color** – how we perceive the energy of light.

**community** – all of the organisms that interact in a given area.

**compact bone** – the layer of bone that provides most of its strength.

**competition** – when organisms in a community vie for the same food supply.

**compound** – a substance that contains two or more different elements that are chemically joined.

**cone cells** – photoreceptors that respond to color.

**connective tissue** – provides strength, support, and protection to soft body parts.

**control variable** – the variables you keep the same in an experiment.

**cornea** – part of the eye that, along with the lens, refracts and focuses light.

**cotyledon** – an embryonic leaf found inside of a seed.

**cross-pollination** – when the pollen from one plant is used to fertilize another plant.

**cuticle** – a waxy layer that covers the parts of a plant that are exposed to air like leaves and stems.

**cytokinesis** – the process where the cytoplasm and its organelles divide into two daughter cells.

**cytoplasm** – a fluid mixture that contains the organelles and the compounds the cell needs.

**cytoskeleton** – a series of protein fibers inside of a cell that give structure and shape to the cell.

## D

**dependent variable** – the variable that you believe is influenced by the independent variable.

**diffusion** – the movement of molecules from areas of greater concentration to areas of lesser concentration.

**digestive system** – a group of organs that take in and digest food, and eliminate wastes.

**diploid** – a double set of chromosomes.

**direct relationship** – a relationship in which one variable increases with an increase in another variable.

**DNA fingerprinting** – the process of producing an image of patterns from someone's DNA.

**DNA replication** – the process of a DNA molecule making a copy of itself.

**dominant allele** – the form of a gene that, when present, covers up the appearance of the recessive allele.

## E

**ecosystem** – a group of living things and their surroundings.

**ectotherms** – animals that are not able to control their body temperature.

**element** – the simplest form of matter.

**embryo** – an organism in its earliest stage of development.

**endocrine system** – a group of glands that produce hormones and release them into the blood.

**endoplasmic reticulum** – an organelle that transports proteins inside of the cell.

**endotherms** – animals that use the heat produced by chemical reactions in their cells to maintain a constant body temperature.

**energy** – the ability to cause change or do work.

**epidermis** – the layer of cells that covers the surface of roots.

**epithelial tissue** – made up of closely packed cells in one or more layers. Lines the internal and external body surfaces.

**eukaryotic cell** – a cell that has a nucleus and membrane-covered organelles.

**evolution** – the process of how organisms acquire adaptations over time.

**evolutionary tree** – a diagram with many branches that shows evolutionary relationships among organisms, both living and extinct.

**excretory system** – a group of organs that excrete chemical wastes.

**experiment** – a controlled test to determine if a hypothesis is supported or refuted.

**experimental variable** – the variable you change in an experiment.

**extensor** – a muscle that straightens part of your body.

**external fertilization** – the female lays eggs and the male deposits sperm on the eggs.

**extinction** – occurs when the environment changes and the adaptations of a species are no longer sufficient for its survival.

## F

**feedback control systems** – systems that control the levels of endocrine hormones in the blood.

**fertilization** – the union of egg and sperm.

**fetus** – an embryo that has developed for 8 weeks and has formed the major structures.

**flagellates** – a group of protozoans that do not have organelles for movement and are parasites.

**flexor** – a muscle that bends part of your body.

**flower** – the reproductive organ of angiosperms.

**focal length** – the distance from the center of the lens to the focal point.

**focal point** – a point where light rays meet.

**follicle** – a structure of the ovary where an egg matures.

**food chain** – shows how each organism in a community gets its food.

**force** – a push or a pull, or any action that has the ability to change motion.

**fossil** – a remnant or trace of an organism from the past, such as a skeleton or leaf imprint, embedded and preserved in Earth's crust.

**fossil record** – a historical sequence of life on Earth based on the sequence of fossils.

**frequency** – the number of vibrations per second.

**fruit** – a ripened ovary that contains angiosperm seeds.

**fulcrum** – the fixed point where a lever rotates.

**fungi** – organisms that make up the Kingdom Fungi, including yeasts, molds, and mushrooms, consisting of eukaryotic cells with cell walls made of chitin.

## G

**gene** – a unit that determines traits.

**genetic disorder** – an abnormal condition that an organism inherits.

**genetic engineering** – the process of transferring genes from one organism into the DNA of another organism.

**genetic variation** – the variety of alleles in a population.

**genetics** – the study of heredity.

**genome** – the total amount of hereditary material in a single cell of an organism.

**genotype** – the alleles of a gene an organism contains.

**geologic time scale** – a model of the history of life on Earth.

**geology** – the study of Earth's formation and structure.

**germination** – the process of a seed sprouting and its growth into a young plant.

**gills** – organs that extract oxygen from water and remove carbon dioxide from the blood.

**Golgi body** – an organelle that receives proteins, packages them, and distributes them.

**graph** – a visual way to represent data.

**growth** – an increase in mass.

**growth rate** – the change in size of a population over time.

**gymnosperms** – vascular, seed-producing plants whose seeds are not enclosed in a fruit.

## H

**habitat** – a place where an organism lives.

**half-life** – the amount of time it takes for half of the unstable atoms in a sample to decay.

**haploid** – a half set of chromosomes.

**heredity** – a set of traits an organism receives from its parents.

**hermaphrodite** – an individual organism that has both male and female reproductive parts.

**hinge joint** – joints that allow one-way movement.

**homeostasis** – the process of maintaining a life-supporting internal environment.

**homologous structures** – body structures that have a common origin but do not necessarily perform the same function.

**hormone** – a chemical that regulates body functions.

**host cell** – a cell that is, or becomes, infected with a virus.

**hyphae** – the thread-like filaments that make up a fungus.

**hypothesis** – a possible explanation that can be tested with an experiment.

## I

**image** – a picture of an object formed where light rays meet.

**immune system** – a system that protects an organism from unfamiliar objects like viruses.

**implantation** – the process in which an embryo becomes embedded in the lining of the uterus.

**incident ray** – the light ray that strikes a surface.

**incomplete dominance** – when the phenotype of the two alleles blend.

**independent variable** – a variable that you believe might influence another variable.

**input force** – the force applied by a level (also called the effort).

**integumentary system** – the body system consisting of the skin, hair, and nails that protects the underlying tissues.

**internal fertilization** – the male deposits sperm inside of the female.

**interphase** – the stage of the cell cycle that occurs between cell divisions.

**inverse relationship** – a relationship in which one variable decreases when another variable increases.

**invertebrate** – an animal without a backbone.

## J

**joint** – the place where two bones meet.

## L

**lateral line system** – rows of sense organs along each side of a fish that detect vibrations.

**length** – a measurement of distance.

**lens** – an object designed to refract light in a specific way.

**ligament** – a strong elastic band of connective tissue.

**light ray** – an imaginary line that represents a thin beam of light.

**lipids** – energy-rich compounds such as fats, oils, and waxes made from carbon, hydrogen, and oxygen.

**lithospheric plates** – giant pieces of solid rock on Earth's surface.

**lung** – a sac-like organ that takes oxygen from the air and transfers it to the blood.

**lysosome** – an organelle that contains enzymes that break things down to be reused by the cell.

## M

**mammary glands** – organs that produce a nutritious fluid called milk.

**mass** – a measure of the amount of matter that makes up something.

**mass extinctions** – periods of large-scale extinction.

**matter** – anything that has mass and takes up space.

**measurement** – a value that tells the amount of something.

**mechanical advantage** – the ratio of output force produced by a simple machine to the applied input force.

**medulla** – the part of the brain that controls the spinal cord and many involuntary activities like breathing and heart rate.

**meiosis** – cell division that produces sex cells with half the number of chromosomes.

**microscope** – magnifies objects so you can see their features.

**mitochondria** – an organelle that produces much of the energy a cell needs to carry out its functions.

**mitochondrial DNA** – DNA that is found in the mitochondria of a cell.

**mitosis** – the process of cell division where the nucleus divides into two nuclei.

**molecule** – a group of two or more atoms joined together chemically.

**motor nerves** – nerves that transmit signals to skeletal muscle, causing movement.

**muscle tissue** – tissue made of muscle cells that allows animals to move.

**muscular system** – a body system that consists of skeletal muscles and tendons.

**muscular system** – a group of organs whose primary function is movement.

**mutation** – a change in the hereditary material of an organism.

## N

- natural selection** – the process by which organisms with favorable adaptations survive and reproduce at a higher rate than organisms with less-favorable adaptations.
- nerve** – a group of nerve cells whose function is to carry signals to control movements.
- nerve impulse** – a wave of electrical activity transmitted between neurons.
- nervous system** – a group of organs and nerves that gather, interpret, and respond to information.
- nervous tissue** – tissue made of nerve cells that enables coordinated movement and response to stimuli.
- non-vascular plants** – do not have any tissues to transport water and nutrients.
- notochord** – a flexible, rod-shaped structure found in the embryos of all chordates.
- nucleic acids** – molecules that contain information needed for making proteins.

## O

- optic nerve** – a nerve that carries nerve impulses from the eyes to the brain.
- optic nerve** – a nerve that transmits signals from the eye to the brain.
- optics** – the study of how light behaves.
- organ** – a group of tissues that works together to carry out a set of functions.
- organ system** – a group of organs that works together to perform a set of functions.

- organelle** – a structure inside of a cell that helps it perform its functions.
- organism** – an individual form of life.
- osmosis** – the diffusion of water across the cell membrane.
- output force** – the force exerted on the load.
- ovary** – (1) part of the flower that holds one or more ovules; (2) female organs that produce eggs and female hormones.
- ovulation** – the release of a mature egg from the ovary.
- ovule** – part of the flower that holds one egg cell.

## P

- paleontologist** – a scientist who studies fossils.
- pancreas** – a gland that produces insulin and digestive enzymes.
- Pangaea** – an ancient supercontinent that broke apart to form today's continents.
- parasite** – an organism that lives in or on a host organism and causes it harm.
- periosteum** – the outer surface of a bone that contains blood vessels and nerves.
- peripheral nervous system** – consists of nerves that connect all areas of the body to the central nervous system.
- phenotype** – the form of a trait that an organism displays.
- phloem** – a vascular tissue that carries sugars and other foods throughout a plant.
- photoreceptors** – light-sensitive cells of the retina that convert light into nerve impulses.

**photosynthesis** – a process where plants use the energy of sunlight to produce carbohydrates.

**photosynthetic bacteria** – bacteria that produce their own food through photosynthesis.

**pigment** – a molecule that absorbs some colors of light and reflects others.

**pistil** – the female part of the flower.

**pitch** – how humans hear and interpret the frequency of sounds.

**placenta** – an attachment to the uterus that supplies food and oxygen from the mother's blood to the embryo.

**plasma** – the fluid part of blood.

**plate tectonics** – a theory that describes how the continents move.

**pollen** – the reproductive spore that contains sperm cells.

**pollination** – the transfer of pollen, containing sperm, to the female part of the flower.

**pollutant** – a variable that causes harm to an organism.

**polygenic traits** – traits that are determined by more than one gene.

**population** – a group of individuals of the same species living in a given area.

**probability** – the mathematical chance that an event will occur.

**prokaryotic cell** – a cell that does not have a nucleus or membrane-covered organelles.

**protein synthesis** – the production of proteins in the cell.

**proteins** – complex molecules made from smaller molecules called amino acids.

**protozoan** – a single-celled eukaryote that has some animal-like characteristics.

**punnett square** – shows all of the possible combinations of alleles from the parents.

**pupil** – the hole in the eye through which light enters.

## R

**radial symmetry** – a body plan in which the body parts are arranged in a circle around a central point.

**real image** – light from a single point on an object comes back together at a single point in another place to make an image.

**recessive allele** – the form of a gene that is hidden when the dominant allele is present.

**red blood cells** – carry oxygen to cells.

**reflected ray** – the light ray that bounces off a surface.

**reflection** – occurs when light bounces off a surface.

**refraction** – the bending of light as it crosses a boundary between two different transparent materials.

**relative dating** – a method of sequencing events in the order in which they happened.

**respiration** – the entire process by which the body takes in oxygen and gets rid of carbon dioxide and water.

**respiratory system** – the body system consisting of the lungs, and passageways that lead to the lungs.

**reproduction** – the formation of new organisms of the same species.

**reproductive system** – a group of organs that function in all reproductive processes.

**response** – how an organism reacts to a stimulus.

**retina** – a thin layer of cells in the back of the eye that converts light into nerve signals.

**rhizoids** – root-like growths on mosses and liverworts that anchor the plant to a surface and do not have vascular tissues.

**ribosomes** – an organelle that makes proteins.

**rock cycle** – the process of rock formation and recycling.

**rod cells** – photoreceptors that respond to light intensity.

## S

**scientific method** – a process used by scientists to find the answers to questions.

**scientific name** – the two-part, scientifically recognized name given to an organism, consisting of its genus and species.

**seed** – a structure that contains a plant embryo and a supply of food inside a protective covering.

**selective breeding** – the process of selecting organisms with desired traits to serve as parents for the next generation.

**semen** – a mixture of sperm and fluid that is ejaculated during sexual intercourse.

**sensory nerves** – nerves that receive sensory stimuli, such as how something feels.

**sex cells** – special cells that contain half the number of chromosomes as body cells.

**sexual reproduction** – a type of reproduction that involves special cells called sex cells.

**skeletal system** – a group of organs that provide support.

**solution** – a mixture of two or more substances that are evenly distributed at the molecular level.

**species** – a group of similar organisms that can produce offspring.

**spore** – a small, usually single-celled reproductive body that is capable of growing into a new organism.

**stamen** – the male part of the flower.

**stigma** – part of the flower that attracts and holds pollen.

**stimulus** – something that causes a response.

**stomata** – tiny pores that allow carbon dioxide to enter a leaf and oxygen and water vapor to exit.

**superposition** – the principle that states that in layers of sedimentary rocks the lowest layers were the earliest to be deposited.

**sweat glands** – glands in the skin that produce sweat to regulate body temperature.

**symbiosis** – an interaction where two species live together for a long time.

**system** – a group of objects, effects, and variables that are related.

**systematics** – the process of classifying living things according to evolutionary relationships.

## T

**taxonomy** – the process of identifying and classifying living things.

**temperature** – a measure of how hot or cold something is.

**tendon** – a strand of tough connective tissue that attaches a skeletal muscle to a bone.

**testes** – produce sperm and testosterone.

**theory** – an explanation of how a process or event is thought to occur.

**therapsids** – an extinct group of reptiles from which mammals evolved.

**tissue** – a group of specialized cells that performs a particular function.

**trait** – a characteristic that an organism can pass on to its offspring.

**transpiration** – the loss of water through the stomata.

**tropism** – growth in response to a stimulus.

**true-breeding plant** – a plant that will always produce offspring with the same form of a trait when it self-pollinates.

## U

**umbilical cord** – contains arteries and veins that connect the embryo to the placenta.

**uniformitarianism** – using features and processes that are observable today to interpret the ancient geologic record.

**unit** – a fixed amount of something.

**uterus** – the organ where a baby grows and develops.

## V

**vaccine** – a preparation of virus particles that, when injected into the body, causes the immune system to produce antibodies.

**vacuole** – an organelle that stores food, water, and other materials needed by the cell.

**valve** – a flap of tissue that prevents the backflow of blood.

**variable** – a factor that affects how a system works.

**vascular plants** – have tissues made of cells that transport water and nutrients throughout the plant.

**vascular tissues** – cells organized into tube-like structures that transport water, minerals, and food throughout a plant.

**veins** – blood vessels that carry blood toward the heart.

**vertebrate** – a set of interlocking bones that form the backbone of a vertebrate.

**vertebrates** – animals with a backbone.

**virtual image** – an image where light rays do not actually come together to form the image.

**virus** – a tiny, nonliving particle made up of genetic material and protein.

**volume** – a measurement of the amount of space something occupies.

## W

**wave** – a vibration that transfers energy from place to place.

**white blood cells** – immune cells that destroy invaders.

**withdrawal reflex** – an involuntary response to an outside stimulus.

## X

**xylem** – a vascular tissue that carries water throughout a plant.

## Z

**zygote** – a fertilized egg.