

# Glossary

**Note:** The number in parentheses at the end of each definition indicates the page number in this book where the term is defined.

## A

**action-at-a-distance force** force that can push or pull an object without touching it; also called a non-contact force (99)

**aquifer** underground freshwater reservoir (282)

**automated system** replacement of human workers with machines that are controlled by a computer (167)

## B

**bias** obvious opinion about an issue (347)

**bioremediation** technique of using living organisms to clean up contamination in land and water (353)

**buoyancy** tendency of an object in a fluid to rise or sink due to density differences with its surroundings (219)

**buoyant force** upward force exerted by a fluid (219)

## C

**cancer** disease related to the uncontrolled and rapid reproduction of cells through cell division (73)

**cell** basic structural unit of an organism and the building block of life; all living things are made of cells (11)

**cell division** process by which a cell divides into two new cells (13)

**cell membrane** thin covering that holds the cytoplasm and organelles inside a cell and controls the passage of materials in or out of the cell (18)

**cell theory** (1) the cell is the basic unit of life; (2) all organisms are made up of one or more cells; (3) all cells come from existing cells (13)

**cell wall** rigid structure that surrounds the cell membrane of plant cells; provides strength and support for a plant cell (18)

**cellular respiration** process by which mitochondria provide energy for plant and animal cells by transforming oxygen and sugar (food) into carbon dioxide and water (51)

**cellular transport** movement of substances into and out of a cell; involves several different processes, such as diffusion and osmosis (25)

**chlorine** chemical used to disinfect water (i.e., kill organisms) (308)

**chloroplast** membrane-bound organelle of a plant cell that contains a green substance (pigment) called chlorophyll; chlorophyll uses the Sun's energy to convert carbon dioxide and water into sugar and oxygen in a process called photosynthesis (18)

**circulatory system** system made up of the heart, blood vessels, and blood; main purpose is to move nutrients, gases, and wastes throughout the body (68)

**component** part of a system (158)

**compound light microscope** microscope that uses light focussed through several different lenses, which make up the eyepiece and the objective lenses, to form a magnified image of a specimen (14)

**compressibility** property of being able to be compressed or made more compact (229)

**compression** decrease in volume caused by a force (229)

**connective tissue** tissue that supports and connects different parts of the body (e.g., blood, fat, cartilage, tendons, bone) (63)

**consumer** individual who uses the goods or services provided by a system (160)

**contact force** force that acts between objects that are touching (99)

**contaminant** content that is harmful to humans, other animals, and the environment (318)

**criterion (pl. criteria)** standard rule or test on which a decision or judgement can be based (169)

**cytoplasm** jelly-like material that fills the cell and surrounds the organelles; contains nutrients the cell needs to survive (18)

## D

**density** amount of mass contained in a given volume (213)

**desalination** process of removing salt from water (354)

**diffusion** movement of particles from an area of higher concentration to an area of lower concentration (26)

**digestive system** system made up of the mouth, salivary glands, esophagus, stomach, liver, gall bladder, pancreas, and small and large intestines; breaks food down so that nutrients can be absorbed by the blood and transported to all cells (68)

**discharge** release or pour out (314)

## E

**efficiency** measurement of the useful work done by a machine compared to the work needed to operate the machine (145)

**endocrine system** system made up of several glands that produce hormones (69)

**endoplasmic reticulum** folded organelle in a cell that makes proteins (18)

**energy** ability to do work (107)

**environmental stewardship** taking action to manage, maintain, and enhance the health of the environment for current and future generations (338)

**epithelial tissue** tissue that covers the surface of the body and internal organs; lines the inside of some organs such as the small intestine (63)

**excretory system** system made up of the kidneys, ureters, bladder, and urethra; filters the blood and removes liquid waste and extra water from the body (68)

**eyepiece** lens of a microscope that magnifies the specimen, usually by 10 times (10×) (14)

## F

**first-class lever** lever that always has the fulcrum between the input and output forces and the output force is always in the opposite direction to the input force (e.g., pry bar) (132)

**flow rate** measure of the speed at which a fluid flows from one point to another; determined by measuring the amount of fluid that flows past a given point in a given time (213)

**fluid** any substance that flows (192)

**fluid system** group of parts, including at least one fluid, that interact with each other and function together as a whole (240)

**force** push or pull that acts on an object; measured in newtons (N) (98)

**fresh water** type of water with less than one percent dissolved salts (280)

**friction** force that opposes the relative motion of an object (99)

**fulcrum** point at which a lever is supported (132)

## G

**glacier** mass of ice and overlying snow that moves slowly down the mountain slope under the influence of gravity (283)

**Golgi apparatus** folded organelle that combines proteins made by the endoplasmic reticulum and delivers them to the rest of the cell and outside the cell (18)

**gravitational potential energy** potential energy of an object that is able to fall (108)

**gravity** force of attraction between two objects because of their mass (99)

**groundwater zone** area where water fills all the air spaces in the soil and in the tiny cracks in the rock (282)

## H

**heat capacity** ability of a material to absorb heat (291)

**hoist** fluid system that uses two pistons of different sizes to create pressure to lift a vehicle (242)

**hydraulic system** system that uses a liquid under pressure to transmit a force and do work (242)

## I

**ice sheet** particularly large glacier that covers the land (284)

**ideal mechanical advantage (IMA)** mechanical advantage of a machine that has no friction (118)

**impartial** presenting facts about an issue in a fair and unbiased way (347)

**impermeable** that cannot be passed through (by air or water, for example) (24)

**inclined plane** simple machine consisting of a sloping surface on which an object can move (139)

**incompressible** not capable of being compressed (e.g., materials in a liquid state) (229)

**input force** force applied to a machine; symbolized by  $F_{in}$  (115)

**integumentary system** system made up of skin, hair, nails and sweat glands. The skin, hair, and nails cover and protect the body. Sweat glands are involved in maintaining normal body temperature. (68)

## K

**kinetic energy** energy of an object in motion (108)

## L

**lever** simple machine made up of a rigid bar that is supported at one point, the fulcrum (132)

**lymphatic system** system made up of lymph, lymph nodes, lymph vessels, and lymphoid tissue; protects the body and is responsible for destroying and removing any invading organisms and abnormal cells (69)

**lysosome** organelle that breaks down food and digests wastes (19)

## M

**machine** any mechanical system that reduces the force required to accomplish work (113)

**mass** amount of matter in an object (100)

**matter** anything that has mass and volume (197)

**mechanical advantage (MA)** amount by which a machine can multiply an input force; determined by the ratio of the output force ( $F_{out}$ ) to the input force ( $F_{in}$ ) (116)

**mechanical system** group of physical parts that interact with each other and function as a whole in order to complete a task (96)

**mechanism** combination of simple machines working together to perform a specific function (128)

**membrane** thin structure that separates an interior environment from its exterior surroundings (e.g., cell membrane); organelle membranes keep different parts of the cell separate from one another (18)

**microclimate** area with a small localized climate variation that differs from the larger climate area around it (293)

**micrograph** photograph taken with a microscope (20)

**microorganism** organism that can only be seen under a microscope (e.g., bacteria, amoebas, and certain algae and fungi) (37)

**mitochondria** membrane-bound organelles that break down food particles and release their stored energy into a form that the cell can use to fuel all of its activities; powerhouses of the cell (18)

**multicellular** describes living things made of more than one cell that rely on a variety of types of cells (specialized cells) to perform cellular functions (43)

**muscle tissue** tissue that allows movement (63)

**muscular system** system made up of skeletal muscles, including tendons and ligaments; enables movement from place to place and moves substances through the body (68)

## N

**nervous system** system made up of the brain, spinal cord, and nerves that exist in every part of the body; sends and receives nerve messages throughout the body, and controls behaviour, movement, and processes such as digestion and circulation (68)

**nervous tissue** tissue that transmits and receives nerve impulses (e.g., tissue of the brain, spinal cord, nerves) (63)

**non-mechanical system** procedure or process designed to perform a task along with the people involved (156)

**nucleus** large organelle that controls all the activities in a cell, such as growth, repair, and reproduction (18)

## O

**organ** group of tissues in an organism that performs a specific task (62)

**organ system** group of two or more different organs that work together to perform one or more specific functions in the body (68)

**organelle** small structure (part) inside a cell that performs a specific function to meet the cell's basic needs to survive and reproduce (18)

**osmosis** special kind of diffusion in which a fluid (usually water) moves through a selectively permeable membrane from an area of higher concentration to an area of lower concentration (27)

**output force** force that a machine applies to an object; symbolized by  $F_{\text{out}}$  (115)

## P

**paralysis** inability to move muscles (73)

**particle theory of matter** theory that states that all matter is made up of particles; that all particles of one substance are identical; that particles of matter are in constant motion; that temperature affects the speed at which particles move; that particles have forces of attraction between them; and that there are spaces between particles (198)

**Pascal's law** law that states that when force is applied to an enclosed fluid, the increase in pressure is transmitted equally to all parts of the fluid (241)

**permeable** that can be easily permeated or penetrated (by air or water, for example) (24)

**photosynthesis** process by which the chlorophyll in chloroplasts uses the Sun's energy to convert carbon dioxide and water into sugar and oxygen (51)

**photosynthetic tissue** tissue that transforms the Sun's energy into sugar (64)

**piston** disk that moves inside a cylinder (242)

**Plimsoll line** line painted on the hull of all cargo ships to show how heavily the ship can be safely loaded in different water conditions (221)

**pneumatic system** system that uses a gas, usually air, under pressure to transmit a force (244)

**polar icecap** sometimes used to refer to the big ice masses at the poles (284)

**potential energy** energy that is stored (108)

**pressure** amount of force applied to a given area (227)

**productivity** amount of output that is produced per unit of time (165)

**protective tissue** tissue that forms a covering on most plants to help prevent water loss and to protect the plant (64)

**pulley** simple machine consisting of a grooved wheel with a rope or cable looped around it; can change the direction of the force or increase the output force, depending on whether it is fixed or movable (136)

**pump** device that moves a fluid through or into something (245)

## Q

**qualitative assessment** analysis made by observation (169)

**quantitative assessment** analysis of numerical data (169)

## R

**recharge** refill (310)

**reproductive system** system made up of organs for producing offspring (69)

**respiration** process that involves the intake of oxygen and the discharge of carbon dioxide (68)

**respiratory system** system made up of the nose, trachea, and lungs, as well as the throat, larynx, and bronchi allows oxygen from the air to enter the body and waste carbon dioxide to exit the body (68)

**ribosome** tiny organelle in the cell's cytoplasm that helps make proteins (18)

## S

**salinity** amount of dissolved salts in water (280)

**salt water** type of water with a concentration of dissolved salts averaging 3.5% (280)

**screw** simple machine consisting of an inclined plane wrapped around a rod (140)

**second-class lever** lever that has the output force between the fulcrum and the input force (e.g., bottle opener) (133)

**selective permeability** refers to the property of a barrier, such as a cell membrane, that allows only certain substances to pass through it (24)

**septic system** self-contained wastewater treatment facility (325)

**septic tank** tank in which wastewater from all indoor sources such as toilets, sinks, and bathtubs enter (325)

**simple machine** machine that requires the application of a single force to do work (128)

**skeletal system** system made up of bones and cartilage; provides support for movement, attachment points for other tissues, and protection of other organs (e.g., the spine protects the spinal cord) (68)

**slurry** mixture of water and solids (193)

**specialized cell** cell that performs a specific function and interacts with other types of cells in the organism in order to carry out its task successfully (43)

**spring scale (Newton gauge)** most common force meter; consists of a spring with a hook on the end; as more force is applied to the hook, the spring stretches farther (101)

**stage** part of a microscope on which a slide is placed for observation (14)

**sustainability** ability of something to exist or be used at the same level for a long period of time without being damaged, harmed, or reduced for future use (338)

**system** group of individual parts or procedures that work together as a complex whole to accomplish a desired task (90)

## T

**thermal expansion** increase in the volume of a substance in response to an increase in its temperature (200)

**third-class lever** lever that has the input force between the fulcrum and the output force and the input and output forces are in the same direction (e.g., garden rake) (133)

**tissue** group of specialized cells in an organism that have similar structure and function (62)

**transport tissue** tissue that contains hollow, tube-like cells that move food and water through the plant (64)

**tumour** mass of cells that continually reproduce but are otherwise non-functional (73)

## U

**unicellular** describes living things made of a single cell (e.g., diatom, amoeba, paramecium) (38)

**useful output work** work that a machine is designed to perform (145)

## V

**vacuole** large, membrane-bound, sac-like organelle that stores excess food, waste, and other substances required by the cell (18)

**valve** device that controls the flow of fluids (247)

**viscosity** resistance of a fluid to flow (210)

**volume** measure of how much space a substance takes up (197)

## W

**water table** upper surface of the groundwater zone (282)

**watershed** area of land where all the water eventually drains into one main water body, such as a stream, river, wetland, lake, or ocean (286)

**wedge** simple machine consisting of an inclined plane that travels through an object or material (140)

**weight** amount of force on an object due to gravity (100)

**well** long, hollow shaft drilled down into an aquifer to obtain fresh water (282)

**wheel and axle** simple machine consisting of a shaft or axle that is attached to a larger disk called the wheel (e.g., screwdriver) (137)

**work** amount of effort expended when a force causes an object to move a distance and energy is transferred (106)



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