

Glossary

A

abiotic: factor in an ecosystem created by non-living agents, for example, amount of sunlight, temperature, and strength and direction of wind

acceleration: the rate of change in speed (a scalar quantity) or velocity (a vector quantity);

$$a = \frac{\Delta v}{\Delta t} \text{ or } \vec{a} = \frac{\Delta \vec{v}}{\Delta t}$$

acceleration due to gravity: the change in velocity of a falling object (ignoring friction), each second; a vector quantity

accuracy: a comparison of an experimental value with an accepted value; usually expressed as a percentage error

acid: a substance that tastes sour, turns blue litmus paper red, reacts with some metals to produce hydrogen gas, is a good conductor of electricity in solution, and reacts with a base to produce a salt and water

acid deposition: a term used to describe the falling of acids from the atmosphere to the ground, whether dissolved in precipitation or as solids

acid precipitation: a form of acid deposition in which acids are dissolved in rain, fog, dew, or snow; this precipitation has a pH of less than 5.6 (the pH of normal rainwater)

acidic oxide: a nonmetal oxide that reacts in water to form an acid

active layer: in the tundra, a layer of soil above the permafrost that thaws in summer; this soil permits the uptake of water and minerals by plant roots

advection: the horizontal transfer of energy by the movement of particles in a fluid

advisory: an alert from Environment Canada that means that severe weather is predicted for your area; an advisory is more serious than a watch

air mass: a large body of air in which the temperature and moisture content at a specific altitude are fairly uniform

albedo: a measurement of the percentage of light that an object reflects; the higher the albedo, the

greater the object's ability to reflect sunlight

alkali metals: elements in the far left column of the periodic table; also called Group 1 elements

alkaline: a substance that may also be described as basic

alkaline earth metals: elements in the second column from the left of the periodic table; also called Group 2 elements

altitude: the height above sea level, usually measured in metres or kilometres; also called elevation

antacid: a mild base that can neutralize acid

anticyclone: a high-pressure system that rotates clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere

antioxidant: a substance that acts as a preservative by slowing down the rate of oxidation of molecules in food, particularly fats

area under the line: the size of the space between the graph line and the x -axis; (of a speed-time graph) a way of calculating distance; (of a velocity-time graph) a way of calculating displacement

artificial ecosystem: an ecosystem that is planned and maintained by humans, for example, a park, a farm, or a garden

atmosphere: the blanket of air and moisture that surrounds Earth

atmospheric pressure: the pressure the air exerts as gravity pulls it toward the centre of the Earth; it is greatest at sea level and decreases at higher altitudes

autotroph: an organism that uses energy and raw materials to make its own food, whether from photosynthesis or some other form of chemical synthesis; a producer

average acceleration: the acceleration of an object measured over a fairly large time interval

average speed: the total distance divided by the total time for a trip or other extended time period

average velocity: the resultant displacement divided by the total time from start to finish; the overall rate of change of position

B

base: a substance that tastes bitter, feels slippery, turns red litmus paper blue, is a good conductor of electricity in solution, and reacts with an acid to produce a salt and water

basic oxide: a metal oxide that reacts in water to form a base

bedrock: a layer of rock, lying below the soil

Bernoulli's principle: a scientific principle that states: where the speed of a fluid is high, the pressure is low, and where the speed of a fluid is low, the pressure is high; named after Swiss scientist Daniel Bernoulli (1700–1782)

bioamplification: a process that results in increasing concentrations of a toxin in the bodies of consumers at each succeeding trophic level

biodiversity: the number of species in an ecosystem, and the variety within those species

biomass: a pyramid-shaped measure of the mass of the dry matter contained in a group of living things, whether of a species, a class of species, or all of the organisms within an ecosystem

biome: a collection of ecosystems that are similar or related to each other in that the dominant form of plant life is the same; for example, the boreal forest biome is dominated by coniferous trees

biotic: a factor in an ecosystem created by the presence and roles of other living things

biotic potential: the maximum number of offspring that a species could produce, if resources were unlimited

blizzard: a severe storm with winds of 55 km/h or greater, low temperatures, and blowing snow that reduces visibility to 0.2 km or less

BOD (biological oxygen demand): a measure of the amount of dissolved oxygen needed by decomposers (bacteria) to break down the organic matter in a sample of water over a five-day period at 20°C; used to indicate the amount of organic matter in a water sample

Bohr diagram: a diagram used to represent the arrangement of electrons for an element; the electrons are drawn in a series of concentric circles around the nucleus

boreal forest: a biome dominated by coniferous trees; the most extensive biome in Canada; its biodiversity can be high or moderate, precipitation may be moderate or high, temperatures vary, and soil is often thin and slightly acidic

C

carbon cycle: the matter cycle in which, through the processes of photosynthesis, digestion, cellular respiration, decomposition, and combustion, carbon atoms move from an inorganic form in the air, water, or soil, to an organic form in living things, and then back to an inorganic form; all organic compounds contain carbon

carnivore: an animal that feeds on other animals

carrying capacity: the maximum population of a species that can be supported indefinitely by an ecosystem

catalyst: a substance that increases the rate of a chemical reaction without being consumed by the reaction

catalytic converter: a device in an automobile that converts polluting exhaust gases into safer molecules

cellular respiration: the process by which most living things generate useful energy, by combining sugars and oxygen to produce carbon dioxide and water

certainty: an expression of the level of confidence in a value; communicated by a number of significant digits

certainty rule: "When multiplying and/or dividing, the answer has the same number of significant digits as the original value with the fewest number of significant digits."

chemical change: the alteration of a substance into one or more different substances with different properties; also called a chemical reaction

chemical equation: a written representation of a chemical reaction using chemical formulas for reactants and products

chemical family: a group of elements in the same vertical column of the periodic table that tend to have similar physical and chemical properties

chemical property: the characteristic behaviour that occurs when a substance interacts with another to become a new substance

chemical test: a distinctive chemical reaction that can be used to identify an unknown substance

chemistry: the study of matter, its properties, and its changes or transformations

clear-cutting: forest harvesting in which all of the trees in an area are cut for use as timber or to make pulp for paper

climate: weather conditions of an area averaged over many years

closed population: a population in which only natality and mortality (not emigration and immigration) are acting

cloud seeding: the process of adding tiny particles (of dry ice or silver iodide) to clouds to control the formation of rain droplets and ice crystals; cloud seeding is used to reduce the chance of hailstones or increase the chance of rain

coastal zone: the area extending out from the high-tide line of an ocean or sea to the edge of the continental shelf; the coastal zone usually contains more nutrients, and so has higher biodiversity, than the oceanic zone

coefficient: a number written in front of a chemical symbol or formula; indicates the number of atoms or molecules of that substance

cold front: the leading edge of a cold air mass

coliform bacteria: a microorganism that occurs naturally in the intestines of humans and many other animals; the presence of this form of bacteria can be used as an indicator of the presence of more dangerous bacteria

collision model: a model of the rate of a reaction showing how the rate is

proportional to the number of collisions of reactant molecules

combination reaction: the combination of smaller atoms and/or molecules into larger molecules; also called a synthesis reaction

combining capacity: the number of electrons an atom can gain, lose, or share to form an ionic compound (or a stable molecule)

combustion: the chemical reaction that occurs when a substance reacts very quickly with oxygen to release energy

community: the collection of all the populations of all the species in an ecosystem; all of the organisms in an ecosystem

compound: a pure substance that contains two or more different elements in a fixed proportion

concentrated solution: a solution that contains a large amount of solute compared to solvent

conduction: the transfer of energy through the collision of particles

constant acceleration: a rate of change in speed or velocity that does not change during the acceleration; also called uniform acceleration

constant speed: travelling the same distance over successive equal time intervals; also called uniform motion

constant velocity: motion in which both the direction and speed remain unchanged

consumer: a heterotroph; an organism that must eat producers or other consumers to survive

convection: the vertical transfer of energy by the movement of particles in a fluid

convective clouds: clouds formed from convection, that is, when air near the ground absorbs energy from heated surfaces (oceans, lakes, asphalt, concrete, dirt), becomes warmer and less dense, and rises in the atmosphere; most clouds are convective

Coriolis effect: the apparent change of direction of a moving object in a rotating system, named after French mathematician Gaspard G. de Coriolis (1792–1843); in weather systems, the Coriolis effect is caused by Earth's counterclockwise rotation

covalent bond: a bond formed by two or more nonmetal atoms sharing one or more pairs of electrons

cumulus clouds: clouds with a billowing, rounded shape; usually indicate unstable weather

cyclogenesis: the process of creating a cyclone

cyclone: a low-pressure, swirling air mass; winds in a cyclonic storm move counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere

D

decomposer: an organism that feeds on detritus, in the process releasing nutrients to the soil and water, where they can be used by other organisms

decomposition reaction: a chemical reaction in which a compound is broken down into elements or smaller compounds

defining equation: the definition of a quantity expressed in quantity symbols, e.g.,

$$\vec{v} = \frac{\vec{d}}{t}$$

denitrification: the process, performed by some soil bacteria, in which nitrates are converted to nitrites, and then to nitrogen gas; part of the nitrogen cycle

density-dependent factor: a factor in an ecosystem that affects a population, and that increases or decreases its effect based on the density of the population, for example, food supply, territory, and some forms of disease

density-independent factor: a factor that affects a population in a manner that does not vary according to the density of the population it is acting on, for example, fire and flood

detritus: waste from plants and animals, including their dead remains

dew: forms when the air cools and the water vapour it contains condenses on a cool surface near the ground

dew point: the temperature at which dew forms; dew forms when the air reaches the saturation temperature, i.e., when the relative humidity is 100%

dilute solution: a solution that contains a small amount of solute compared to solvent

displacement: a change in position; a vector quantity; the area under the line on a velocity–time graph

distance: length of path travelled; a scalar quantity (SI unit: metre)

double displacement reaction: a chemical reaction that occurs when elements in different compounds displace each other or exchange places to form two new compounds

drought: a long period with much less rainfall than average; some areas can experience both droughts and floods

E

ecological niche: the place or role of a species within an ecosystem; everything an organism does to survive and reproduce, including its place in the food web, its habitat, its breeding area, and the time of day that it is most active

ecology: the study of the interaction of living things with each other and with the abiotic (non-living) factors in their environment

ecosystem: in an area defined by an ecologist, the set of relationships between populations of species and between those populations and the abiotic (non-living) factors in their environment

ecotone: a transition area between two ecosystems that includes members of the community of both ecosystems

El Niño: a shift in the ocean currents, temperatures (water becomes warmer), and atmospheric conditions in the tropical Pacific Ocean; during El Niño, the warmer than normal water temperatures off the west coast of South America have a chain reaction effect, devastating plant and bird life and the local fishing industry

electrolyte: a substance that can conduct electricity when it dissolves in water

electromagnetic spectrum: the set of waves that can travel through empty space at the speed of light

electron: a negatively charged particle that moves around the nucleus of an atom at different energy levels, or orbits

element: a pure substance that cannot be broken down into a simpler substance

emigration: the number of individuals of a species moving out of an existing population

empirical knowledge: knowledge gained through observation or measurement

endangered: a species that is close to extinction

endothermic: a chemical reaction that absorbs heat (energy) from the surroundings

enzyme: a protein that controls the rate of chemical reactions in the body; also known as a biological catalyst

epilimnion: the upper level of a lake, which warms up in summer

eutrophic: a term used to describe a lake that contains more dissolved nutrients than an oligotrophic lake; such lakes are generally shallow and warm, and the water is often murky

exothermic: a chemical reaction that releases heat (energy) to the surroundings

extinct: a species that no longer exists anywhere on Earth

extirpated: a species that no longer exists in one part of its range

eye: the centre of a hurricane; in the eye of a hurricane the winds are fairly calm, the pressure is low, and the sky above is clear

eye wall: the part of a hurricane where the swirling winds and volume of rainfall are the greatest; the eye wall is at the outer edges of the eye

F

fertilizer: a material used to restore nutrients to plants, usually for the purpose of increasing production from farmland and in gardens

flood: extra water from rain, rivers, or oceans over land that is already saturated and cannot hold any more water; there are two types of floods: flash floods and broadside floods

food chain: a step-by-step sequence linking organisms that feed on each other, starting with a food source, such as a producer or detritus, and continuing with a sequence of consumers

food spoilage: natural breakdown of food that occurs over time

food web: a pictorial representation of the feeding relationships among organisms in an ecosystem

fossil fuel: a fuel (coal, oil, gasoline, or natural gas) formed over millions of years as organic materials decayed and were changed by heat and pressure under the surface of the Earth

front: the leading edge of a moving air mass; air masses with different properties don't blend easily, so a boundary, or front, develops as they meet

frontal clouds: clouds that form where the front of a large moving mass of air meets another air mass of a different temperature

G

glucose: a sugar; one of the products of photosynthesis

grassland: a biome dominated by grasses, it is found in Canada at approximately the same latitude as deciduous forests, but in areas where average precipitation is lower; its biodiversity is moderate, precipitation is low to moderate, temperatures are moderate, and soil is thick and very fertile

greenhouse effect: the process by which gases build up energy in the form of warmth in the atmosphere by absorbing long-wavelength (infrared) radiation from Earth's surface; this effect is named after how an actual greenhouse works

greenhouse gases: the gases in the atmosphere that absorb or reflect infrared radiation, for example, water vapour, carbon dioxide, and oxygen

ground water: the water found in the soil or rock layers of the Earth's crust; may flow out on to the surface (as it does at springs) or into bodies of surface water

H

habitat: the conditions required for the survival of a species

hail: a solid form of water created in cumulonimbus clouds high in the troposphere

halogens: elements in the second column from the right of the periodic table; also called Group 17 elements

heat capacity: the measure of how much heat a substance requires to increase its temperature or how much heat it releases as its temperature decreases

heat sink: any object or material that absorbs energy and becomes warmer; the atmosphere and oceans are examples of heat sinks

heat wave: a period of more than three days at or above 32°C

herbivore: an animal that eats plants

heterotroph: an organism that is incapable of making its own food, and so must feed on other organisms to gain energy

humidity: a measure of the amount of water vapour in the atmosphere; the more water vapour in the atmosphere, the more humid it becomes

humus: the organic component of soil, made up mostly of decomposing plants

hurricane: a severe cyclone that occurs in the western Atlantic Ocean, the Caribbean Sea, the Gulf of Mexico, or the eastern Pacific Ocean; if the winds in a cyclonic storm exceed 119 km/h, the storm is officially classified as a hurricane

hydrate: a solid compound that contains water molecules as part of the solid crystalline structure

hydrocarbon: a compound composed of hydrogen and carbon

hydrosphere: all of Earth's water, both fresh and salt, liquid and ice; the hydrosphere makes up around 70% of Earth's surface

hypolimnion: the lower level of a lake, which remains cool even in summer

I

ice storm: a storm in which rain freezes on contact with the surfaces it touches, forming a coat of ice; ice storms generally last for a few hours

immigration: the number of individuals of a species moving into an existing population

incomplete combustion: the chemical reaction that occurs when there is not enough oxygen available for complete combustion; the incomplete

combustion of a hydrocarbon produces carbon monoxide, carbon, carbon dioxide, and water

indicator: a substance that turns a different colour in acids and bases

inhibitor: an antioxidant that slows down chemical reactions; used as a preservative in food

inorganic: compounds that do not contain a combination of carbon and hydrogen atoms; carbon dioxide, water, and ammonia are all inorganic

instantaneous speed: the speed of an object at a particular instant

instantaneous velocity: the change in position over an extremely short period of time; a tangent to the curve on a position-time graph

intertidal zone: the area of the coastal zone of an ocean or sea that is defined by low and high tide

ion: an atom that has become charged by gaining or losing one or more electrons

ionic charge: the numerical value of the electric charge of an ion

ionic compound: a compound consisting of positive and negative ions

J

jet stream: high-speed winds in the upper troposphere, often around the mid-latitudes

L

La Niña: a shift to cooler than average water temperatures and atmospheric conditions in the tropical Pacific Ocean; this effect is opposite to El Niño

land breeze: a thermal, or wind, that forms over water near the shore and flows from the land toward the water

Law of Conservation of Mass: a scientific law that states that the total mass of the reactants in a chemical reaction is always equal to the total mass of the products

law of the minimum: the nutrient in least supply is the one that limits growth

law of tolerance: states that an organism can survive within (tolerate) a certain range of an abiotic factor; above and below this limit it can not

survive; the greater this range of tolerance, the greater the organism's ability to survive

leaching: a process in which nutrients such as organic matter and minerals are dissolved in percolating water and carried into lower layers of soil or bedrock

limnetic zone: the area of the open lake, beyond the littoral zone, where there is enough light for free-floating organisms, such as algae, to carry out photosynthesis

litter: the upper layer of soil, made up mostly of partially decomposed leaves or grasses

littoral zone: the area extending out from the shore of a lake to the point where plants rooted in the bottom of the lake can no longer be found

M

matter: anything that has mass and takes up space

metal oxide: the substance formed when a metal reacts in oxygen; a metal oxide, also called a basic oxide, reacts in water to form a base

meteorologist: a person who works in the field of meteorology

meteorology: the study of the atmosphere and weather forecasting; the science of weather

microclimate: a set of atmospheric conditions near Earth's surface at a particular location, for example, the centre of a forest

molecular compound: a compound formed by the combination of two or more atoms held together with covalent bonds

monsoons: seasonal winds that bring heavy rains in one season and dry air in its other season

mortality: the number of individuals of a species that die in an ecosystem in one year

N

natality: the number of offspring of a species born in an ecosystem in one year

natural ecosystem: an ecosystem that is neither planned nor maintained by humans; an ecosystem in which

organisms are free to interact and change their interactions without human interference

natural product: a product that is obtained from natural sources, such as animals, plants, or minerals

neritic zone: the area of the coastal zone of an ocean or sea where photosynthesis can occur (i.e., to a depth of about 200 m), lying between the low-tide mark and the edge of the continental shelf

neutralization: a chemical reaction between an acid and a base that produces a salt and water

neutron: a neutral particle found in the nucleus of an atom

nitrogen cycle: a matter cycle in which, through the processes of nitrogen fixation, synthesis, decomposition, and denitrification, nitrogen atoms move from nitrogen gas in the atmosphere, to inorganic form in the soil, to organic form in living things, and then back to inorganic form in the soil and nitrogen gas in the atmosphere; organic compounds that contain nitrogen include amino acids (and therefore proteins) and DNA

nitrogen fixation: two processes in which atmospheric or dissolved nitrogen is converted into nitrate ions; part of the nitrogen cycle; both lightning and some soil bacteria can fix nitrogen

noble gases: the elements in the far right column of the periodic table; also known as Group 18 elements

nonmetal oxide: the substance formed when a nonmetal reacts in oxygen; a nonmetal oxide, also called an acidic oxide, reacts in water to form an acid

nutrient: any chemical that is essential to living things; nutrients are cycled through ecosystems and geological processes

O

occluded front: the front that forms when a cold front catches up to and overtakes a warm front; the warm air is lifted above the surface of Earth and cut off, or occluded, from the cooler air below and the storm weakens

oligotrophic: a term used to describe a lake that is deep, cold, and low in dissolved nutrients; the water of such lakes is usually clear

omnivore: an animal that eats both plants and animals

open population: a population in which natality, mortality, immigration, and emigration are all acting

organic: compounds that contain atoms of both carbon and hydrogen; many organic compounds also contain oxygen and nitrogen atoms; sugars, fats, and proteins are all organic

organic compound: a molecular compound that contains carbon

orographic clouds: clouds that form when air moves up a mountain, expands at the lower pressure, and cools

oxyacid: a compound formed when hydrogen combines with a polyatomic ion that contains oxygen

ozone: a gas that consists of three oxygen atoms (O₃); in the upper atmosphere ozone absorbs ultraviolet (UV) radiation, which is harmful to us

ozone hole: an extended area in the upper atmosphere where the ozone concentration is abnormally low

P

peat: slowly decomposing plant matter; created in low-oxygen environments such as bogs; peat may be transformed, through geologic processes, into coal

percolation: the process in which ground water, pulled by gravity, flows downward through the soil

periodic table: a structured arrangement of elements; elements with similar chemical and physical properties are in the same column

permafrost: in the tundra, a layer of soil that remains frozen, even in summer

pest: an organism that people consider harmful or inconvenient in a particular situation, such as weeds and some insects, fungi, and rodents

pesticide: a chemical designed to kill pests; pesticides are often used to protect species that are beneficial to



humans from a competitor or predator that is less useful

pH scale: a numerical scale, ranging from 0 to 14, used to measure how acidic or basic a solution is

photosynthesis: the process by which green plants and some other organisms use sunlight energy, carbon dioxide, and water to produce carbohydrates (sugars) and oxygen

physical change: a change in the size or form of a substance, which does not change the chemical properties of the substance

physical property: a characteristic or description of a substance (including the state of matter at room temperature, hardness, melting and boiling points, odour, solubility, and colour) that can be used to identify it

plankton: a term used to describe small organisms found in lakes and oceans; the term includes heterotrophic plankton (usually invertebrate animals) and autotrophic plankton (such as algae)

plastics: polymers that are shaped by flow at some point in their manufacture

pollutant: a chemical in the air that causes harm to living things or to the environment

polyatomic ion: a group of atoms that tend to stay together and carry an overall ionic charge

polymers: long-chain molecules formed when hundreds of smaller molecules link together

population: all of the members of a species living in the same ecosystem or habitat

position: the straight-line distance and direction from a reference point; a vector quantity

position-time graph: a graph in which position is plotted on the y -axis and time on the x -axis

positive test: a test for a substance that clearly indicates the substance is present

precipitate: a solid formed from two solutions

precipitation: water that reaches the ground in either liquid or solid form, for example, rain, snow, freezing rain,

and dew; it is the stage in the water cycle that follows condensation, freezing, or sublimation

precision: the place value of the last digit obtained from a measurement or calculation; indicated by the number of decimal places

precision rule: "When adding and/or subtracting values, the answer has the same number of decimal places as the original value with the fewest number of decimal places."

pressure gradient: a measure of the amount the atmospheric pressure changes across a certain distance; can be vertical or horizontal

prevailing winds: winds that affect large areas, for example, the trade winds, mid-latitude westerlies, and the jet stream

primary consumer: in a food chain or food web, an organism that relies on autotrophs directly for its source of energy; organisms at the second trophic level

producer: an autotroph; an organism that uses photosynthesis or another form of chemical synthesis to make food

product: the substance produced in a chemical reaction

profundal zone: the region beneath the limnetic zone of a lake, where there is not enough light to carry out photosynthesis

proton: a positively charged particle that is found in the nucleus of an atom

psychrometer: an instrument used to determine the relative humidity in the atmosphere; the most common psychrometer uses a wet-bulb and a dry-bulb thermometer

pure substance: a substance that contains only one kind of particle

Q

quantity symbols: italic letters used to represent quantities in scientific equations, e.g., t , d , v

R

radiation: the transfer of energy by means of waves that do not require a medium

rate of reaction: the speed at which a reaction occurs

reactant: the starting material in a chemical reaction

reference point: the point from which position is measured; usually the origin or starting point

relative humidity: the measure of the amount of water vapour actually in the air as a percentage of the maximum amount of water vapour the air can hold at that temperature

resultant displacement: vector sum of two or more displacements; a single displacement that has the same effect as all of the individual displacements; a vector quantity

rounding: reducing the results of a calculation to the appropriate number of significant digits or decimal places

S

salt: a combination of positive and negative ions; formed by the reaction of an acid and a base

saturation: when a substance reaches saturation, this means that, at a particular temperature, the substance is holding the maximum amount of water vapour (e.g., in air) or a material (e.g., in a solution) possible

scalar quantity: a quantity that involves only size, but not direction

scientific law: a general statement that sums up the conclusions of many experiments

sea breeze: a thermal, or wind, that forms near a sea, an ocean, or a lake and flows from the water toward the land

secondary consumer: in a food chain or food web, an organism that relies on primary consumers for its principal source of energy; organisms at the third trophic level

selective cutting: forest harvesting in which only certain species or sizes of trees are removed from an area for use as timber or to make pulp for paper

SI: *Système international d'unités* or the International System of Units

significant digits: an indication of the certainty of a measurement; the number of certain digits, plus one estimated digit, in a measurement

single displacement reaction: a chemical reaction in which one element displaces, or replaces, another element in a compound

skeleton equation: a representation of a chemical reaction in which the formulas of the reactants are connected to the formulas of the products by an arrow

slope of the line: on a graph, represents the steepness of the line; the relationship between the two variables:
$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

smog: a type of air pollution resulting from emissions from vehicles and industries that burn fossil fuels; greenhouse gases also contribute to smog (from the words “smoke” and “fog”)

stationary front: an unmoving front between a warm air mass and a cold air mass; usually means stable weather until the air masses begin to move

storm surge: a huge volume of water that is piled up by the winds of a severe storm and pushed onto the shore; can cause serious damage and flooding because of the sheer volume of water

stratus clouds: clouds with a flattened, layered shape; usually indicate stable weather

subsoil: a layer of soil, below the topsoil, that usually contains many stones and only small amounts of organic matter

surface area: the amount of area of a sample of matter that is visible and able to react

surface water: water in lakes, ponds, rivers, and streams

sustainable system: a system that survives, functions, and is renewed over time; a system in which people can continue to live and flourish for many generations

sustainable yield: the maximum amount of fish, whether of a species or of all species, that can be harvested in a year from a body of water and that can be replaced through natural processes in the course of that year

synthesis reaction: a chemical reaction in which two or more elements or compounds combine to

form a single compound; also called a combination reaction

synthetic: artificially made materials that have been manufactured in the chemical industry

T

tangent: a straight line that just touches a curve at one point; used to find the slope of a curve on a graph

temperate deciduous forest: a biome dominated by deciduous trees — birch and maple in the north, oak and beech in the south; this biome is limited to the area south of the boreal forest in Eastern and Central Canada; its biodiversity is high, precipitation is moderate, temperatures are moderate, and soil is mostly thick and fertile

temperature gradient: the change of temperature of the atmosphere at different altitudes

temperature inversion: forms when a warm layer of air in a high-pressure system moves in and pushes down on cooler air; when this happens at the lower altitudes, the cooler air mass is trapped near the ground, and it cannot rise as it becomes heated, thereby keeping the air near the ground humid and often polluted

theoretical knowledge: knowledge that we cannot observe, but that explains the world around us

thermal: a rising current of warm air, caused by convection; a wind

thermocline: a narrow zone in a lake between the epilimnion and the hypolimnion in which the temperature drops rapidly from warm to cold

thermodynamics: the scientific study of energy transformations, described by laws; the first law states that although energy can be transformed from one form to another, it cannot be created or destroyed; the second law states that during any energy transformation, some of the energy is converted into a form, mostly heat, that cannot be used (i.e., each time energy is transformed in a system, some of that energy is lost from the system)

threatened: a species that is likely to become endangered if factors that make it vulnerable are not reversed

thunderstorm: a storm with lightning, thunder, heavy rain, and sometimes hail

time: duration between two events (SI unit: second)

titration: a method used to analyze a solution by measuring the amount of a solution needed to completely react with another solution; in acid-base reactions, an acid is added to a base until neutralization is complete

topsoil: a layer of soil, below the litter, made up of small particles of rock, usually mixed with relatively large amounts of decaying plant and animal matter

tornado: a severe component of a thunderstorm in which a rotating funnel cloud extends from the base of the cumulonimbus clouds to the ground

trophic level: a way of categorizing living things according to how they gain their energy; the first trophic level contains autotrophs, and each higher level contains heterotrophs

tropical cyclone: a severe cyclone that develops in the Indian Ocean and the area around Australia; typhoons and tropical cyclones can be more severe than hurricanes because they are fuelled by the warm waters of the huge Pacific and Indian oceans

tropopause: the layer in the atmosphere where the troposphere ends and before the stratosphere begins

troposphere: the atmospheric layer closest to Earth’s surface, up to an altitude of about 12 km, but less near the poles; responsible for most of our weather systems

tundra: the huge treeless region, between the northern limits of Canada’s tree line and the permanently ice-covered area in the Arctic; it is dominated by lichens and small plants such as moss, sedge, and short grasses; its biodiversity and average precipitation and temperatures are all low, and its soil is thin and low in fertility

typhoon: a severe cyclone that develops in the northwestern Pacific Ocean or the China Sea

U

universal indicator: a substance that turns different colours in solutions with different pH values

uniform motion: constant speed or constant velocity

UV index: a scale that reveals how much time in the Sun on a specific day would cause sunburn

V

valence: the combining capacity of an element

valence shell: the outer electron shell of an atom; the electrons in this shell are called valence electrons

vector: a line segment representing the size and direction of a vector quantity

vector diagram: a combination of several vectors, usually added "head-to-tail," to show the resultant vector, such as the resultant displacement

vector quantity: a quantity that includes a direction, such as position

velocity: speed in a stated direction; displacement divided by time interval; a vector quantity

velocity-time graph: a graph in which velocity is plotted on the *y*-axis and time on the *x*-axis

vulnerable: a species that is not in imminent danger of extinction, but that is at risk because of low or declining numbers at the fringe of its range, or in some restricted area

W

warm front: the leading edge of a warm air mass

warning: an alert from Environment Canada that means that extreme weather may be occurring or that it is highly likely to arrive somewhere in your area; this is the most serious weather alert

watch: an alert from Environment Canada that means that extreme weather could occur in your area

water pollution: any change, whether physical or chemical, that is introduced to surface water or ground water

water table: the boundary, found either in the soil or in bedrock, between the area where ground water is percolating down and a layer that is saturated with water

weather: the conditions outside considered from day to day; compare with climate

weather balloon: a helium-filled balloon used to gather weather-related data as it rises in the atmosphere; different types of weather balloons gather different data

weather dynamics: the study of how the motion of water and air causes weather patterns; air pressure and ocean currents are two examples of weather dynamics

weather satellite: a spacecraft that orbits Earth, regularly obtaining images and gathering data related to weather; information gathered by weather satellites is relayed to weather stations on the ground

weather system: a set of temperature, wind, pressure, and moisture conditions, for a certain region, that moves as a unit for a period of days

wind chill factor: a measure of the cooling effect of wind on a body; the effect of wind in the winter can be dangerous

word equation: a representation of a chemical reaction