A

abiotic components the non-living components of the biosphere; includes chemical and physical factors
abiotic factor a non-living factor that influences an organism
accommodation adjustments made by the lens and pupil of the eye for near and distant objects
acetylcholine neurotransmitter released from vesicles in the end plates of neurons, which makes the postsynaptic membranes more permeable to Na⁺ ions
acrosome the cap found on sperm cells, containing enzymes that permit the sperm cell to move through the outer layers that surround the egg
action potential the voltage difference across a nerve cell membrane when the nerve is excited
active transport movement of substances across cell membranes against a concentration gradient which uses energy
active site the area of an enzyme that combines with the substrate
ADP a molecule containing two high-energy phosphate bonds that may be formed by breaking one of the phosphate bonds in ATP; abbreviation of adenosine diphosphate
adrenal cortex outer region of the adrenal gland that produces glucocorticoids and mineralocorticoids
adrenal medulla found at the core of the adrenal gland, produces epinephrine and norepinephrine
adrenocorticotropic hormone (ACTH) pituitary hormone that promotes cortisol release by the adrenal cortex; also called corticotropin
aerobic cellular respiration the set of reactions that takes place in the cell in the presence of oxygen and releases energy stored in glucose
analogue features features that are similar in appearance and function, but do not appear to have the same evolutionary origin
analyze make an examination of parts to determine the nature, proportion, function, interrelationship, etc. of the whole
anaerobic cellular respiration the set of reactions that takes place in the cell in the absence of oxygen and releases energy stored in glucose
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anemia the reduction in blood oxygen due to low levels of hemoglobin or poor red blood cell production
aneurysm a bulge in the weakened wall of a blood vessel, usually an artery
antagonistic muscles a pair of skeletal muscles that are arranged in pairs and that work against each other to make a joint move
antibody a protein formed within the blood that reacts with an antigen
antigens the surface components of a cell that are recognized by immune system proteins
antigen a substance, usually protein, that stimulates the formation of an antibody
antiparallel parallel but running in opposite directions; the 5’ end of one strand of DNA aligns with the 3’ end of the other strand in a double helix
aorta the largest artery in the body; carries oxygenated blood to the tissues
aqueous humour  watery liquid that protects the lens of
the eye and supplies the cornea with nutrients
Archaebacteria  in a six-kingdom system, a kingdom
consisting of prokaryotic microorganisms distinct from
cubacteria that possess a cell wall not containing
peptidoglycan and that live in harsh environments such as
salt lakes and thermal vents
arteriosclerosis  a group of disorders that cause the blood
vessels to thicken, harden, and lose their elasticity
artery  a blood vessel that carries blood away from the heart
artificial ecosystem  an ecosystem that is planned or
maintained by humans
artificial selection  the process of humans selecting and
breeding individuals with the desired traits
asexual reproduction  the production of offspring from a
single parent; offspring inherit the genes of that parent only
astigmatism  vision defect caused by abnormal curvature of
surface of the lens or cornea
atherosclerosis  a degeneration of blood vessels caused by
the accumulation of fat deposits in the inner wall
ATP  a molecule containing three high-energy phosphate
bonds that acts as the primary energy-transferring
molecule in living organisms; abbreviation of adenosine
triphosphate
ATP synthase complex  a specialized protein complex
embedded in the thylakoid membrane that allows H+ ions
to escape from the lumen and uses the resulting energy to
generate ATP
atrioventricular (AV) node  a small mass of tissue in the
right atrioventricular region through which impulses from
the sinoatrial node are passed to the ventricles
atrioventricular (AV) valve  a heart valve that prevents the
backflow of blood from a ventricle into an atrium
atrium (plural atria)  a thin-walled chamber of the heart that
receives blood from veins
auditory canal  carries sound waves to the eardrum
autonomic nervous system  the part of the nervous
system that controls the motor nerves that regulate
equilibrium, and that is not under conscious control
autosome  a chromosome not involved in sex determination
autotroph  an organism that uses the Sun’s energy and raw
materials to make its own food; a producer
axon  extension of cytoplasm that carries nerve impulses
away from the cell body

B

B cell  a lymphocyte, made and processed in the bone
marrow, that produces antibodies
bacteriophage  a virus that infects bacteria

Barr body  a small, dark spot of chromatin located in the
nucleus of a female mammalian cell
basilar membrane  anchors the receptor hair cells in the
organ of Corti
bedrock  the layer beneath the soil, composed of rock
beneficial mutation  a mutation that enhances an
organism’s fitness
bile salt  a component of bile that breaks down large fat
globules
binomial nomenclature  a method of naming organisms by
using two names—the genus name and the species name;
scientific names are italicized
biodiversity  the number of species in an ecosystem
biogeography  the study of the geographic distribution of
life on Earth
biological oxygen demand (BOD)  the amount of
dissolved oxygen needed by decomposers to completely
break down the organic matter in a water sample at 20 °C
over five days
biomass  the total dry mass of all the living material in an
ecosystem
biome  a large geographical region with a specific range of
temperatures and precipitation, and the organisms that are
adapted to those conditions of temperature and
precipitation
biosphere  the narrow zone around Earth that harbours life
biotic components  the biological or living components of
the biosphere
biotic factor  a living factor that influences an organism
biotic potential  the maximum number of offspring that a
species could produce with unlimited resources
blastocyst  an early stage of embryo development
blunt ends  fragment ends of a DNA molecule that are fully
base paired, resulting from cleavage by a restriction enzyme
bottleneck effect  a dramatic, often temporary, reduction in
population size, usually resulting in significant genetic drift
Bowman’s capsule  the cuplike structure that surrounds
the glomerulus
breathing  the process of the exchange of air between the
lungs and the environment, including inspiration and
expiration
bronchi  the passages from the trachea to the left and right
lung
bronchial asthma  a respiratory disorder characterized by
reversible narrowing of the bronchial passages
bronchiole  the smallest passageways of the respiratory tract
bronchitis  an inflammation of the bronchial tubes
**buffer** a substance capable of neutralizing acids and bases, thus maintaining the original pH of the solution

**calcitonin** hormone produced by the thyroid gland that lowers calcium levels in the blood

**Calvin cycle** a cyclic set of reactions occurring in the stroma of chloroplasts that fixes the carbon of CO₂ into carbohydrate molecules and recycles coenzymes

**canopy** the upper layer of vegetation in a forest

**capillary** a blood vessel that connects arteries and veins; the site of fluid and gas exchange

**carbohydrate** a molecule composed of sugar subunits that contains carbon, hydrogen, and oxygen in a 1:2:1 ratio

**carbon cycle** the cycle of matter in which carbon atoms move from an inorganic form to an organic form and then back to an inorganic form

**carbon fixation** the process of incorporating CO₂ into carbohydrate molecules

**carbonic anhydrase** an enzyme found in red blood cells that speeds the conversion of carbon dioxide and water to carbonic acid

**cardiac muscle** the involuntary muscle of the heart

**cardiac output** the amount of blood pumped from the heart each minute

**carnivore** an animal that feeds only on other animals

**carrying capacity** the maximum number of individuals of a species that can be supported by an ecosystem

**catalyst** a chemical that regulates the rate of chemical reactions without being altered itself

**cataract** condition that occurs when the lens or cornea becomes opaque, preventing light from passing through

**cell cycle** the sequence of stages through which a cell passes from one cell division to the next

**cellular respiration** the process by which cells break down glucose into carbon dioxide and water, releasing energy

**cellulose** a plant polysaccharide that makes up plant cell walls

**central nervous system (CNS)** the body’s coordinating centre for mechanical and chemical actions; made up of the brain and spinal cord

**centriole** small protein body found in the cytoplasm of animal cells that provide attachment for spindle fibres during cell division

**centromere** the structure that holds chromatids together

**cerebellum** part of the hindbrain that controls limb movements, balance, and muscle tone

**cerebral cortex** outer layer of the cerebral hemispheres

**cerebrospinal fluid** cushioning fluid that circulates between the innermost and middle membranes of the brain and spinal cord; it provides a connection between neural and endocrine systems

**cerebrum** largest and most highly developed part of the human brain, which stores sensory information and initiates voluntary motor activities

**cervix** a muscular band that separates the vagina from the uterus

**chemiosmosis** a process for synthesizing ATP using the energy of an electrochemical gradient and the ATP synthase enzyme

**chemoautotroph** an organism that can synthesize organic compounds from inorganic chemicals without using solar energy

**chemoreceptor** a specialized nerve receptor that is sensitive to specific chemicals

**chemosynthesis** the process by which non-photosynthetic organisms convert inorganic chemicals to organic compounds without solar energy

**chlorophyll** the light-absorbing green-coloured pigment that begins the process of photosynthesis

**chloroplast** a membrane-bound organelle in green plant and algal cells that carries out photosynthesis

**cholecystokinin** a hormone secreted by the small intestine that stimulates the release of bile salts

**cholinesterase** enzyme, which breaks down acetylcholine, that is released from presynaptic membranes in the end plates of neurons shortly after acetylcholine

**chorion** the outer extraembryonic structure of a developing embryo that will contribute to the placenta

**chorionic villi** vascular projections of the chorion

**choroid layer** middle layer of tissue in the eye that contains blood vessels that nourish the retina

**chromatin** the complex of DNA and protein that make up chromosomes

**cilia** tiny hairlike structures found on some cells that sweep away foreign debris

**cirrhosis** chronic inflammation of the liver tissue characterized by the growth of nonfunctioning fibrous tissue

**clear-cutting** the removal of all trees in an area

**cleavage** cell division of a zygote, in which the number of cells increases without any change in the size of the zygote

**climax community** the final, relatively stable community reached during successional stages

**closed population** a population in which change in size and density is determined by births and deaths alone
clumped dispersion the pattern in which individuals in a population are more concentrated in certain parts of a habitat
coaagulation the process that occurs when the bonds of a protein molecule are disrupted, causing a permanent change in shape
cochlea coiled structure of the inner ear that responds to various sound waves and converts them into nerve impulses
codominance the expression of both forms of an allele in a heterozygous individual in different cells of the same organism
codon sequence of three bases in DNA or complementary mRNA that serves as a code for a particular amino acid
coenzyme an organic molecule synthesized from a vitamin that helps an enzyme to combine with a substrate molecule
cofactor an inorganic ion that helps an enzyme combine with a substrate molecule
coliform bacteria a type of bacteria that occurs naturally in the intestines of humans and other animals, and indicates the presence of fecal contamination in water
collecting duct a tube that carries urine from nephrons to the renal pelvis
colon the largest segment of the large intestine, where water reabsorption occurs
combustion the chemical reaction that occurs when a substance reacts very quickly with oxygen to release energy
commensalism a symbiotic relationship in which one organism benefits and the other organism is unaffected; it is categorized as a +/0 relationship
community all the organisms of various species that share a habitat or ecosystem
compare examine the character or qualities of two things by providing characteristics of both that point out their mutual similarities and differences
competitive exclusion the concept that, if resources are limited, no two species can remain in competition for exactly the same niche indefinitely; also know as Gause's Principle
competitive inhibitor a molecule with a shape complementary to a specific enzyme that competes with the substrate for access to the active site of the enzyme and blocks chemical reactions
complement protein a plasma protein that helps defend against invading microbes by tagging the microbe for phagocytosis, puncturing cell membranes, or triggering the formation of a mucus coating
complementary base pairing pairing of the nitrogenous base of one strand of DNA with the nitrogenous base of another strand

conclude state a logical end based on reasoning and/or evidence
cones photoreceptors that operate in bright light to identify colour
consumer a heterotroph; an organism that must eat producers or other consumers to survive
continuity of life a succession of offspring that share structural similarities with those of their parents
contrast point out the differences between two things that have similar or comparable natures
cornea transparent part of the sclera that protects the eye and refracts light toward the pupil of the eye
coronary artery an artery that supplies the cardiac muscle with oxygen and nutrients
corpus callosum nerve tract that joins the two cerebral hemispheres
corpus luteum a mass of follicle cells that forms within the ovary after ovulation; secretes estrogen and progesterone
cortex the outer layer of the kidney
cortisol hormone that stimulates the conversion of amino acids to glucose by the liver
Cowper's (bulbourethral) gland structure that contributes a mucus rich fluid to the seminal fluid (semen)
creatine phosphate a compound in muscle cells that releases a phosphate to ADP and helps regenerate ATP supplies in muscle cells
criticize point out the merits and demerits of an item or issue
crossing over the exchange of genetic material between two homologous chromosomes
cytokinesis the division of cytoplasm

deamination removal of an amino group from an organic compound
decomposer an organism that feeds on detritus
define provide the essential qualities or meaning of a word or a concept; make distinct and clear by marking out the limit
dehydration synthesis the process by which larger molecules are formed by the removal of water from two smaller molecules
deletion the elimination of a base pair or group of base pairs from a DNA sequence
ΔN a variable describing the change in the number of individuals in a population
denaturation the process that occurs when the bonds of a protein molecule are disrupted, causing a temporary change in shape
**dendrite** projection of cytoplasm that carries impulses toward the cell body

**denitrification** the process in which nitrates are converted to nitrites and then to nitrogen gas

**density-dependent factor** a factor in an ecosystem that affects members of a population because of the population density

**density-independent factor** a factor in an ecosystem that affects members of a population regardless of population density

**deoxyribose sugar** a sugar molecule containing five carbons that has lost the –OH (hydroxyl group) on its 2′ position

**depolarization** diffusion of sodium ions into the nerve cell resulting in a charge reversal

**describe** give a written account or represent the characteristics of something by a figure, model, or picture

**design** construct a plan, i.e., a detailed sequence of actions, for a specific purpose

**determine** find a solution, to a specific degree of accuracy, to a problem by showing appropriate formulas, procedures, and calculations

**detoxify** remove the effects of a poison

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

**diabetes** chronic disease in which the body cannot produce any insulin or enough insulin, or is unable to use properly the insulin it does make

**diaphragm** a sheet of muscle that separates the organs of the thoracic cavity from those of the abdominal cavity

**diastole** relaxation (dilation) of the heart, during which the atria fill with blood

**dichotomous key** a two-part key used to identify living things; *di* means “two”

**dihybrid cross** a genetic cross involving two genes, each of which has more than one allele

**diploid** refers to twice the number of chromosomes in a gamete

**disaccharide** a sugar formed by the joining of two monosaccharide subunits

**distal tubule** conducts urine from the loop of Henle to the collecting duct

**distinguish** point out the differences between two things that have similar or comparable natures

**divergent evolution** evolution into many different species

**DNA** the molecule that makes up genetic material; abbreviation of deoxyribonucleic acid

**DNA helicase** the enzyme that unwinds double-helical DNA by disrupting hydrogen bonds

**DNA ligase** an enzyme that joins DNA fragments together

**DNA polymerase I** an enzyme that removes RNA primers and replaces them with the appropriate nucleotides during DNA replication

**DNA polymerase III** the enzyme that synthesizes complementary strands of DNA during DNA replication

**DNA replication** the process whereby DNA makes exact copies of itself

**dominant trait** a characteristic that is expressed when one or both alleles in an individual are the dominant form

**doubling time** (*td*) the time needed for a population that is growing exponentially to double

**duodenum** the first segment of the small intestine

**dynamic equilibrium** describes any system with constant change in which the components can adjust to the changes without disturbing the entire system

**E**

**Ecological density** population density measured in terms of the number of individuals of the same species per unit area or volume actually used by the individuals

**Ecological niche** an organism’s role in an ecosystem, consisting of its place in the food web, its habitat, its breeding area, and the time of day at which it is most active

**Ecological pyramid** a representation of energy flow in food chains and webs

**Ecology** the study of interactions between organisms and their living and non-living environment

**Ecotone** a transition area between ecosystems

**Ectoderm** the outer layer of cells in an embryo

**Effector** a cell or organ that produces a physiological response when stimulated by a nerve impulse

**Efferent arteriole** a small branch of the renal artery that carries blood away from the glomerulus to the peritubular capillaries

**Electron transport chain** a series of progressively stronger electron acceptors; each time an electron is transferred, energy is released

**Embolus** a blood clot that dislodges and is carried by the circulatory system to another part of the body

**Emphysema** a respiratory disorder characterized by an overinflation of the alveoli

**Endemic** a term used to describe a species that is found in one location only
endocrine hormones  chemicals secreted by endocrine glands directly into the blood
endoderm  the inner layer of cells in an embryo
endometrium  the glandular inner lining of the uterus
enterogastrone  a hormone secreted by the small intestine that decreases gastric secretions and motility
enterokinase  an enzyme of the small intestine that converts trypsinogen to trypsin
enucleated  the condition where a cell does not contain a nucleus
environmental resistance  any factor that limits a population's ability to realize its biotic potential when it ... to exceed the environment's carrying capacity
enzyme  a protein catalyst that permits chemical reactions to proceed at low temperatures
epididymis  structure located along the posterior border of the testis, consisting of coiled tubules that store sperm cells
epiglottis  the structure that covers the glottis (opening of the trachea) during swallowing
epilimnion  the upper level of a lake, which warms up in summer
epinephrine (adrenaline)  hormone, produced in the adrenal medulla that accelerates heart rate and body reactions during a crisis (the fight-or-flight response)
erepsin  an enzyme that completes protein digestion by converting short-chain peptides to amino acids
erythrocyte  a red blood cell that contains hemoglobin and carries oxygen
essential amino acid  an amino acid that must be obtained from the diet
estrogen  hormone that activates development of female secondary sex characteristics, and increased thickening of the endometrium during the menstrual cycle
Eubacteria  in a six-kingdom system, a kingdom consisting of prokaryotic microorganisms that possess a peptidoglycan cell wall
eustachian tube  air-filled tube of the middle ear that equalizes pressure between the external and internal ear
eutrophic  having high nutrient levels
evaluate  give the significance or worth of something by identifying the good and bad points or the advantages and disadvantages
explain  make clear what is not immediately obvious or entirely known; give the cause of or reason for; make known in detail
exploitative competition  interspecific competition that involves consumption of shared resources by individuals of different species, where consumption by one species may limit resource availability to other species
exponential growth  a pattern of population growth in which the population size increases by a fixed rate per a fixed unit of time
extensor  the muscle that must contract to straighten a joint
extracellular fluid (ECF)  fluid that occupies the spaces between cells and tissues; includes plasma and interstitial fluid
extraembryonic coelom  body cavity between the amnion and the chorion
facilitated diffusion  transport of substances across cell membrane down a concentration gradient by a carrier in the membrane; does not use energy
FAD+  an electron carrier, accepts electrons in cellular processes; abbreviated form of flavin adenine dinucleotide
FADH2  an electron carrier, donates electrons in cellular processes; reduced form of FAD+
Fallopian tube (oviduct)  one of two tubes that connect the ovaries to the uterus
farsightedness  condition that occurs when the image is focused behind the retina
fat  a lipid composed of glycerol and saturated fatty acids; solid at room temperature
feedback inhibition  the inhibition of an enzyme in a metabolic pathway by the final product of that pathway
fertilization  fusion of a male and a female sex cell
fertilizer  a material used to restore nutrients to plants
fetus  the later stages of an unborn offspring's development
fibrium (plural fibria)  a fingerlike projection at the end of a Fallopian tube
filtration  the selective movement of materials through capillary walls by a pressure gradient
first trimester  the period during pregnancy from conception until the end of the third month
fitness  an organism's reproductive success
fixed frequency  the frequency of an allele within a population when only a single allele is present for a particular gene (i.e., the allele's frequency is 100 %)
flexor  the muscle that must contract to bend a joint
follicle  structure in the ovary that contains the oocyte
follicle-stimulating hormone (FSH)  a gonadotropin hormone that in females, promotes the development of the follicles in the ovary; in males, it increases sperm production
follicular phase  phase marked by development of ovarian follicles before ovulation
food chain a sequence linking organisms that feed on each other, starting with a food source and continuing in order with each consumer

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

founder effect genetic drift that results when a small number of individuals separate from their original population and find a new population

fovea centralis area at center of retina where cones are most dense and vision is sharpest

frameshift mutation a mutation that causes the reading frame of codons to change

g

gallstone crystals of bile salts that form in the gallbladder

gametogenesis the formation of gametes (sex cells) in animals

ganglion (plural ganglia) collections of nerve cell bodies located outside the central nervous system

gastrin a hormone secreted by the stomach that stimulates the release of HCl

gastrula stage of embryonic development in which the embryo is composed of three layers: ectoderm, mesoderm, and endoderm

gastrulation process by which a gastrula is formed

gated ion channel a pore in the cell membrane that allows ions to move in and out of the cell by opening and closing

gene a segment of DNA that performs a specific function, such as coding for a particular protein

gene expression conversion of a gene into a specific trait through the production of a particular polypeptide

gene flow the movement of alleles from one population to another through the movement of individuals or gametes

gene mutation a mutation that changes the coding for amino acids

gene pool all the genes in a certain population

genetic drift changes to allele frequency as a result of chance

genetic transformation introduction and expression of foreign DNA in a living organism

Genotype the genetic complement of an organism

genotypic ratio the ratio of offspring with each possible allele combination from a particular cross

genus the first part of a binomial name; a genus includes several species

Glaucous disease of the eye in which increased pressure within the eyeball causes a gradual loss of sight

Glia cell nonconducting cell important for structural support and metabolism of the nerve cells

Glomerulus the high-pressure capillary bed that is the site of filtration

Glucagon hormone produced by the pancreas; when blood sugar levels are low, glucagon promotes conversion of glycogen to glucose

Glucocorticoid any of the steroids produced by the adrenal cortex that help to regulate electrolyte and water balance

Glycogen a plant carbohydrate used to store energy

Glycolysis a process for harnessing energy in which a glucose molecule is broken into two pyruvate molecules in the cytoplasm of a cell

Goiter disorder that causes an enlargement of the thyroid gland

Gonadotropic hormones (gonadotropins) hormones produced by the pituitary gland that regulate the functions of the testes in males and the ovaries in females

Gonadotropin-releasing hormone (GnRH) chemical messenger from the hypothalamus that stimulates secretions of FSH and LH from the pituitary

Grana (singular granum) stacks of thylakoids

Granulosa the layer of small cells that forms the wall of a follicle

Graphically using a drawing that is produced electronically or by hand, and that shows a relationship between certain sets of numbers

Groundwater water in the soil or rock below Earth’s surface

Growth rate \( (\text{gr}) \) the change in population size per unit of time

H

Habitat a place or type of environment with conditions suitable for the survival of an organism or population of organisms

Haploid refers to the number of chromosomes in a gamete

Harmful mutation a mutation that reduces an organism’s fitness

Helper T cell a T cell with receptors that bind to fragments of antigens

Hemoglobin the oxygen-carrying molecule in red blood cells

Herbivore an animal that eats only plants

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

Heterozygous having different alleles for the same gene

Homeostasis the process by which a constant internal environment is maintained despite changes in the environment
**homologous chromosomes** paired chromosomes similar in shape, size, gene arrangement, and gene information

**homologous features** features with similar structures but different functions

**homozygous** having identical alleles for the same gene

**hormones** chemicals released by cells that affect cells in other parts of the body

**how** show in what manner or way, with what meaning

**human chorionic gonadotrophic hormone (HCG)** an embryonic hormone that maintains the corpus luteum

**human growth hormone (hGH)** hormone produced by the pituitary gland that stimulates growth of the body; also known as somatotropin (STH)

**humus** decaying plant and animal matter

**hydrogen bond** the type of bond that is formed between the positive end of one water molecule and the negative end of another water molecule

**hydrological cycle (water cycle)** the movement of water through the environment from the atmosphere to Earth and back

**hydrolysis** the process by which larger molecules are split into smaller molecules by the addition of water

**hyperpolarization** condition in which the inside of the nerve cell membrane has a greater negative charge than the resting membrane; caused by excessive diffusion of potassium ions out of the cell

**hypolimnion** the lower level of a lake, which remains at a low temperature year round

**hypothalamus** area of the brain that coordinates many nerve and hormone functions

**hypothesize** from a tentative position intended as a possible explanation for an observed phenomenon; i.e., a possible cause for a special effect; the proposition should be testable logically and/or empirically

**identify** recognize and select as having the characteristics of something

**illustrate** make clear by giving an example; the form of the example must be specified in the question; i.e., word description, sketch, or diagram

**immigration** the number of individuals that move into an existing population per unit of time

**implantation** the attachment of the embryo to the endometrium

**inbreeding** the process whereby breeding stock is drawn from a limited number of individuals possessing desirable phenotypes

**incomplete dominance** the expression of both forms of an allele in a heterozygous individual in the cells of an organism, producing an intermediate phenotype

**indicator species** a species sensitive to small changes in environmental conditions

**induced mutation** a mutation caused by a chemical agent or radiation

**infer** form a generalization from sample data; arrive at a conclusion by reasoning from evidence

**inflammatory response** localized nonspecific response triggered when tissue cells are injured by bacteria or physical injury, characterized by swelling, heat, redness, and pain

**inheritance of acquired characteristics** the false concept of inheritance of features acquired during the life of an individual

**inhibit** a hormone produced by the Sertoli cells that inhibits production of FSH

**inhibiting factor** chemical that inhibits production of a hormone by the anterior pituitary gland

**insertion** the placement of an extra nucleotide in a DNA sequence

**insulin** hormone produced by the islets of Langerhans in the pancreas; insulin is secreted when blood sugar levels are high

**intercostal muscle** a muscle that raises and lowers the rib cage

**interference competition** interspecific competition that involves aggression between individuals of different species who fight over the same resource(s)

**intermembrane space** the fluid-filled space between the inner and outer mitochondrial membranes

**interneuron** a neuron of the central nervous system that connects with sensory, motor, and other interneurons to integrate sensory input with motor output; also known as association neuron

**interphase** the time interval between nuclear divisions when a cell increases in mass, roughly doubles the cytoplasmic components, and duplicates its chromosomes

**interpret** tell the meaning of something; present information in a new form that adds meaning to the original data

**interspecific competition** competition between individuals of different species

**interstitial fluid** the fluid that surrounds the body cells

**intraspecific competition** an ecological interaction in which individuals of the same species compete for resources in their habitat

**inversion** the reversal of a segment of DNA within a chromosome
iris opaque disk of tissue surrounding the pupil that regulates amount of light entering the eye

islets of Langerhans hormone producing cells of the pancreas; these cells are part of the endocrine system

isomer one of a group of chemicals that have the same chemical formula but different arrangements of the atoms

isotope one of two or more atoms of the same element containing the same number of protons but a different number of neutrons

jaundice the yellowish discoloration of the skin and other tissues brought about by the collection of bile pigments in the blood

juxtaglomerular apparatus (JGA) a functional unit near a kidney glomerulus that controls renin release in response to changes in blood pressure

justification show reasons for or give facts that support a position

K

K a variable indicating the number of individuals in a population at the carrying capacity of an environment

K-selected organism an organism that is adapted to survive at or near the carrying capacity of its environment

karyotype chart a picture of chromosomes arranged in homologous pairs

killer T cell a T cell that destroys microbes, body cells infected with viruses, and mutated cells by puncturing cell membranes

Krebs cycle a cyclic series of reactions that transfers energy from organic molecules to ATP, NADH, and FADH₂, and removes carbon atoms as CO₂

lacteal a small vessel that transports the products of fat digestion to the circulatory system

lactic acid fermentation a form of fermentation occurring in animal cells in which NADH transfers its hydrogen atoms to pyruvate, regenerating NAD⁺ and lactic acid

lactic acid threshold the value of exercise intensity at which lactic acid production increases

lag phase the initial stage in which population growth rates are slow as a result of a small population size; characteristic of geometric, exponential, and logistic population growth

lagging strand the new strand of DNA that is synthesized away from the replication fork and in short fragments, which are later joined together

lamellae (singular lamella) groups of unstacked thylakoids between grana

larynx the voice box

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

law of tolerance states that an organism can survive within a particular range of an abiotic factor

leaching the removal of soluble minerals by percolation

leading strand the new strand of DNA that is synthesized towards the replication fork and continuously during DNA replication

leukocyte a white blood cell

light-dependent reactions the first set of reactions of photosynthesis in which light energy excites electrons in chlorophyll molecules, powers chemiosmotic ATP synthesis, and results in the reduction of NADP⁺ to NADPH

light-independent reactions The second set of reactions in photosynthesis (the Calvin cycle); these reactions do not require solar energy

limnetic zone the area of a lake or pond in which there is open water and sufficient light for photosynthesis to occur

LINEs repeated DNA sequences 5000 to 7000 base pairs long that alternate with lengths of DNA sequences found in the genomes of higher organisms

linkage group a group of linked genes on a chromosome

linked genes genes that are located on the same chromosome

lipase a lipid-digesting enzyme

litter the upper layer of soil, composed mainly of partially decomposed leaves or grasses

littoral zone the area from the shore of a lake or pond to the point where no more plants grow in the lake bottom

locus (plural loci) a specific location along a chromosome where a particular gene is found

log phase the stage in which population growth rates are very rapid; characteristic of exponential and logistic growth

logistic growth a model of population growth describing growth that levels off as the size of the population approaches its carrying capacity

loop of Henle the section of the tubule that carries filtrate from the proximal tubule to the distal tubule

luteal phase phase of the menstrual cycle characterized by the formation of the corpus luteum following ovulation

luteinizing hormone (LH) a gonadotropin, in females, promotes ovulation and the formation of the corpus luteum; in males, it regulates the production of testosterone

lymph the fluid found in lymph vessels that contains some proteins that have leaked through capillary walls

lymph node a mass of tissue that stores lymphocytes and removes bacteria and foreign particles from the lymph nodes
lymphocyte a white blood cell that produces antibodies  
lymphokine a protein produced by the T cells that acts as a chemical messenger between other T cells and B cells

M

macrophage a phagocytic white blood cells found in lymph nodes, bone marrow, and the spleen and liver  
marker gene a gene that confers an easily identifiable phenotype and is used to trace the inheritance of other genes that are difficult to identify; the marker gene must be located on the same chromosome, and ideally, at a very small distance from the gene being followed  
maximum oxygen consumption (VO₂ max) the maximum volume of oxygen, in millilitres, that the cells of the body can remove from the bloodstream in one minute per kilogram of body mass while the body experiences maximal exertion  
medulla oblongata region of the hindbrain that joins the spinal cord to the cerebellum; one of the most important sites of autonomic nerve control  
medulla the area inside of the cortex  
meiosis two-stage cell division in which the chromosome number of the parental cell is reduced by half  
memory B cell a B cell that retains information about the shape of an antigen  
meninges protective membranes that surround the brain and spinal cord  
menopause the termination of the female reproductive years  
menstrual cycle an almost-monthly cycle in which the endometrial lining of the uterus prepares for pregnancy; if pregnancy does not occur the lining is shed at menstruation  
menstruation (flow phase) the shedding of the endometrium during the menstrual cycle  
mesoderm the middle layer of cells in an embryo  
messenger RNA (mRNA) the product of transcription of a gene; mRNA is translated by ribosomes into protein  
methylase an enzyme that adds a methyl group to one of the nucleotides found in a restriction endonuclease recognition site  
microvilli microscopic, fingerlike projections of the cell membrane  
microlarocorticoid any of the steroids produced by the adrenal cortex that regulate carbohydrate, lipid, and protein metabolism and inhibit the release of corticotrophin  
minimum viable population size the smallest number of individuals needed for a population to continue for a given period of time  

missense mutation a mutation that results in the single substitution of one amino acid in the resulting polypeptide  
mitochondrial matrix the fluid that fills the interior space of the mitochondrion  
mitochondrion a eukaryotic cell organelle in which aerobic cellular respiration occurs  
mitosis a type of cell division in which a daughter cell receives the same number of chromosomes as the parent cell  
Monera in a five-kingdom system, a kingdom that includes organisms that lack a true nucleus  
monoculture cultivation of a single species  
monosaccharide a single sugar unit  
monosomy the condition in which there is a single chromosome in place of a homologous pair  
mortality the number of deaths per unit of time  
motor neuron neuron that carries impulses from the central nervous system to an effector; also known as efferent neuron  
mucus a protective lubricating substance composed mostly of protein  
multiple-cloning site a region in a vector that is engineered to contain the recognition site of a number of restriction enzymes  
muskeg soil above the permafrost that is swampy or boggy in summer  
mutagenic agent an agent that can cause a mutation  
mutant any allele of a gene other than the wild type allele  
mutation a change in the DNA sequence in a chromosome  
mutualism a symbiotic relationship in which both organisms benefit; as neither is harmed, it is categorized as a +/+ relationship  
myelin sheath insulated covering over the axon of a nerve cell  
myofilament a thread of contractile proteins found within muscle fibres  
myogenic muscle muscle that contracts without external nerve stimulation  

N

N a variable describing the number of individuals in a population  
NAD⁺ an electron carrier, accepts electrons in cellular processes; abbreviation of nicotinamide adenine dinucleotide  
NADH an electron carrier, donates electrons in cellular processes; reduced form of NAD⁺
NADP+ a compound that accepts one hydrogen atom and two electrons, forming NADPH; is an electron acceptor; abbreviation of nicotinamide adenine dinucleotide phosphate

NADPH a compound that donates one hydrogen atom and two electrons to another molecule, to reform NADP+; is an electron donor

natality the number of births per unit of time

natural ecosystem an ecosystem in which the interactions are not changed purposely by human actions

natural selection the result of differential reproductive success of individuals caused by variations in their inherited characteristics

nearsightedness condition that occurs when the image is focused in front of the retina

negative feedback the process by which a mechanism is activated to restore conditions to their original state

nefrophon a functional unit of the kidney

neurilemma delicate membrane that surrounds the axon of some nerve cells

neuron nerve cell that conducts nerve impulses

neurotransmitter chemical messenger released by the presynaptic neuron that binds to receptors on the postsynaptic neuron

neutral mutation a mutation that has no effect on the organism

nitrogen cycle a cycle of matter in which nitrogen atoms move from nitrogen gas in the atmosphere, to inorganic forms in the soil, to organic forms in living things, and then back to inorganic forms in the soil and nitrogen gas in the atmosphere

nitrogen fixation two processes in which atmospheric or dissolved nitrogen is converted into nitrate ions

nitrogenous base an alkaline, cyclic molecule containing nitrogen

nodes of Ranvier regularly occurring gaps between sections of myelin sheath along the axon

nondisjunction the failure of a pair of homologous chromosomes to separate properly during meiosis

nonsense mutation a mutation that converts a codon for an amino acid into a stop codon

norepinephrine also known as noradrenaline, it initiates the fight-or-flight response by increasing heart rate and blood sugar

nucleotide a molecule having a five-carbon sugar with a nitrogenous base attached to its 1’ carbon and a phosphate group attached to its 5’ carbon

nutrient a substance that provides the raw materials required for cell metabolism and growth

O

oil a lipid composed of glycerol and unsaturated fatty acids; liquid at room temperature

olfactory bulb area of the brain that processes information about smell; one bulb in each hemisphere

oligotrophic having low nutrient levels

omnivore an animal that eats both plants and other animals

ooocyte an immature ovum

oogenesis the formation and development of mature ova

ootid an unfertilized ovum

open population a population in which change in number and density is determined by births, deaths, immigration, and emigration

organ of Corti primary sound receptor in the cochlea

osmoreceptors sensory receptors in the hypothalamus that detect changes in the osmotic pressure of the blood and surrounding extracellular fluids (ECF)

ossicles tiny bones that amplify and carry sound in the middle ear

otoliths tiny stones of calcium carbonate embedded in a gelatinous coating within the saccule and utricle

outline give, in an organized fashion, the essential parts of something; the form of the outline must be specified in the question; i.e., lists, flow charts, concept maps

oval window oval-shaped hole in the vestibule of the inner ear, covered by a thin layer of tissue

ovaries (singular ovary) the female gonads, or reproductive organs; female sex hormones and egg cells are produced in the ovaries

ovulation release of the secondary oocyte from the follicle held within the ovary

ovulatory phase phase in which ovulation occurs

ovum (plural ova) egg cell

oxidation a reaction in which an atom or molecule loses electrons

oxidative ATP synthesis the production of ATP from a series of oxidation reactions

oxyhemoglobin hemoglobin that is bound to oxygen

oxytocin a hormone from the pituitary gland; causes strong uterine contractions

ozone (O3) an inorganic molecule; a layer of ozone found in the stratosphere helps to screen out ultraviolet radiation

P

paleontology the study of fossils

palindromic reading the same backwards and forwards
parasitism a symbiotic relationship in which one organism (the parasite) benefits at the expense of another organism (the host), which is often harmed but usually not killed; it is categorized as a +/-

parasympathetic nervous system a division of the autonomic nervous system that returns the body to normal resting levels following adjustments to stress

parathyroid glands four pea-sized glands in the thyroid gland that produce parathyroid hormone to regulate blood calcium and phosphate levels

parathyroid hormone (PTH) hormone produced by the parathyroid glands, which will increase calcium levels in the blood and lower the levels of phosphates

parturition the act of giving birth; labour

peat slowly decomposing plant material produced in low-oxygen environments such as bogs

pedigree chart a chart used to record the transmission of a particular trait or traits over several generations

pepsin a protein-digesting enzyme produced in the stomach

peptide bond the bond that joins amino acids

per capita growth rate (cgr) the change in population size relative to the initial size of the population, per unit time

percolation the movement of a liquid through a porous material, such as soil particles

peripheral nervous system (PNS) all parts of the nervous system, excluding brain and spinal cord, that relay information between the central nervous system and other parts of the body

peristalsis rhythmic, wavelike contractions of muscle that move food along the gastrointestinal tract

peritubular capillary a member of the network of small blood vessels that surround the tubule of the nephron

permafrost permanently frozen soil

phagocytosis the process by which a white blood cell engulfs and chemically destroys a microbe

phenotype the observable characteristics of an organism

phenotypic ratio the ratio of offspring with a dominant trait to the alternative, recessive trait

phosphate group a group of four oxygen atoms surrounding a central phosphorus atom; found in the backbone of DNA

phospholipid a lipid with a phosphate molecule attached to the glycerol backbone, making the molecule polar; the major components of cell membranes

phosphorus cycle the cycling of phosphorus between the biotic and abiotic components of the environment; consists of a biological and geochemical cycle

photolysis a chemical reaction in which a compound is broken down by light; in photosynthesis, water molecules are split by photolysis

photon a packet of light

photosynthesis the process by which green plants and some other organisms use solar energy, carbon dioxide, and water to produce carbohydrates

photosystem a cluster of photosynthetic pigments embedded in a thylakoid membrane of a chloroplast that absorbs light energy

phylogeny proposed evolutionary history of a species or group of organisms

pinna outer part of the ear that acts like a funnel, taking sound from a large area and channelling it into a small canal

pioneer community the first species to appear during succession

pituitary gland gland at the base of the brain that, together with the hypothalamus, functions as a control centre, coordinating the endocrine and nervous systems

placenta the site for the exchange of nutrients and wastes between mother and fetus

plan construct a plan, i.e., a detailed sequence of actions, for a specific purpose

plankton autotrophic and heterotrophic microorganisms found in the limnetic zone of a lake or pond

plasma the fluid portion of the blood

plasmid a small double-stranded circular DNA molecule found in some bacteria

platelet a component of blood responsible for initiating blood clotting

pleural membrane a thin membrane that surrounds the outer surface of the lungs and lines the inner wall of the chest cavity

pluripotent cell a cell that is capable of developing into a number of specialized cells, such as a neuron or muscle cell

point mutation a mutation at a specific base pair

polar body cell that contains all the genetic information of a haploid ovum, but lacks sufficient cytoplasm to survive; formed during meiosis in females

polar molecule a molecule that has a positive and a negative end

polarized membrane membrane charged by unequal distribution of positively charged ions inside and outside the nerve cell

polymer a molecule composed of three or more subunits

polymerase chain reaction (PCR) a technique for amplifying a DNA sequence by repeated cycles of strand separation and replication
polypeptide  a chain of three or more amino acids
polyploidy  a condition in which an organism has more than two complete sets of chromosomes
polysaccharide  a carbohydrate composed of many single sugar subunits
pons  region of the brain that acts as a relay station by sending nerve messages between the cerebellum and the medulla
population  a group of organisms of the same species that live in the same habitat or ecosystem at the same time
population density  the number of individuals of the same species that occur per unit area or volume
population dispersion  the general pattern in which individuals are distributed through a specified area
population size  the number of individuals of a specific species occupying a given area/volume at a given time
positive feedback  the process by which a small effect is amplified
postsynaptic neuron  neuron that carries impulses away from the synapse
precursor activity  the activation of the last enzyme in a metabolic pathway by the initial substrate
predation  an ecological interaction in which a predator (a member of one species) kills and consumes prey (usually a member of another species)
predict  tell in advance on the basis of empirical evidence and/or logic
prescribed burn  a controlled fire set intentionally in a designated area
presynaptic neuron  neuron that carries impulses to the synapse
primary sexual characteristics  physical characteristics of an organisms that are directly involved in reproduction
primary succession  the occupation, by plant life, of an area not previously covered by vegetation
primary consumer  in a food chain or food web, an organism that relies directly on autotrophs for its source of energy; organisms at the second trophic level
producer  an autotroph; an organism that makes its own food
profundal zone  the region of a lake beneath the limnetic zone, in which there is insufficient light for photosynthesis to occur
progeny  new individuals that result from reproduction; offspring
progesterone  hormone produced primarily by the corpus luteum, that induces changes in the endometrium during the menstrual cycle
prolactin  a hormone produced by the pituitary gland and associated with milk production
promoter  sequence of DNA in front of a gene that binds RNA polymerase
prostaglandins  a group of hormones that act on the cells that produce them in response to cell damage; produced by most cells
prostate gland  structure that contributes to the seminal fluid (semen), a secretion containing buffers that protect sperm cells from the acidic environment of the vagina
protein  a chain of amino acids that form the structural parts of cells or act as antibodies or enzymes
Protista  a kingdom originally proposed for all unicellular organisms such as the amoeba; more recently, multicellular algae have been added to the kingdom
prove  establish the truth or validity of a statement for the general case by giving factual evidence or logical argument
proximal tubule  the section of the nephron joining the Bowman's capsule with the loop of Henle
pulmonary circulatory system  the system of blood vessels that carries deoxygenated blood to the lungs and oxygenated blood back to the heart
pulse  change in the diameter of the arteries following heart contractions
Punnett square  a chart used to determine the predicted outcome of a genetic cross
Purkinje fibre  a nerve fibre that branches and carries electrical impulses throughout the ventricles
pus  a thick liquid composed of protein fragments from digested leukocytes and microbes

**R**

r  a variable indicating the rate of increase of a population experiencing exponential growth; r is limited only by the biotic potential of the organisms in the population
r-selected organism  an organism that is adapted to increase population size rapidly
radioisotope  an unstable isotope that decays spontaneously by emitting radiation
radiometric dating  a technique used to determine the age of a rock or fossil
random dispersion  the pattern in which individuals are spread throughout a habitat in an unpredictable and patternless manner
receptor sites  a port along a cell membrane into which hormones, nutrients, and other needed materials fit
recessive lethal  a trait that, when both recessive alleles are present, results in death or severe malformation of the
offspring; usually, recessive traits occur more frequently in males.

**recessive trait** a characteristic that is expressed only when both alleles in an individual are the recessive form.

**recognition site** a specific sequence within double-stranded DNA that a restriction endonuclease recognizes and cuts.

**recombinant DNA** fragment of DNA composed of sequences originating from at least two different sources.

**reduction** a reaction in which an atom or molecule gains electrons.

**reflex arc** neural circuit through the spinal cord that provides a framework for a reflex action.

**refractory period** recovery time required before a neuron can produce another action potential.

**relate** show logical or casual connection between things.

**relaxin** a hormone produced by the placenta prior to labour; causes the ligaments within the pelvis to loosen.

**releasing hormone** a peptide produced by the hypothalamus that stimulates the anterior pituitary gland to release a stored hormone; also called a releasing factor.

**renal pelvis** the hollow area where the kidney joins the ureter.

**repolarization** process of restoring the original polarity of the nerve membrane.

**resource partitioning** avoidance of, or reduction in, competition for similar resources by individuals of different species occupying different non-overlapping ecological niches.

**respiration** all processes involved in the exchange of oxygen and carbon dioxide between cells and the environment, including breathing, gas exchange, and cellular respiration.

**respiratory membrane** the membrane where the diffusion of oxygen and other gases occurs between the living cells of the body and the external environment (the atmosphere or water).

**resting potential** voltage difference across a nerve cell membrane when it is not transmitting a nerve impulse (usually negative).

**restriction endonuclease** an enzyme that cuts double-stranded DNA into fragments at a specific sequence; also known as a restriction enzyme.

**retina** innermost layer of tissue at the back of the eye containing photoreceptors.

**rhodopsin** the pigment found in the rods of the eye.

**ribonucleic acid (RNA)** a nucleic acid consisting of nucleotides comprised of the sugar ribose and nitrogenous bases.

**ribosome** an organelle composed of RNA and protein and located in the cytoplasm that carries out protein synthesis.

**RNA polymerase** enzyme that transcribes DNA.

**rods** photoreceptors that operate in dim light to detect light in black and white.

**saltatory conduction** generation of action potentials only at nodes of Ranvier in myelinated axons, resulting in rapid transmission of nerve impulses.

**sarcolemma** the delicate sheath that surrounds muscle fibres.

**Schwann cell** special type of glial cell that produces the myelin sheath.

**sclera** outer covering of the eye that supports and protects the eye’s inner layers; usually referred to as the white of the eye.

**scrotum** the sac that contains the testes.

**second trimester** the period during pregnancy from the fourth month to the end of the sixth month.

**secondary sexual characteristics** external features of an organism that are indicative of its gender (male or female), but are not the reproductive organs themselves.

**secondary succession** succession in an area that was previously covered by vegetation and still has some soil.

**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.

**secretin** a hormone released from the duodenum that stimulates pancreatic and bile secretions.

**segregation** the separation of alleles during meiosis.

**selective breeding** the crossing of desired traits from plants or animals to produce offspring with both characteristics.

**selective cutting** the harvesting of only certain trees from an area.

**semen (seminal fluid)** a secretion of the male reproductive organs that is composed of sperm and fluids.

**semicircular canals** fluid-filled structures within the inner ear that provide information about dynamic equilibrium.

**semiconservative replication** process of replication in which each DNA molecule is composed of one parent strand and one newly synthesized strand.

**semilunar valves** a valve that prevents the backflow of blood from an artery into a ventricle.

**seminal vesicles** structure that contributes to the seminal fluid (semen), a secretion that contains fructose and prostaglandins.

**seminaliferous tubules** coiled ducts found within the testes, where immature sperm cells divide and differentiate.
**sensory adaptation** occurs once you have adjusted to a change in the environment; sensory receptors become less sensitive when stimulated repeatedly.

**sensory neuron** neuron that carries impulses to the central nervous system; also known as afferent neuron.

**sensory receptor** highly modified dendrites of a sensory neuron that are activated by an environmental stimulus.

**septum** a wall of muscle that separates the right and left sides of the heart.

**Sertoli cell** a cell that provides metabolic and mechanical support to developing sperm cells.

**sex hormone** any hormone that affects the development and growth of sex organs.

**sex-linked trait** trait that is determined by genes located on the sex chromosomes.

**sexual dimorphism** striking differences in the physical appearance of males and females not usually applied to behavioural differences between sexes.

**sexual selection** differential reproductive success that results from variation in the ability to obtain mates; results in sexual dimorphism and mating and courtship behaviours.

**sexual reproduction** the production of offspring by the union of sex cells from two different parents; the offspring inherit a combination of genes from both parents.

**show how** show reasons for or give facts that support a position.

**siblings** offspring from the same parent (in asexual reproduction) or parents (in sexual reproduction).

**silent mutation** a mutation that does not result in a change in the amino acid coded for.

**SINEs** repeated DNA sequences 300 base pairs long that alternate with lengths of DNA sequences found in the genomes of higher organisms.

**sinoatrial (SA) node** a small mass of tissue in the right atrium that originates the impulses stimulating the heartbeat.

**sister chromatids** a chromosome and its duplicate, attached to one another by a centromere until separated during mitosis.

**skeletal muscle** the voluntary muscle that makes the bones of the skeleton move.

**sketch** provide a drawing that represents the key features of an object or graph.

**slash-and-burn** the complete clearing of a forest by felling and burning the trees.

**smooth muscle** the involuntary muscle found in the lining of many organs.

**social parasite** a parasite that completes its life cycle by manipulating the social behaviour of its hosts.

**sodium-potassium pump** a transporter in the cell membrane that moves potassium ions into the cytoplasm while simultaneously removing sodium ions from the cytoplasm to the extracellular fluid.

**somatic cell** any cell in a multicellular organism that is not a reproductive cell.

**speciation** the formation of new species.

**species** a group of organisms that look alike and can interbreed under natural conditions to produce fertile offspring.

**spermatid** an immature sperm cell that arises from division of a spermatocyte.

**spermatocyte** a cell that arises from division of spermatogonia during spermatogenesis.

**spermatogenesis** process by which spermatogonia divide and differentiate into mature sperm cells.

**spermatogonia** sperm-producing cells found in the seminiferous tubules.

**sphincter** a constrictor muscle that regulates the opening and closing of a tubelike structure.

**sphygmomanometer** a device used to measure blood pressure.

**spindle fibre** protein structure that guides chromosomes during cell division.

**spleen** a lymphoid organ that acts as a reservoir for blood and a filtering site for lymph.

**spontaneous mutation** a mutation occurring as a result of errors made in DNA replication.

**spontaneous generation** the belief that living things arose from non-living matter.

**starch** a plant carbohydrate used to store energy.

**start codon** specific codon (AUG) that signals the start of translation.

**stationary phase** the phase in which population growth rates approach zero as the population size reaches the carrying capacity and stabilizes; the defining characteristic of logistic population growth.

**stem cell** a cell from which any other type of cell can arise; any precursor cell.

**sticky ends** fragment ends of a DNA molecule with short single stranded overhangs, resulting from cleavage by a restriction enzyme.

**stop codon** specific codon that signals the end of translation.

**stroke volume** the quantity of blood pumped with each beat of the heart.
stroma the protein-rich semiliquid material in the interior of a chloroplast
stromatolite a banded limestone structure containing fossilized bacteria
subsoil the soil layer beneath the topsoil, usually containing more rock particles and less organic matter than the topsoil
substrate a molecule on which an enzyme works
succession the slow, progressive replacement of one community by another during the development of vegetation in any area
summarize give a brief account of the main points
summation increased muscle contraction produced by the accumulation of neurotransmitters from two or more neurons
suppressor T cell a T cell that turns off the immune system
symbiosis various interactions in which two species maintain a close, usually physical, association; includes parasitism, mutualism, and commensalism
sympathetic nervous system a division of the autonomic nervous system that prepares the body for stress
synapse a region between neurons, or between neurons and effectors; also known as the synaptic cleft
synapsis the pairing of homologous chromosomes
systemic circulatory system the system of blood vessels that carries oxygenated blood to the tissues of the body and deoxygenated blood back to the heart
systole contraction of the heart, during which blood is pushed out of the heart

T
T cell a lymphocyte, manufactured in the bone marrow and processed by the thymus gland, that identifies and attacks foreign substances
taxon (plural taxa) categories used to classify organisms
taxonomy the science of classification according to the inferred (presumed) relationships among organisms
telomere the cap at the end of a chromosome
template a single-stranded DNA sequence that acts as the guiding pattern for producing a complementary DNA strand
template strand the strand of DNA that the RNA polymerase uses as a guide to build complementary mRNA
 tendon a band of connective tissue that joins muscle to bone
teratogen any medication, chemical, infectious disease, or environmental agent that might interfere with the normal development of a fetus or embryo
termination sequence sequence of bases at the end of a gene that signals the RNA polymerase to stop transcribing
test cross the cross of an individual of unknown genotype to an individual that is fully recessive
testes the male gonads, or primary reproductive organs; male sex hormones and sperm are produced in the testes
testosterone male sex hormone produced by the interstitial cells of the testes
tetanus the state of constant muscle contraction caused by sustained nerve impulses
tetrad a pair of homologous chromosomes, each with two chromatids
thalamus area of brain that coordinates and interprets sensory information and directs it to the cerebrum
theory of gradualism the idea that speciation takes place slowly
theory of punctuated equilibrium the idea that species evolve rapidly, followed by a period of little or no change
thermocline the zone between the epilimnion and hypolimnion, in which temperature changes rapidly
thermodynamics a scientific study of energy transformations, described by laws
thermoregulation maintenance of body temperature within a range that enables cells to function efficiently
third trimester the period during pregnancy from the seventh month until birth
threshold level minimum level of a stimulus required to produce a response; the maximum amount of a substance that can be moved across the nephron in the kidney
thrombus a blood clot that forms within a blood vessel and blocks it
thylakoid a system of interconnected flattened membrane sacs forming a separate compartment within the stroma of a chloroplast
thylakoid lumen the fluid-filled space inside a thylakoid
thylakoid membrane the photosynthetic membrane within a chloroplast that contains light-gathering pigment molecules and electron transport chains
thymus gland a lymphoid organ in which T lymphocytes mature
thyroid gland a two-lobed gland at the base of the neck that regulates metabolic processes
thyroxine (T4) hormone produced by the thyroid gland that increases metabolism and regulates growth
topsoil the soil layer beneath the litter, composed of small particles of rock mixed with humus
trachea the windpipe
transcription the process of converting DNA into messenger RNA
transfer RNA (tRNA) the form of RNA that delivers amino acids to a ribosome during translation
**transgenic** a cell or an organism that is transformed by DNA from another species

**translation** the process of synthesizing a specific polypeptide as coded for by messenger RNA

**translocation** the transfer of a fragment of DNA from one site in the genome to another location

**transpiration** the loss of water through plant leaves

**triglyceride** a lipid composed of glycerol and three fatty acids

**triiodothyronine (T3)** hormone produced by the thyroid gland that increases metabolism and regulates growth; contains three iodine atoms

**trisomy** the condition in which there are three homologous chromosomes in place of a homologous pair

**trophic hormone** hormone that stimulates a specific target gland to secrete other hormones

**trophic level** a category of living things defined by how it gains its energy; the first trophic level contains autotrophs, and each higher level contains heterotrophs

**trypsin** a protein-digesting enzyme

**tympanic membrane** thin layer of tissue that receives sound vibrations, also known as the eardrum

**V**

**vagina** the muscular canal extending from the cervix to the outer environment; the birth canal

**vagus nerve** major cranial nerve that is part of the parasympathetic nervous system

**vas deferens** tube that conducts sperm toward the urethra

**vasoconstriction** the narrowing of blood vessels, allowing less blood to the tissues

**vasodilation** the widening of blood vessels, allowing more blood to the tissues

**vector** a vehicle by which foreign DNA may be introduced into a cell

**vein** a blood vessel that carries blood toward the heart

**ventricle** a muscular, thick-walled chamber of the heart that delivers blood to the arteries

**vestibule** chamber found at the base of the semicircular canals that provides information about static equilibrium

**vestigial features** rudimentary structures with no useful function

**villi** small, fingerlike projections that extend into the small intestine to increase surface area for absorption

**W**

**water table** the boundary between the layer of soil that is saturated with water, and the unsaturated soil above it

**watershed** the land that drains toward a lake or other body of water

**wax** a long-chain lipid that is insoluble in water

**why** show the cause, reason, or purpose

**wild type** the most common allele of a gene with multiple alleles

**Y**

**yolk sac** a membranous sac that forms during embryo development of most vertebrates; in humans, it does not contain yolk

**Z**

**zygote** the cell resulting from the union of a male and female sex cell
A
Abiotic factors, 9, 86, 109, 742
Accommodation, 453
Acetabularia, 642–43
Acetylcholine, 421, 422, 424, 434
Acetyl-CoA, 215
Acid–base balance, 385
Acid deposition, 46–47
Acidity, 14
Acids, buffering of, 290
Acrossly, 488
Acrosome, 515
Actin filaments, 301, 302
Action potential, 415, 416–18, 421
Active sites, 254
Active transport, 205, 381, 416
Adenine (A) nitrogenous base, 146, 648, 649, 662–63
ADH. See Antidiuretic hormone
Adrenal cortex, 481, 491
Adrenal glands, 331, 478, 481–82
Adrenalin. See Epinephrine
Adrenal medulla, 481, 483
Adrenocorticotropic hormone (ACTH), 482–83
Aerobic cellular respiration, 202, 208–9, 213–20, 301
Afferent arterioles, 379
Agglutination, 356
Aging process, 488, 489
a cell division and, 563
Agranulocytes, 351
Agriculture, 33–34, 62, 119. See also Crop plants
Albedo effect, 54
Albinism, 606
Albumins, 350
Alcohol, 267, 268, 332, 424, 491, 538
Alcohol fermentation, 221–22
Aldosterone, 381, 483, 491–92, 492
Algae, 62, 63, 70, 99, 116, 180
Allantois, 531
Allele frequencies, 717–22
Alleles, 598, 599, 608, 628, 629
Allergies, 367–68
allopatric speciation, 157
All-or-none responses, 418–19
Allotonic activity, 257
Alveoli, 284–85, 288, 294, 295
Alzheimer’s disease, 422, 431
Amino acids, 249–50, 265
Aurorods and, 474, 488
mutations and, 687
in proteins, 670
stress and, 481
in RNA, 671
Ammonia, 61, 378
Aminoenctesis, 585, 624
Amnion, 531, 539
Amniotic cavity, 531
Ampulla, 459
Amylase, 260, 265
Anabolic steroids, 495–96
Anaerobic cellular respiration, 202, 209, 221–28
Analogous features, 144
Anaphase, 561, 562, 573, 574, 576, 577
Anaplylactic reactions, 367, 368
Androgens, 535
Anemia, 351

Aneurysms, 315
Angiotensin/angiotensinogen, 491
Animals
biological traits, 596
cloning of, 567–69
of deciduous forest, 97
life cycles, 579–80
temperatures and, 103
transgenic, 391
Antagonistic muscles, 298
Antibodies, 249, 356, 357, 359, 360–61, 364, 540
Anticodon, 671, 672
Antidiuretic hormone (ADH), 387, 475, 490–91, 492, 494
Antigens, 355, 359, 360–61, 364–65
Antitriangular, defined, 663
Aorta, 292, 315, 320, 330, 331
Aquatic ecosystems, 98–99, 104–6
Aquous humour, 449, 453
Arachnoid mater, 426
Archaebacteria, 136
Arctic, 24, 53, 754
Arrhythmia, 324
Arteries, 288, 312–15, 325
Arterioles, 312, 314, 329–30, 332
Arteriosclerosis, 314
Arthroscopy surgery, 304
Artificial ecosystems, 88–89
Artificial selection, 148–49
Asexual reproduction, 154, 512, 556, 565
Asigmatism, 453–54
Atherosclerosis, 248, 314–15
Atmosphere, 8–9, 54–56, 56
ATP (adenosine triphosphate), 186
and Calvin cycle, 193
carbon fixation and, 187
in cellular respiration, 204–7
creatinine phosphate and, 226, 227
electron transport chain and, 188
and exercise, 494
glucose and, 485
in glycolysis, 211, 221, 222
in Krebs cycle, 216
muscle contractions and, 225, 301
myosin filament and, 303
in proximal tubule, 387
ATP synthase (ATPase), 218
ATP synthase complexes, 191
Atria, 519, 523, 525
Atrioventricular (AV) node, 323
Atrioventricular (AV) valves, 319
At-risk species, 11–12
Auditory canal, 456
Autoimmune diseases, 368
Autonomic nervous system, 314, 409, 433–35
Autosomes, 629
Autotrophs, 22, 24
Avery, Oswald, 643, 645, 646
Axons, 409, 410

B
cells, 359–60, 364, 365, 368, 499
Bacon, Francis, 140
Bacteria, 769
antibiotic-resistant, 684, 727–28
classification of, 136
in digestive system, 270
fermentation by, 221
in lake ecosystems, 99
in large intestine, 268
methane-producing, 55–56
nitrogen-fixing, 61
oxygen-producing, 56
photosynthesis and, 56, 178
transformation of, 683–84
and water quality, 117
Bacteriophages, 646–47
Balance receptors, 446
Banting, Frederick, 480
Bar receptors, 408
Barr bodies, 631
Basilar membrane, 457–58
Bedrock, 101
Beneficial mutations, 154
Best, Charles, 480
Beta amyloid, 431
Beta blockers, 326, 496
Bile, 267
Bile salts, 267
Binary fission, 555
Binomial nomenclature, 135
Biodiversity, 9–10, 24, 33, 87, 90, 134, 249. See also Genetic diversity
Biogeography, 97, 142–43
Biological oxygen demand (BOD), 118
Biomass, 29
Biomes, 94
Biosphere, 8–9
albedo effect and, 54
changes in, 80
as closed system, 6, 40
Biotic factors, 9, 86, 109, 742
Biotic potential, 108, 743, 755
Bipolar cells, 430, 452
Birth, 533, 539–40
Birth control, 513, 526
Birth defects, 538
Blastocyst, 530, 531
Blasitula, 567
Blood
artificial, 355
circulation, 226
clotting, 352–53
components of, 350–56
flow, 319–20, 328–35
glucose, 471
groups, 355–57, 611
hereditary traits in, 626
oxygen in, 471
pH, 471
sugar, 478–84
vessels, 312–18
Blood cells, 350. See also Erythrocytes; Leukocytes
Blood pressure, 316, 329–31, 471, 491
Blunt ends, 681
Bogs, 50, 61
Bone(s)
breakdown of, 488
estrogen and, 529
marrow, 350, 351, 352
Boreal forests, 94–96, 755
Botelleneck effect, 724
Bovine somatotropin (BST), 489
Bovine spongiform encephalopathy (BSE), 348, 361–63
Bowman’s capsule, 380, 381
G

Gaia hypothesis, 8
Galactose, 243
Galen, 312
Galileo, 312
Gallbladder, 267–68
Gallstones, 268
Gamete intrafallopian transfer (GIFT), 542
Gametes, 578–79
Gametogenesis, 578
Gamma-amino-butyric acid (GABA), 422, 423, 424, 425
Ganglia, 410
Gastrin, 269
Gastrula, 532, 567
Gastrulation, 532–33
Gated ion channels, 416–17
Gause's principle, 765
Gene expression, 667–76
Gene flow, 725
Gene mutations, 687
Gene pools, 155, 716, 717, 723–30
Genes, 146–47, 406, 596, 598, 667
hereditary traits in, 626
structural, 689
technology and, 628
vestigial, 147
Gene therapy, 247, 708
Genetic diversity, 134, 716, 726
Genetic drift, 723–24
Genetic engineering, 477
Genetic modification (GM), 92
of animals, 628
of plants, 618–19
Genetics, 596
and natural selection, 155
Genetic screening, 606, 633
Genetic transformation, 677
Genetic variation, 752
Genomes, 716
Genotypes, 599, 603, 716
Genotypic ratio, 601
Genus, 135
Gigantism, 488
Glaucoma, 453
Gliai cells, 409
Global warming, 14, 52, 54, 55, 56–57
Globulins, 350
Glomerulus, 379, 380, 381, 387
Glucagon, 478, 479
Glucocorticoids, 481
Glucose
adrenal system and, 481–82
ATP and, 207
blood pressure and, 329
in cellular respiration, 282, 376
in cellulo molecules, 244
fatty acids and, 488
glycolysis and, 212
insulin and, 478–79
as monosaccharide, 243
and muscle fatigue, 301
photosynthesis and, 186, 204
stress and, 494
thyroid gland and, 485
Glycogen, 244, 246, 481, 485
Glycolysis, 210–12, 218, 221, 222, 224, 225
Glycoproteins, 355

Goiter, 486
Gonadotropic hormones, 517, 526, 530
Gonadotropin-releasing hormone (GnRH), 518, 525
Gonadotropins, 525
Gonads, 512
Gould, Stephen Jay, 158
GSP, 192–93
Grana, 183
Granulocytes, 351
Granulosa, 522
Grasslands, 96–97, 103
Greenhouse effect, 52, 56
Griffith, Frederick, 643, 644, 646
Groundwater, 102
Growth hormone. See Human growth hormone (hGH)
Growth rate (g), 723
Guanine (G) nitrogenous base, 146, 648, 649, 662–63, 681
Gyri, 438

H

Habitats, 13–44, 38, 91, 738, 740
Hair cells, 456, 457, 458
Hammering, Joachim, 642–43
Haploid number, 572
Hardy–Weinberg Principle, 718–22, 723
Harmful mutations, 154
Harvey, William, 312, 316, 317
HCG. See Human chorionic gonadotrophic hormone
Hearing, 457–58, 460
Heart, 312, 319–27
attacks, 330
beating of, 322–23
disease, 248, 314–15
medications, 326
murmurs, 325
rate, 328
sounds, 325
transplantable, 236, 321
valves, 319, 325
Helicobacter pylori, 262, 375
Helper T cells, 364
Hemacrit, 350
Hemispheres, of brain, 427–29
Hemoglobin, 62, 227, 250, 288–89, 350–51
Hemophilia, 631, 632
Hemorrhages, 337
Herbicides, 114
Herbivores, 12, 264
Hereditary disorders, 678–79
Heredit, 406, 596
Hertz, 461
Heterotrophs, 22, 23, 174
Heterozygous individuals, 599, 605, 605, 613, 635
HGH. See Human growth hormone (hGH)
High-density lipoprotein (HDL), 248
Hindbrain, 429
Hippocampus, 424
Histamine, 367
Homeostasis, 470, 474, 475
feedback systems and, 472
growth hormone and, 488
hormones and, 473
water balance and, 490
Homeotherms, 256
Homologous chromosomes, 572, 573, 574, 582, 584, 628, 635, 637
Homologous features, 144
Homo species, 690
Homozyygous individuals, 599, 603, 605, 613, 616
Hormones, 473–75
and blood sugar, 478–84
digestion and, 269
environmental, 335
and male reproductive system, 516–19
and menstrual cycle, 526
metabolism and, 485–89
and metamorphosis, 486
nontarget, 473
stress, 494
synthetic, 497
water balance and, 490–91
Human chorionic gonadotrophic hormone (hCG), 531
Human genome project, 678–79
Human growth hormone (hGH), 473, 475, 477, 488, 489, 496, 685, 709
Human Proteome Project, 703
Humus, 96, 97, 101
Huntington disease, 606, 703
Hybridization, 616
Hydrogenation, 248
Hydrogen bonds, 43, 235, 662, 664
Hydrological cycle, 42–48
Hydrolisis, 243
Hydrosphere, 8–9
Hypertension, 424
Hydrops, 479, 494
Hyperopia, 454
Hyperplasia, 488
Hyperpolarization, 417, 418, 453
Hyperscretion, 488
Hypertension, 330
Hyperthyroidism, 485
Hypertrophy, 488
Hypoglycemia, 479
Hypominion, 108
Hypooscretion, 488
Hypothalamus, 428–29, 439
and female reproductive system, 525
fevers and, 358
and GnRH, 518
and male reproductive system, 517, 518
osmoregulators in, 446
pituitary gland and, 473, 475
and stress, 494
temperature and, 333, 334
and thyroid-releasing hormone, 486
Hypothermia, 334
Hypothyroidism, 485

I

Immigration, 742
Immune response, 359–65
Immune system, 357, 367–69
Immunodeficiency diseases, 367
Immunosuppression, 480
Implantation, 530
Inbreeding, 616, 752
Incomplete dominance, 609
Incs (anvil), 456, 457
Indicator species, 12
Induced mutations, 688
Inflammatory response, 357
Ingestion, 259–63
Inheritance, 598
of acquired characteristics, 130
chromosomal theory, 628–29
Inhibin, 517, 518
Inhibiting factors, 475
Inhibitory impulses, 299, 422
Insertion of nucleotides, 688
Inspiration, 285
Insulin, 387, 473, 478–79, 479, 494
Intercostal muscles, 286, 292
Interference competition, 765
Intermembrane space, 213, 217, 218
Interneurons, 410, 411, 412, 426
Interphase, 558, 560
Interspecific competition, 765
Intestinal cells, 517
Intestinal fluid, 381
Intraspecific competition, 751
Intraterine insemination, 542
Inversions, 688
In vitro fertilization, 509, 542, 543
Iris, 449
Irradiation, 252
Islands, 142–43
Islets of Langerhans, 478, 480–81, 3877
Isomers, 243, 303
Isotopes, 141–42, 647
Jaundice, 268
K
K, 748
Karyotype charts, 584–86
Kelvin, Lord, 141
Kidneys, 376, 378, 379
dysfunction of, 387–92
and pH balance, 385
stones, 388, 488, 492
transplants, 368–69, 390–91
Killer T cells, 364, 365
King, Malcolm, 294
Klinefelter syndrome, 583
Krebs cycle, 215–16, 218
K-selected organisms, 755, 756
Kyoto Accord, 55
Labour, 539, 540
Lactation, 540–41
Lacteals, 265
Lactic acid, 224–26, 301
Lactic acid threshold, 225–26
Lactose, 158, 243, 266, 783
Lagging strand, 665
Lag phase, 748
Lakes, 99, 105–6, 115–21
Lamarck, Jean-Baptiste, Chevalier de, 150
Lamellae, 183
Laparoscopy, 542
Large intestine, 268
Larynx, 284
Law of the minimum, 110
Law of tolerance, 110
Leaching, 45, 103
Leading strand, 665
Lens, 449, 453
Leukemia, 356
Leukocytes, 351, 357, 359
Liebig, Justus von, 109–10
Life cycles, and cell division, 579–80
Light-dependent reactions, 187
Light-independent reactions, 187
Light receptors, 446
Light-sensitive cells, 450
Limestone, 50
Limiting factors, 109, 762
Lipemic zone, 99
LINES (long interspersed elements), 691
Linkage groups, 637
Linked genes, 629, 636
Linnaeus, Carl, 135, 150
Lipases, 266, 267
Lipids, 246–47, 249, 254, 314
Lipoprotein, 285
Liposomes, 247
Lithosphere, 8–9
Litter, 101
Littoral zone, 99
Liver, 267–68, 378, 480, 538
Loci, 637
Logistic growth model, 748–49
Log phase, 748
Loop of Henle, 380
Low-density lipoprotein (LDL), 248
Lungs, 284–85, 288, 295–96, 305, 350, 378
Luteal phase, 524–25, 526
Luteinizing hormone (LH), 517, 518, 525, 526,
311
Lyell, Sir Charles, 141
Lymph, 337
Lymphatic system, 337–39
Lymph nodes, 338
Lymphocytes, 338, 359, 368
Lymphokine, 364
Lysozyme, 357
MacLeod, Colin, 643, 645, 646
Macrophages, 357, 358, 364
MAG. See Myelin-associated glycoprotein
Major histocompatibility complex (MHC), 368–69
Malaria, 12, 726, 727, 771
Malleus, 456, 457
Malathus, Thomas, 151
Maltose, 243
Mammillary body, 348
Marfan syndrome, 608
Marker genes, 641
Maximum oxygen consumption (VO2) max, 225–26
McCarty, Maclyn, 643, 645, 646
Medulla, 579
Medulla oblongata, 292, 300, 429, 432
Meiosis, 572–77, 582–86, 628, 635
Melatonin, 438
Memory B cells, 365
Mendel, Gregor, 598–600, 601, 613, 628, 636
Meninges, 426
Menopause, 525, 526, 550
Menstrual cycle, 522, 524–28
Menstruation, 524, 530
Mental health workers, 422
Mesoderm, 532–33
Messenger RNA (mRNA), 667–71, 671
Metabolism, 485–89, 643
Metamorphosis, 486
Metaphase, 561, 562, 573, 574, 576, 577, 584
Methane, 55–56
Methylases, 681, 682, 685
Microvilli, 264
Midbrain, 429
Miescher, Friedrich, 642
Migration, 737
Mineralocorticoids, 481
Minimum viable population size, 752
Mining, 47
Misseence mutations, 688
Mitochondria, 213, 283, 315, 694
Mitochondrial DNA (mtDNA), 690
Mitochondrial matrix, 213, 215, 217, 218
Mitosis (M), 558, 560, 561–62, 567, 570, 575–77,
628, 663
Molecular biology, 660
Molecular genetics, 660
Monera, 136
Monocultures, 33–34, 34, 114
Monoglycercides, 246
Monosaccharides, 243, 265
Monosomy, 582
Morgan, Thomas Hunt, 629–31, 635–36, 637
Morphogenesis, 532
Mortality, 742, 746, 752
Mosquitos, 12, 771
Motion, large-scale, 206
Motor neurons, 410, 411, 412, 413
Motor system injuries, 303–4
Mucus, 261, 284, 294, 296
Multiple-cloning sites, 684
Multiple sclerosis, 410
Muscles, 206, 227, 261, 298–304
Muskeg, 95–96, 97, 101
Mutagenic agents, 688, 689
Mutant traits, 608
Mutations, 153–64, 651, 641, 687–94, 707, 725
Mutualism, 768, 769
Myasthenia gravis, 421
Myelin-associated glycoprotein (MAG), 443
Myelin sheath, 409
Myofilaments, 300
Myogenic muscle, 322
Myopia, 454, 631
Myosin, 300
Myosin filaments, 301, 302, 303
N
NAD+, 204, 211, 215, 218, 221, 222, 224
NADH, 204, 211, 216–17, 218, 221, 224
NADP+, 186, 189, 191
NADPH, 186, 187, 189, 191, 192–93
Natality, 742, 746
Natural ecosystems, 88–89
Natural selection, 151–52, 153, 155, 157, 510,
512, 690, 714, 716, 725, 726–27
Nearsightedness, 454
Negative feedback, 472, 474, 486, 489, 518, 525,
526, 530
Nebrius, 387
Nephrons, 379–80, 381, 383, 385, 387, 491
Nerve impulses, 409, 415, 416, 419
Nerves, repairing of damaged, 411
Nervous system, 408–14, 494, 536
Neural pathways, 421–22
Neurilemma, 409
Neuroimaging, 431
Neurons, 409, 419
Neurotransmitters, 420, 421–22, 423
Neutral mutations, 154
Nicotine, 297, 424, 536. See also Smoking
Nitrates, 60–61, 62
Nitrates, 62
Nitrogen, 46, 61
Nitrogen cycle, 60–65
Nitrogen fixation, 60–61
Nitrogenous bases, 648, 662
Nitrous oxides, 46, 47
Nodes of Ranvier, 409, 418
Nondisjunction, 582, 583
Nonrenewable resources, 84
Nonsense mutations, 688
Norepinephrine, 406, 424, 434, 481, 483
Nucleic acid, 642
Nuclein, 642
Nucleotides, 146, 468, 662, 667, 677
Nucleus, discovery of, 628
Nutrients, 64, 242–53
O
Oligotrophic lakes, 115, 116
Omnives, 12, 264
Oncogenes, 689, 690
Oocytes, 520, 530, 579
Oogenesis, 522, 524
Otids, 578
Open populations, 745
Opiate, 423
Opsin, 451, 452
Optic nerve, 450, 452
Organ of Corti, 457, 458
Organ transplants, 368–69, 391
Osmoreceptors, 490
Osmoregulators, 446
Ossicles, 456, 457
Otoliths, 459
Oval window, 456, 457
Ovaries, 512, 520, 522, 525, 707
Oviduct, 521
Ovulation, 522, 524, 526, 531
Ovulatory phase, 524
Ovum, 520, 521, 522, 579
Oxidation, 189, 282
Oxidation-reduction (redox) reactions, 189–91,
204
Oxidative ATP synthesis, 218
Oxone layer, 14
Oxygen, 24–25, 99, 101
in aquatic ecosystems, 104, 106
in blood, 471
capillaries and, 316
in cellular respiration, 208–9, 283, 284, 290
chemoreceptors, 292
deforestation and, 56
delivery system in human body, 282–87
in electron transport chains, 227
in photosynthesis, 191
transport, 288–89
and water quality, 117–18
Oxygen cycle, 51
Oxygen debt, 224–25, 301
Oxyhemoglobin, 288, 351
Oxytocin, 539, 540
P
Pain receptors, 446
Paleontology, 140
Palindromic sequence, 680
Pancreas, 265–66, 387, 478
Parasitism, 768, 769
Parasympathetic nervous system, 300, 323, 409,
434
Parathyroid glands, 485, 486–88, 541
Parathyroid hormone (PTH), 487–88
Parkinson's disease, 406, 411, 422, 443
Parturition, 539, 540
Pasteur, Louis, 222
Pauling, Linus, 650
PCR. See Polymerase chain reaction (PCR)
Peat, 50
Pedigree charts, 605–7
Penfield, Wilder G., 430, 432
Pepsin, 255, 261, 265
Peptide bonds, 250
Peptides, 474
Per capita growth rate (cgr), 723
Percolation, 45
Pericardium, 319
Peripheral nervous system (PNS), 408–9, 411,
433–35
Peristalsis, 260
Peritubular capillaries, 379
Permafrost, 95
Pesticides, 47, 65, 116, 730, 752
PH, 255
balance in body, 385–86
blood, 471
in small intestine, 269
of soil, 102
in stomach, 261
Phages. See Bacteriophages
Phagocytosis, 351, 357, 358, 359, 365
Pharynx, 284
Phenotypes, 599, 603, 610, 716
Phenotypic ratio, 60
Phenylethronuria (PKU), 624
Phosphate groups, 247, 648, 662, 665
Phosphate ions, 487
Phosphates, 64, 116, 647
Phospholipids, 247, 266, 416
Phosphorus cycle, 63–64, 66
Photolysis, 188
Photons, 180, 188
Photosynthesis, 24–25, 178
artificial systems, 192
carbon and, 49
chloroplasts and, 183
in deciduous forest, 97
human activities and, 56
in lake ecosystems, 99
light and, 180–81
overview of, 187
oxygen cycle and, 51
reactions of, 186–94
water in, 47
Photosystems, 188, 190–91
Phylogeny, 138, 690
Pia mater, 426
Pigmentated epithelium, 450
Pillow fungus, 294
Pinac gland, 438
Pinna, 456
Pioneer communities, 772
Pitocin, 539
Pituitary gland, 428–29, 473, 475–76, 517,
525–26
Placenta, 531, 539
Plankton, 99
Plants. See also Crop plants
aquatic, 99
cloning of, 565, 566–67
drought-tolerant, 618–19
genetically modified (GM), 618–19
insect-eating, 39
life cycles, 579–80
numbers of species of, 33–34
salt-tolerant, 618–19
shoreline, 119
transmission of traits, 598–600
Plaques, 431
Plasma, 337, 350
Plasma cells, 360
Plasmids, 683–84, 685
Platelets, 352–55
Pleiotropic genes, 608
Fleural membrane, 285
Pluripotent cells, 369
Pneumothorax, 286
Point mutations, 687
Polar bodies, 578–79
Polarized membrane, 416
Polar molecules, 43
Pollination, 598
self-pollination, 598, 599, 614, 723
Pollution, 14
Pollgenic traits, 616–17
Polygraphs, 433
Polymerase chain reaction (PCR), 682, 686
Polymers, 245, 249
Polypeptides, 250, 667, 670–74
Polypeptide, 582, 716
Polsaccharides, 244
Polspermy, 530
Pons, 429, 438
Population density, 738. See also Density-
dependent factors
Population dispersion, 739
Population growth, 736, 742–43, 745–50
Populations, 9, 86, 710
changes in, 736–61, 745, 751–57
cycles in, 766
interactions of, 762–81
limits on, 108–12
Population size, 710, 723–24, 738, 743–45, 751,
753
Positive feedback, 472
Postganglionic neurons, 433, 434
Postsynaptic neuron, 420, 421, 423
Potassium ions, 415–17, 421
Precipitation, 44, 45, 96–97, 120
Precursor activity, 257
Predation, 87, 91, 110, 752, 766
Preganglionic neurons, 433, 434
Pregnancy, 522, 530–39, 544
Prescribed burns, 115
Presynaptic neuron, 420
Primary consumers, 22
Primary sexual characteristics, 516
Primary succession, 772
Primers, 664–65
Prions, 348
Probability (P), 601–2, 614–16
Producers, 9
Profoundal zone, 99
Progeny, 598
Progestrone, 525, 526, 530, 531, 539, 540
Prokaryotes, 136
Prokaryotic cells, 663
Prolactin, 540
Promoter, 668
Prophase, 561, 572, 573, 574, 575, 576, 577
Prostaglandins, 495, 516, 539
Protein synthesis, 488, 670–74
Proteins, 249–50, 254, 406, 667
Prostate gland, 516
Puberty, 517, 520, 525, 579
Psychoactive drugs, 423, 425
Proximal tubule, 380, 387, 491
Pulmonary circulatory system, 319
Puberty, 517, 520, 525, 579
Purkinje fibres, 323
Pupil, 453
Punnett square, 601, 603, 613, 614
Pulmonary circulatory system, 319
Pulse, 312
Punnett square, 601, 603, 613, 614
Pupil, 453
Purkinje fibres, 323
Pus, 357
Pyrimidines, 662–63
Pyruvate, 210, 211, 215, 218, 221, 224
Primary succession, 772
Prophases, 561, 572, 573, 574, 576, 577
Protein synthesis, 488, 670–74
Prothrombin, 355
Protista, 136
Proximal tubule, 380, 387, 491
Psychoactive drugs, 423, 425
PTH. See Parathyroid hormone (PTH)
Pulbery, 517, 520, 525, 579
Pulmonary circulatory system, 319
Pulse, 312
Punnett square, 601, 603, 613, 614
Pupil, 453
Purkinje fibres, 323
Pus, 357
Pyrimidines, 662–63
Pyruvate, 210, 211, 215, 218, 221, 224

R
R, 745
R-selected organisms, 755, 756
RAAS. See Renin-angiotensin-aldosterone system (RAAS)
Radioactive decay, 141–42
Radioisotopes, 647
Radiometric dating, 142
Rainforest ecosystems, 29
Random dispersion, 740
Ras, 690
Receptors, 471, 472
Receptor sites, 360
Recessive alleles, 635
Recessive lethal traits, 631
Recessive traits, 598, 599, 601, 613
Recognition site, 680
Recombinant DNA, 677, 679–83, 704
Recombinant DNA human growth hormone (rhGH), 477
Recombinant DNA technology, 477
Reduction, 189
Reflex arc, 411–13
Refraction, 453
Refractory period, 417, 418
Regulator genes, 689
Regulatory sites, 256–57
Relaxin, 539
Releasing hormones, 475
Renal pelvis, 379
Renal-angiotensin-aldosterone system (RAAS), 491, 494
Repolarization, 417
Reproduction, 510. See also Asexual reproduction; Biotic potential; Sexual reproduction
hormones in, 473
intraspecific competition and, 751
of X-selected organisms, 755
Reproductive rate, 743
Reproductive systems
female, 520–29
male, 512–19
Reproductive technology, 509, 342–43
Resource partitioning, 765
Respiration, 282
Respiratory membrane, 282
Respiratory system, 283–86, 357
Resting potential, 415–16, 418
Restriction endonucleases, 680–81, 685
Retina, 450, 451
Retinene, 452
Rheus factor, 357
Rhodopsin, 451–52
Ribose sugar, 667
Ribosomes, 670–71
RNA polymerase, 668
RNA (ribonucleic acid), 642, 667
Rods, 450, 451
Round window, 457
S
Saccule, 456, 459
Salinity, 118–19
Salivary glands, 260
Salatory conduction, 418
Sanger, Frederick, 250, 677, 678
Sanguineous system (RAAS)
Sanguineous system, 114
Sangithermogene, 514
Sanguineous system, 114
Saprophytic, 614
Saphenous veins, 86
Saprophytic, 614
Saprophytic, 614
Saprophytic, 614
Saprophytic, 614
Saprophytic, 614
Saprophytic, 614
Saprophytic, 614
Saprophytic, 614
Sticky ends, 680–81
Stimulants, 423
Stimuli, 419, 446
Stomach, 261–62
Stop codons, 670
Streptococcus pneumoniae, 643, 644, 646
Stress, 331, 481–83, 494–97
Strokes, 330, 452, 442
Stroke volume, 328
Stroma, 183, 187, 193
Stromatolites, 54
Subsoil, 101
Substrates, 254, 255, 256, 257
Succession, 772–75
Sucrose, 254
Sugars, 243, 244
Sulfonamides, 479
Sulfur, 46, 647
Sulfur dioxide, 43, 46, 47
Summation, 302, 421
Sun, 20
Sunlight, 104
Suppressor T cells, 365, 368
Suzuki, David, 10
Symbiosis, 764, 768
Sympathetic nervous system, 300, 323, 331, 409, 434
Synapses, 420, 423–24, 572, 637
Systemic circulatory system, 319
Systole, 325, 330
Tachycardia, 323
Tangles, 431
Taq DNA polymerase, 682
Taste, 446, 447–48
Taxa, 135
Taxonomic systems, 135–39
Taxonomy, 135
T cells, 359, 361, 364, 365, 368
Teeth, 260
Telomerase, 570
Telomeres, 570
Telophase, 561, 562, 573, 574, 576, 577
Temperature
  in aquatic ecosystems, 104
  body, 332–34, 471
  enzymes and, 255–56
  in terrestrial ecosystems, 103
Templates, 663
Template strands, 664, 668
Tendons, 298
Teratogens, 536–37
Termination sequence, 668
Terrestrial ecosystems, 94–98, 113–15
Test crosses, 602–3
Testes, 512, 513, 514, 517, 535
Testosterone, 256, 496, 497, 517, 518, 526, 535
Tetanus, 302, 486
Tetras, 572
Thalamus, 428, 439
Thalassemia, 606, 624
Theory of gradualism, 158
Theory of punctuated equilibrium, 158
Thermal energy, 24, 25, 26, 116
Thermocline, 106
Thermodynamics, 26
Thermoreceptors, 447
Thermoregulation, 332
Threshold levels, 571
Third trimester, 533
Threshold levels, 418–19
Thrombi, 355
Thromboplastin, 352–55
Thylakoid lumen, 183, 189, 190–91
Thylakoid membranes, 183, 188, 190–91, 218
Thylakoids, 183
Thymine (T) nitrogenous base, 146, 648, 649, 662–63
Thymus gland, 339
Thyroid gland, 485–86
Thyroid-releasing hormone (TRH), 486
Thyroid-stimulating hormone (TSH), 486
Thyroxine, 485, 486
Tolerance, limits on, 109–10
Topsoil, 101
Trachea, 284
Traits, 573, 574, 596
genes and, 626
single, 601–4
Transcription, 667, 668–69
Trans fats, 248
Transfer RNA (tRNA), 671–76
Transformation, 645, 683–85
Transgenic, defined, 683
Translation, 667, 670–74
Translocation, 688
Transpiration, 45
Triglycerides, 246
Triiodothyronine (T3), 485
Trisomy, 582
Trisomy 21, 583
Trophic levels, 22, 29, 99
Tropic hormones, 482–83
Trypsin, 255, 265
Tundra ecosystems, 29
Turner syndrome, 583
Twins, 154, 565
Tympanic membrane, 456, 457
U
Ulcers, 262, 375
Ultraviolet (UV) radiation, 14, 452, 688, 689
Umbilical cord, 531
Urea, 378, 381
Ureters, 379
Urethra, 379, 513, 521
Uric acid, 378, 381
Urinary bladder, 379, 521
Urinary system, 379–80
Urine, 267, 380–83, 490, 513
Uterine contractions, 525, 539
Uterus, 521, 525, 530, 540
Utricle, 456, 459
V
Vagina, 516, 521
Vagus nerve, 435
Varicose veins, 317
Vasa deferentia, 513, 516
Vasectomy, 513
Vasoconstriction, 314
 Vasodilation, 314, 332
Vectors, 683
Veins, 317–18
Ventricles, 319, 323, 325
Venules, 316, 317–18
Vestibule, 264
Vestigial features, 145
Villi, 264
Viruses, 360–61, 364, 689
Vision
  chemistry of, 451–52
defects, 453–54
Vitamin A, 452, 701
Vitamin C, 536
Vitamin D, 488
Vitreous humour, 449
W
Wallace, Alfred Russell, 151
Waste excretion, 387–86
Wastes
  sewage, 118, 119
  solid, 116
treatment of, 223–24
Water, 98. See also Aquatic ecosystems; Freshwater; Lake ecosystems; Oceans; Snow and ice
  balance, 378, 381
  beneath soil, 45
density, 105
dissociation of, 44
in ecosystems, 102–3
as polar molecule, 43
pollution, 115–18
pressure, 105
properties of, 43
quality, 117–18
selling of, 120–21
vapour, 44
Water cycle, 44
Watersheds, 119
Water table, 45, 102–3
Watson, James, 648–50, 649, 660, 662, 678
Waxes, 247
Wildlife tracking, 741
Wild type, 608
Wilkins, Maurice, 648, 649, 650
Wolves, 15–16, 38
Womb, 521
X
Xenotransplants, 391
X-rays, 564, 688
Y
Yeast, 222, 641
Yolk sac, 531
Z
Zebra mussels, 92, 751, 770
Zygote, 512, 530
### Greek and Latin Prefixes and Suffixes

#### Some Greek and Latin Prefixes

<table>
<thead>
<tr>
<th>Prefix</th>
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### Some Greek and Latin Prefixes

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### Some Greek and Latin Suffixes

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### Some English Terms Formed from Greek and Latin Prefixes and Suffixes

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<td>cancer agent</td>
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<td>hypertonic</td>
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<td>saprophage</td>
<td>rotten eater (eats rotten matter)</td>
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<td>below strength</td>
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