

## Appendix A: Complete Online Glossary

16s rRNA	Ribosomal subunit used to determine relationships among bacteria.
3-phosphoglycerate	Intermediate three-carbon molecule produced during the Calvin cycle of photosynthesis.
30-nm fiber	The bead-like nucleosomes packaged together into fibers in DNA packing.
5' cap	One of the additions to the messenger RNA, a series of guanines at the 5' end, before it leaves the nucleus.
abyssal zone	A deep, deep, deep benthic zone.
accessory pigment	Non-chlorophyll <i>a</i> pigments that also absorb light energy.
acetyl CoA	An acetate linked to Coenzyme A and the molecule that enters the Krebs cycle.
acidophile	Organism that thrives in a highly acidic environment.
acrosomal reaction	The release of enzymes from the acrosome of the sperm upon recognition by the egg.
acrosome	Enzyme-filled tip of a sperm cell.
actin	A common protein used structurally in the microfilaments of the cytoskeleton.
action potential	The all-or-nothing depolarization response of a neuron that occurs when a threshold of depolarization is reached and sodium channels open.
activation energy	The energy barrier or "hump" that must be overcome before a biochemical reaction can move forward.
active site	The site on an enzyme where the molecule binds and interacts with its substrate.

---

active transport	Energy-requiring transport of molecules against their concentration gradient, from low to high.
adenine	A nitrogenous base found in the nucleotide building blocks of DNA and RNA; a purine.
adenosine diphosphate	ADP, one of the building blocks of adenosine triphosphate, or ATP. ADP is an adenine nucleotide with two phosphates bound to it.
adenosine triphosphate	Usually known as ATP. An adenine nucleotide with three phosphates bound to it and the energy-carrying molecule of most cells.
adenylate cyclase	Enzyme responsible for cleaving ATP to produce cyclic AMP in second-messenger signaling pathways.
adhesion	The outcome of the interaction of water molecules with non-water molecules, such as a surface or lining.
aerobic	Requiring oxygen, as in aerobic respiration.
afferent	Carrying signals from the outside in.
agonistic behavior	Aggressive or defensive behaviors.
alcohol fermentation	An anaerobic process of cellular respiration that yields ethanol and carbon dioxide as byproducts.
aldosterone	A hormone released from the adrenal gland that plays a role in blood pressure maintenance.
alleles	Different forms of a gene.
allopatric	Referring to populations separated geographically; often used to describe speciation.
allosteric regulation	Regulation, usually of enzymes, involving changing the molecule's shape through interaction somewhere besides the enzyme's active site. The interaction usually will alter the shape of the active site and affect the enzyme's ability to bind its substrate.

alternation of generations	The alternation of forms between a diploid phase and a haploid phase.
alveoli	Clusters of air sacs in the lungs with moist surfaces to facilitate gas exchange.
amino acid	The monomer or building block of a protein. Consists of a carboxylic acid joined to an amino group by a central carbon that also bears a variable group that defines the specific amino acid.
amino group	A functional group and also one of the main components of amino acids, the building blocks of proteins.
anabolic	Building up.
anaerobic	Not requiring oxygen, as in anaerobic respiration.
analogous trait	A trait that taxa share not because of relatedness but because of similar environmental selection pressures; can be misleading in building phylogenetic trees.
angiosperm	A vascular plant that produces "dressed" seeds and flowers.
angiotensin	A signaling molecule that plays a role in blood pressure maintenance, among other things.
anion	A negatively charged ion.
antheridium	In plants, the chamber where the gametes develop in the male.
antibiotics	Chemicals that can disarm or kill bacteria; often produced by microbes and fungi.
antibody	Proteins produced by B cells and used to tag infected cells or invaders for destruction; also called immunoglobulins. Consist of two heavy chains and two light chains that form the characteristic Y shape of a single antibody.

---

antidiuretic hormone (ADH)	The hormone that signals to the collecting duct to release water back to the bloodstream.
antigen	Anything that elicits an antibody response.
anvil	A bone of the middle ear involved in transmitting sound waves.
aphotic zone	In water, the zone where light does not penetrate.
apical bud	The bud at the tip of a plant, where elongation occurs.
apical meristem	The embryonic tissue of the plant at its tips that drives lengthening growth.
apoptosis	Programmed cell death; also called cell suicide.
aposematic coloration	Warning coloration, usually involving bright and contrasting colors.
archegonium	In plants, the chamber where eggs develop in the female; plural, archegonia.
archenteron	An embryonic structure, the primitive gut.
archipelago	A group of islands often formed by the action of underwater volcanoes, often forming in an arc.
artificial selection	A distinction describing selection that occurs through human agency.
associative learning	Association of a response to one stimulus with a response to a completely unrelated stimulus.
aster	Star-like array of short microtubules that is formed during mitosis at each cellular pole.
astrocyte	A type of glial cell that has many duties, including structural support for the neuron, environmental regulation, and nerve-to-nerve signaling.
atom	The smallest unit of an element

---

atomic mass	The mass of an atom, determined roughly by the number of its protons and neutrons added together. The added mass of the electrons is generally considered negligible.
atomic number	The number of protons an element has.
ATP	Adenosine triphosphate. A nucleotide with three phosphates and the energy-carrying molecule of most cells.
ATP synthase	The enzyme that lies on the inner mitochondrial membrane and catalyzes the addition of phosphate to ADP to produce ATP, using free energy provided by the proton gradient.
arterioles	Small arteries.
atrium	An upper chamber of the heart.
australopithecine	Literally, "southern ape." Early human-like primates in the hominid family tree.
autocrine	Signaling of a cell to itself.
autonomic nervous system	The part of the peripheral nervous system in charge of involuntary responses.
autopolyploidy	The process of increasing the number of sets of chromosomes through self fertilization; common to plants.
autosome	Chromosome that is not immediately involved in sex determination. In humans, all chromosomes except X and Y.
autotroph	An organism that builds its own organic molecules for nutrition.
axillary bud	A bud that grows at an angle from the stem, the beginnings of a branch.
axis	In organismal signaling and homeostasis, a pathway of signaling among several tissues or organs, usually involving the hypothalamus and the pituitary.

---

axon	Extension of the nerve body, or neuron.
axon terminal	The end of the axon, where it interacts with the dendrites of the next neuron or with a target tissue, such as muscle.
B cell	A type of lymphocyte that matures in the bone and are involved in antibody production and memory; active in the humoral response.
bacteriophages	Viruses that infect bacteria.
bark	In plants, the tough outer covering that arises from a combination of periderm and phloem.
basophil	A white blood cell and granulocyte that releases histamine.
Batesian mimicry	A type of mimicry in which a harmless species mimics a harmful one so that the harmless species benefits.
behavioral isolating mechanism	A form of prezygotic isolating mechanism in which organisms of different species do not mate because of behavioral incompatibility.
benthic zone	In water, the zone at the bottom, including the sediment.
bile	A product of the liver, stored in the gall bladder, and used to break up fats in the duodenum.
binary fission	Division in prokaryotes, single-celled eukaryotes, and some organelles, such as mitochondria.
binomial nomenclature	The system of assigning a two-word Latin name to each species, the first word indicating the genus and the second specifying the species.
biofilm	Layer of bacteria.
biological species concept	In the words of Ernst Mayr, defining a species as a reproductive community of populations (reproductively isolated from others) that occupies a specific niche in nature.

---

biome	Large area of a general type of ecosystem.
biotic potential	The maximum reproductive output a population could produce under the best-possible environmental conditions.
Blastomere	A cell that results from cleavage of the zygote.
Blastula	A ball of blastomeres; the developmental stage at implantation, about 100 cells.
Blastocoel	The cavity that forms in the blastula and allows gastrulation to take place by making space for cells to move around.
Blastocyst	The mammalian version of the blastula. Why? Because mammals are just that special.
Blastopore	The invagination in the blastula where gastrulation begins. These cells invaginate into the blastocoel. In mammals and other deuterostomes, the blastopore is destined to become the anus.
bottleneck	Process in which a population dwindles to a few individuals; results in reduced variation in the population.
Bowman's capsule	Tissue where filtrate from the blood first enters the kidney from the capillary bed (glomerulus).
Calvin cycle	The cycle of reactions during the light-independent (dark) reactions of photosynthesis.
cancer	Uncontrolled cell division.
carrying capacity	The maximum population that the environment can support.
cation	A positively charged ion.
carbohydrate	A class of the four big biomolecules; a polar molecule consisting of carbon, hydrogen, and oxygen, also called sugar.

carotenoid	Accessory pigments that absorb in the blue wavelengths; ex. beta-carotene.
carpel	The reproductive unit of the female angiosperm, consisting of the stigma, the style, and the ovary.
carrier protein	A membrane-spanning protein that facilitates the passive diffusion of large molecules via shape recognition and change or that facilitates active transfer through energy-requiring conformational changes.
catabolic	Breaking down.
catastrophism	The school of thought that the Earth has been subjected to global catastrophic events that reshaped it.
cell cycle	A cell's life cycle involving several phases, including interphase, mitosis, and cytokinesis.
cellular respiration	The breakdown of organic molecules to harvest their energy for building ATP, using set of redox reactions.
cell wall	A relatively rigid but still flexible structure made of carbohydrates like cellulose and other molecules. The cell wall surrounds the plasma membrane and occurs plants and fungi and some bacteria and Archaea. It provides stability and support against gravity, in addition to protection.
central nervous system	The tissues of the brain and spinal cord.
centromere	Where sister chromatids attach.
centrosome	The structure of the cell that gives rise to and organizes the mitotic spindle during mitosis.
channel proteins	Proteins that span the plasma membrane and form aqueous channels, usually for the passage of charged particles like ions.
character displacement	The developmental of different forms of a trait between similar species because of competition.

---

checkpoint	The decisive timepoint in cell division in which the cell enters into G1 and begins preparing for cell division.
chemoautotroph	A chemotroph that builds its own organic molecules for nutrition.
chemotroph	obtains energy by oxidizing, or stripping electrons from, a molecule, usually a reduced compound.
climax community	The stable community at the peak of succession.
chlorophyll	Green pigment that reflects light wave in the green spectrum and absorbs primarily at the red and blue wavelengths; a key pigment in photosynthesis
chloroplast	A double-membrane-bound organelle where the process of photosynthesis takes place.
cholesterol	A lipid, technically a steroid with an alcohol, occurring in the cell membrane, primarily in animals; also the chemical precursor for steroid hormones and vitamin D, among other molecules.
convergent evolution	The process by which organisms evolve similar adaptations because of occupying similar ecological niches, even though they may not be closely related and/or occupy different geographical regions.
chromatid	The sister copy of a chromosome, attached to the original at the centromere.
chromatin	The combination of DNA packaged with protein.
chromosome	A discrete packet of DNA packaged together with proteins.
chymotrypsin	A pancreatic digestive enzyme.
clade	A group consisting of a common ancestor and all of its descendents.

---

cladistics	The science of classifying living organisms based on shared ancestry.
cladogram	The phylogenetic tree that represents the hypothesized evolutionary relationships among taxa.
cochlea	Site of the organ of Corti, which picks up sound wave vibrations and transmits them to the brain.
co-dominance	In inheritance, when a heterozygote expresses the phenotype of each of the alleles in its gene pair for a trait; ex. AB blood type.
codon	A sequence of three bases that serves as a code designating a specific amino acid or the termination of translation.
coelom	Body cavity.
coenzyme	A cofactor that aids in enzymatic activity.
coenzyme a	A coenzyme derived from B vitamin that is attached in a highly unstable bond to acetate to make acetyl CoA just before the Krebs cycle.
cohesins	Proteins holding sister chromatids together.
cohesion	The outcome of water molecules forming hydrogen bonds with other water molecules.
collecting duct	Structure in the nephron and the last place where water can be passed back into the blood.
collenchyma	A plant tissue that is part of the ground tissue system, gives the plant support.
colon	The part of the digestive tract following the small intestine and the site of water absorption and fecal formation.
colonizer	In community succession, species that alter the environment in ways that open up new niches.
commensalism	A symbiotic relationship that benefits one species and has no effect either way

---

competitive exclusion	The idea competition between two very similar species for the same niche will end in the extinction of one unless a compromise is made.
competitive inhibition	A regulatory pathway targeting enzymes in which a molecule inhibits the binding of the enzyme to a substrate by occupying the enzyme's active site.
complementary base pairing	The tendency of adenine (A) to pair with thymine (T) in DNA or uracil (U) in RNA and of cytosine (C) to pair with guanine (G).
cone	In the eye, the cone-shaped cells of the retina responsible for sensing color.
consumer	Any non-photosynthesizing organism in a food chain; can be primary (eating primary producers), secondary, tertiary, or quaternary.
continuous trait	Traits with measurements that vary along a continuum, rather than being discrete; ex. height.
cork cambium	Arises from the lateral meristem and produces the outer plant layers in widening (secondary) growth, including cork and bark.
corpus luteum	Literally, "yellow body"; the remains of the ovarian follicle after ovulation; secretes progesterone.
coprolite	Fossilized feces.
corpus callosum	The structure that connects the two hemispheres of the human brain.
cotyledon	Seed leaf; a way of classifying plants, based on the presence of one or two initial seed leaves.
coupled reaction	The coupling of an exergonic reaction to an endergonic reaction, with the free energy of the former fueling the latter.
covalent bond	The result of the sharing of a pair of electrons between two atoms.

---

Cowper's gland	Supports production of sperm in the testes.
crossing over	The exchange of genetic material between homologous chromosomes during prophase of meiosis I.
cyclic AMP	Also known as cAMP. An adenine nucleotide with one bound phosphate; plays a significant role in intracellular signaling involving second messengers.
cyclin	Protein that regulates cell division, give the signal to divide.
cyclin-dependent kinase	Protein that responds to cyclin signaling by phosphorylating molecules and kicking of the G1 phase of cell division.
cytokine	A signaling molecule involved in the body's inflammatory response.
cytokinesis	Splitting of the cytoplasm, the typical final stage of a cell cycle.
cytoplasm	The internal environment of the cell, encompassing the organelles, cytosol, and other structures.
cytoplasmic determinants	Molecules in the egg that direct early development after fertilization.
cytoplasmic receptors	Proteins in the cytoplasm that receive and respond to chemical signals.
cytosine	A nitrogenous base found in the nucleotide building blocks of DNA and RNA; a pyrimidine.
cytoskeleton	An intracellular structure that serves many purposes in prokaryotes and eukaryotes, including cell structure and shape, motion, and intracellular transport in eukaryotes.
cytosol	The liquid component of the internal environment of the cell, outside of the organelles.

---

cytotoxic T cells	A type of T cell that targets and kills infected cells.
dark reactions	The reactions of photosynthesis that can take place independent of sunlight.
degenerate	Refers to the redundancy in the genetic code: in many cases, an amino acid has more than one code word designating it.
dehydration synthesis	The process of linking monomers or building blocks together through covalent bonds formed by the removal of a water molecule.
dendrite	Extension from the soma of a neuron that interacts with the axon terminals of other neurons.
deoxyribose	The sugar component of a DNA nucleotide; a pentose sugar.
depolarization	A shift from the negative membrane potential of the inner membrane toward the positive.
deuterostome	Organism that develops a coelom anus first.
diastole	The period from when the heart atria fill to their contraction. Indicated by the upper number in a blood pressure reading.
differentiation	The process of cell specialization.
diploid	Having two sets of chromosomes per somatic cell.
diffusion	The passive movement of molecules from high to low concentration.
dihybrid cross	A genetic cross focusing on the genotypes for two traits, with each individual usually being heterozygous for each trait.
dimer	A pair of (usually) like molecules.
diploblast	An organism that forms two tissue layers during gastrulation.

---

distal convoluted tubule	Part of the nephron where wastes are passed into the filtrate at the last minute.
DNA	Deoxyribonucleic acid. A nucleic acid that is used to hold the genetic code for building proteins.
dominant allele	An allele is considered dominant if only one copy of it is required for its related phenotype to manifest.
dominant species	The species usually that is most numerous in a community or ecosystem.
dopamine	A neurotransmitter related to epinephrine and norepinephrine and involved in a number of signaling pathways, including those involving reward and pleasure.
dosage compensation	The process by which one sex equilibrates its dose of sex chromosomes when the sexes differ in their number of copies of these chromosomes.
double helix	The characteristic shape of double-stranded DNA, like a winding staircase or twisted ladder.
duodenum	The initial portion of the small intestine where digestion continues.
ecological isolating mechanism	A form of prezygotic isolating mechanism in which organisms of different species do not mate because of niche differences.
ectoderm	One of the three primary tissues arising from gastrulation, forming the outermost layer.
ectoparasite	A external parasite, like a tick.
efferent	Carrying signals from the inside out.
electromagnetic spectrum	The range of photon frequencies and wavelengths.
electronegativity	The ability of an atom to attract electrons,

---

electrons	A relatively tiny, negatively charged particle that orbits the nucleus of an atom.
electron transport chain	A chain consisting of a series of proteins along the inner mitochondrial membrane that participate in redox reactions and pump protons across the membrane against their gradient into the mitochondrial intermembrane space.
element	Substance consisting of the same kind of atom.
elongation	In transcription and translation, the process of building the nucleic acid strand (transcription) or peptide (translation).
emulsify	The process of breaking up fat.
endergonic	A reaction involving the input of free energy (energy in).
endocrine	Related to a system of communication involving signaling molecules called hormones.
endocytosis	An active process by which the cell takes in molecules from the external environment.
endoderm	One of the three primary tissues arising from gastrulation, forming the innermost layer.
endomembrane system	The membranous system in a eukaryotic cell that consists of a continuation of the nuclear membrane as the endoplasmic reticulum and that includes the Golgi apparatus. Involved in protein synthesis, folding, packaging, and transport.
endoparasite	An internal parasite, like a tapeworm.
endoplasmic reticulum	A network of interconnected tubules, vesicles, and sacs.
endorphins	Neurotransmitters associated with producing a peaceful, easy feeling.
endosperm	Triploid tissue in angiosperms form from the fusion of a pollen nucleus and diploid central cell; nourishes the plant embryo.

---

energy-investment phase	The initial phase of glycolysis, in which the energy carriers ATP and NADH are depleted.
enteric nervous system	The bundle of nerves with oversight of digestive processes.
entropy	The measure of the disorder of a system.
environmental resistance	The limiting effects of the environment on a population.
eosinophil	A white blood cell and granulocyte that targets parasites and bacteria and plays a role in allergic reactions.
epidermis	In plants, a tissue of the dermal tissue system derived from the protoderm of the apical meristem.
epinephrine (adrenaline)	A hormone and a neurotransmitter.
epithelium	Tissue formed by cells tightly packed together in sheets.
epistasis	The interaction of two or more independent gene pairs to determine a phenotype.
equilibrium	In biology, usually related to equal molecular concentrations on either side of a membrane.
erythropoietin	A hormone released by the kidneys that stimulates red blood cell production in the bone.
esophagus	The muscular tube that pushes food from the pharynx to into the stomach.
estrogen	A steroid hormone.
euchromatin	DNA and its proteins loosened up and available to be transcribed.
eudicot	A plant classification based on the presence of two seed leaves; was once called dicot.

---

eukaryote	A type of cell that contains a nucleus and membrane-bound organelles; the cell type that makes up all life assigned to the Eukarya domain and excludes organisms in the Bacteria and Archaea domains, which are prokaryotes (lacking a nucleus). Adj. eukaryotic, meaning have a nucleus.
eutherian	Mammal that completes embryonic and fetal development in a true uterus, with nutrition provided via the maternal blood.
eutrophication	In lakes and rivers, the gradual accumulation of nutrients, leading to an overgrowth of organisms.
enzyme	A molecule, usually a protein, that acts as a catalyst for biochemical reactions by lowering the activation energy required for the reaction to move forward.
excretion	Release of metabolic waste products across a plasma membrane.
exergonic	A reaction that releases free energy (energy out).
exocrine gland	A gland that secretes its contents into ducts.
exocytosis	The active process by which the cell releases molecules, usually from intracellular vesicles, into the external environment.
exons	Coding sequences of DNA.
exonucleases	Enzymes that remove nucleotides.
extinction	The disappearance of a taxon from existence.
extremophile	Organism that can thrive in extreme, usually inhospitable environments, such as high salt or high temperature.
facilitated diffusion	The passive movement of molecules across the plasma membrane through proteins that span the membrane, usually proteins with gated channels that can open and close or carrier proteins that handle larger molecules.

---

facultative	Refers to organisms that have a choice in terms of biochemical processes, usually related to metabolism.
FAD	flavin adenine dinucleotide; an electron carrier molecule active in cellular respiration in the Krebs cycle and in the electron transport chain.
fallopian tube	One of a pair of tubes that transports the egg from the ovary to the uterus; the site of fertilization.
fast block to polyspermy	An electrical response to block entry of more than one sperm into the egg.
fatty acid	A hydrocarbon chain attached to a carboxylic acid; the major component of a triglyceride.
feedback	A regulatory process in biochemical pathways in which a molecule or molecules, usually involved in the pathway, regulate(s) the function of the pathway.
fermentation	The anaerobic pathways of cellular respiration.
fertilization	The union of two gametes.
fertilization envelope	The fluid-filled barrier that forms after sperm recognition by the egg and prevents other sperm from fertilizing.
final electron acceptor	In the processes of cellular respiration and photosynthesis, the depleted electrons have a final acceptor. In cellular respiration, the acceptor is oxygen; in photosynthesis, it is ultimately NADPH <sup>+</sup> .
first messenger	The initial signaling molecule in a signaling cascade.
fitness	Related to the proportion of an individual's genes that occur in a population; often discussed in terms of reproductive success.

---

fixed action pattern	An innate behavior programmed in the genes that does not change with experience.
fluid mosaic	The current model of the plasma membrane, considering it as a fluid environment of diverse molecules.
follicle	An ovarian structure containing the oocyte and secreting estrogen.
food chain	The path of energy transfer through trophic levels, starting with the largest and most energy abundant, the producers.
food web	An elaboration on food chain, representing the more accurate real-world scenario in which food chains overlap and organisms can be represented in or use more than one.
founder effect	The effect in a population of reduced genetic variation if the population traces to only a few founding individuals.
frameshift mutation	A mutation that results in a shift of the reading frame.
free energy	The energy available to do work on a system.
functional groups	A group of atoms that confers specific characteristics and behaviors (functions) on a molecule.
fundamental niche	The niche a species might occupy in the absence of competition from similar species.
G-protein-coupled receptor	A membrane receptor protein associated with a G protein, operating in a classic second-messenger signaling pathway involving epinephrine.
G <sub>0</sub>	The cell resting phase.
G <sub>1</sub>	Gap phase, the first stage of interphase, a stage of growth and preparation for division.
G <sub>2</sub>	Gap phase 2, the third stage of interphase, when relevant organelles double.

---

gall bladder	The site of bile storage.
gamete	The result of meiosis, cells that have half the chromosome number of the parent cell. Ex. sperm or egg.
gametophyte	The multicellular structure that arises from a haploid cell in organisms that exhibit alternation of generations.
gap junctions	Protein channels through cell membranes that allow cytoplasmic communication between cells for passage of materials.
Gastrula	The embryo after gastrulation
gastrulation	The embryonic process that results in the formation of the initial three tissue layers of ectoderm, mesoderm, and endoderm.
gene expression	The process of transcribing a gene and using its code to build a protein (translation).
gene flow	The movement of alleles into or out of a population as a result of migration.
genetic drift	The process by which an allele becomes either fixed or lost in a population because of an absence of any selection pressure related to it.
genome	A complete set of DNA, e.g., all nuclear DNA in a cell.
genotype	The genetic combination that underlies a phenotype.
geographic isolating mechanism	A form of prezygotic isolating mechanism in which organisms of different species do not mate because of geographic separation.
germ cell	A cell that will undergo meiosis and give rise to gametes.

---

glial cell	Nervous system cells that provide support for neurons.
glomerulus	The wad of capillaries inside the Bowman's capsule of the kidney.
glucose	A carbohydrate and the building block (monomer) of starch, glycogen, and cellulose.
glyceraldehyde-3-phosphate	The product of the light-independent (dark) reactions of photosynthesis.
glycogen	The branched polymer of glucose molecules used for sugar storage in animals.
glycolysis	The breakdown of glucose into two molecules of pyruvate (pyruvic acid).
glycoprotein	A protein with a branched carbohydrate polymer attached to it, often emerging through the membrane to the outside and used for chemical signaling.
Golgi apparatus	An organelle consisting of membrane-bound stacks called cisternae. Responsible for packaging and modifying proteins and other biomolecules.
grana	Stacks of thylakoids in a chloroplast. Sing. granum.
granulocyte	A class of white blood cell that looks granular under microscopy.
ground meristem	Arises from the apical meristem in plants and in turn gives rise to the plant ground tissue system.
growth factor	Usually an cellular signaling molecule that triggers a growth response in the form of cell division.
guanine	A nitrogenous base found in the nucleotide building blocks of DNA and RNA; a purine.
guard cells	Paired cells in leaves that open and close the gap between them to regulate water loss.

---

gymnosperm	A vascular plant that makes “naked” seeds, i.e., no fruit or other seed accouterments; ex. pine.
habituation	Decline in response to a repeated stimulus; can be modification of an innate response.
halophile	Literally, "salt loving." Organisms that can live in high-salt environments; adj. halophilic.
hammer	A bone of the middle ear, involved in transmitting sound waves.
haploid	Having one set of chromosomes in a cell, or having half of the organism's somatic chromosome number.
heat	The workless transfer of energy from high temperature to low temperature.
helicase	Enzyme active in DNA replication, “unzipping” the helix.
hemocoel	The open circulatory system of insects.
heritable	Anything with a genetic component that can be passed from parent to offspring.
heterochromatin	Tightly packed DNA that is not available for transcription.
heterogamy	A state in which the male and female gametes are of different sizes.
heterosporous	In plants, an organism that produces spores that make either male or female gametophytes.
heterozygous	Describing an individual (heterozygote) carrying different alleles in its gene pair for a trait.
histamine	Both a neurotransmitter and a trigger of the inflammatory response; associated with allergies.
histone	Nuclear protein involved in DNA packaging.

---

homeostasis	Regulation of balance in the internal environment.
hominid	Species, living or extinct, in the family Hominidae, including apes, humans, and human ancestors.
homologous pair	A pair consisting of a paternal and a maternal chromosome with genes in the same order on each chromosome.
homologous trait	A trait that taxa share because of a common ancestry.
homosporous	In plants, an organism that produces a spore that yields a bisexual gametophyte.
homozygous	Describing an individual (homozygote) carrying identical alleles in its gene pair for a trait.
homozygous dominant	The condition in which the individual carries two identical, dominant alleles in its gene pair for a trait.
homozygous recessive	The condition in which the individual carries two identical, recessive alleles in its gene pair for a trait.
hormone	A blood-borne signaling molecule, usually either of lipid or amino acid/protein origin.
humoral defense	The immune response involving antibodies.
hybridization	The outcome of a mating event between two individuals that are not members of the same species.
hybrid vigor	The concept that some hybrids will exhibit increased fitness relative to the non-hybrid parent species.
hydride	Consists of two electrons and a single proton; put another way, a hydrogen atom with one extra electron.

---

hydrogen bond	An intermolecular attraction that arises between a charged atom or molecule and a polar molecule containing a hydrogen in a polar covalent bond.
hydrolases	Enzymes that break down macromolecules through the process of hydrolysis; the main active molecules of the lysosome.
hydrolysis	The process of breaking covalent bonds holding a polymer together through the addition of a water molecule.
hydrophobic	Literally, “water fearing”; a feature of molecules that lack charge and generally do not interact with polar or charged molecules, including water. Not soluble in water but may be fat soluble.
hydrophilic	Literally, “water loving”; a feature of molecules with a charge or that are ions. These molecules usually interact with water or other polar or charged molecules and are typically soluble in water but not in fat.
hyphae	The visible, multicellular haploid structures in fungus.
hypothalamus	A structure in the brain, lying below the thalamus, involved in many of the processes of homeostasis.
ileum	The last portion of the small intestine and the site of further absorption.
imprinting	During a window of time, the establishment of a behavior in response to a specific trigger, usually movement of the mother.
independent assortment	The law that states that in meiosis, chromosomes will assort into daughter cells independently of their parental origin (maternal or paternal); the outcome is a mix of paternally and maternally originated chromosomes in each daughter cell.
initiation	In transcription or translation, the steps that start the process.

---

inorganic carbon	A carbon-containing compound lacking hydrogen.
insight learning	Solving a novel problem without trial-and-error learning or previous experience.
integument	A tissue layer that protects the sporangium in angiosperms.
intermediate filament	A kind of filament made of proteins that forms part of the cytoskeleton.
interneuron	A central nervous system cell that serves as an adaptor to connect inputs and outputs.
intertidal zone	In oceans, the zone nearest the shore.
introns	Noncoding sequences of DNA in eukaryotic genes.
ionic bond	A bond formed between two oppositely charged ions.
intermembrane space	The space between the two membranes of a double-membrane-bound organelle, specifically the mitochondria or chloroplasts.
intermolecular bonds	Bonds formed between molecules, such as a hydrogen bond
interphase	The longest phase of the cell life cycle, consisting of three stages, G1, S, and G2.
interstitial cells	Cells of the seminiferous tubules, also known as Leydig cells; produce testosterone.
intramolecular bonds	Bonds formed within a molecule, such as covalent or ionic bonds.
iris	The colored portion of the eye.
isotope	Different form of an atom.
jejunum	The middle portion of the small intestine where much absorption takes place.

keystone species	A species whose relevance to the ecosystem is out of proportion with its representation.
kinetic energy	Energy of motion.
kinase	A class of enzymes with the job of adding a phosphate onto a molecule.
kinetochore	Region of the centromere where microtubules will attach in mitosis to pull sister chromatids apart.
Klinefelter syndrome	A trisomy in which the male has three sex chromosomes, two X and one Y.
Krebs cycle	The first aerobic step of cellular respiration in which energy from organic molecules entering the cycle is transferred to electron carriers for transport to the electron transport chain; takes place in the mitochondrial matrix.
lactic acid fermentation	An anaerobic pathway of cellular respiration that yields lactic acid as a byproduct.
Lagging strand	In DNA replication, the strand on which the newly forming DNA strand is built in the direction opposite of the replication process.
lateral meristem	The embryonic plant tissue responsible for thickening or widening growth of the plant.
lateral root	Root extensions from the central, or tap, root.
Law of Segregation	The allele pairs underlying a phenotype will separate during the making of gametes (when homologues and then chromatids separate during meiosis).
leading strand	In DNA replication, the strand on which the newly forming DNA strand is built in the direction of replication.
leukocyte	A white blood cell.
ligand	A molecule that interacts with the binding site of a protein.

---

ligase	Enzyme that seals up gaps between nucleotides.
light reactions	Reactions of photosynthesis that depend on sunlight.
limnetic zone	In freshwater, the open water away from the shore where light still penetrates.
linked genes	Genes encoding different traits that appear to be linked because of their proximity to each other on the same chromosome.
linker DNA	The DNA strands that link the bead-nucleosomes together in DNA packing.
lipid	A class of the four big biomolecules; includes dietary fats, cholesterol, and phospholipids.
lithoautotrophs	Organisms that derive energy from minerals in rocks for building their own organic compounds for nutrition.
lithoheterotrophs	Lithotrophs that acquire organic compounds for nutrition from other sources.
lithotrophs	Bacteria that derive energy from minerals in rocks.
littoral zone	In freshwater, the shallow area near the shore where light penetrates.
looped domain	In DNA packing, a set of 30-nm fibers looped together in a daisy-like formation.
loop of Henle	The site in the nephron where water is kicked back into the blood and the filtrate is concentrated.
lumen	The open space inside a tube-like structure.
luteal phase	In the menstrual cycle, the phase following ovulation when the corpus luteum produces progesterone.

---

lysogenic cycle	The "benign" infection of a virus in a bacterium, in which the viral genome is silently incorporated into the bacterial genome and replicates with it.
lysosome	A membrane-bound organelle that breaks down macromolecules through hydrolysis.
lytic cycle	The deadly form of infection of a virus in a bacterium in which the viruses hijack the bacterial machinery to produce more viruses, eventually destroying the host.
macrophage	A type of white blood cell that phagocytoses infected cells and other things.
major histocompatibility complex	Plays a role in helping the immune system distinguish self and non-self cells.
Malpighian tubules	Excretory structures in insects.
marsupial	A group of mammals that does not complete development in the uterus but instead emerges early and completes development in a pouch; ex. kangaroo.
mast cell	A cell harboring granules full of histamine.
mating type	In yeasts, the haploid cells that signal or respond to chemical signaling by achieving sexual reproduction.
mechanical isolation	A type of prezygotic isolating mechanism in which organisms are unable to mate because of physical incompatibility of reproductive structures.
meiosis	Specialized cell division that halves the chromosome number for sexual reproduction.
memory B cells	A type of B cell charged with remembering a specific antibody for targeting a specific invader.
memory T cells	A type of T cell charged with remembering and recognizing previously encountered foreign invaders.

Mendelian genetics	The basic transfer of hereditary information in genes from parent to offspring.
menstruation	The shedding of the uterine lining in the absence of implantation.
meristem	A source of embryonic tissue in the plant that allows it to continue growth throughout its life.
mesenchyme	A tissue formed by cells in loose conformation.
mesoderm	One of the three primary tissues arising from gastrulation, forming the middle tissue layer of the embryo.
mesophyll	Cells in the leaf specialized for photosynthesis.
metabolism	All of the biochemical processes that take place in an organism.
metastasis	The spread of cancer cells from their original location to other tissues.
methionine	Amino acid; encoded by the start codon, AUG.
micelle	"Fatty bubble" formed by spontaneous orientation of fatty acids into a ball in an aqueous environment.
microfilaments	In eukaryotes, thin filaments made of actin that form part of the cytoskeleton.
microglia	When activated, phagocytose dead cells in nerve tissue.
micropyle	In plants, a pore that leads into the ovule.
microtubules	The thick filaments of the cytoskeleton in eukaryotes, made of tubulin proteins. Involved in intracellular transport and cell division.
microvilli	The fingerlike extensions on the villi of the intestinal wall that further increase the absorption area.

---

mid-blastula transition	A critical time in early embryonic development when developmental control shifts from maternal to embryonic.
mitochondria	Cellular organelles where most of cellular respiration and the building of ATP takes place. A double-membrane-bound organelle with its own DNA and ribosomes. Sing. mitochondrion.
mitosis	A stage of cell division; specifically, division of the nucleus.
mitotic spindle	An array of microtubules from each pole of the cell that attach to the kinetochores of sister chromatids and pull them apart.
mixotrophs	Organisms that can either fix carbon for building organic molecules or acquire organic molecules from other sources.
molarity	Grams per liter of a substance; given as M, a unit of concentration.
monocot	A plant classification based on the presence of one seed leaf, or cotyledon.
monohybrid cross	A genetic cross focused on the genotype for a single trait, usually involving two heterozygotes.
monomer	A unit or building block for large molecules; ex: nucleotides used to build DNA or amino acids used to build proteins.
monosomy	Having only one chromosome, instead of two, in one of the pairs of the chromosome set.
monotreme	Egg-laying mammal; ex. platypus.
morphological species concept	A way of determining species based on form.
Morula	The embryo at the “mulberry” stage (morula = mulberry), consisting of about 16 blastomeres. Just prior to the blastula/blastocyst stage.
mRNA	Messenger RNA, the clean copy of the genetic code that enters the cytoplasm for translation.

	The result of transcription and other processes in the nucleus.
Müllerian mimicry	A type of mimicry in which a harmful species mimics another harmful species, with the result that both species may benefit.
multiple alleles	In humans, when a trait has more than two possible alleles encoding it.
multiregional hypothesis	The hypothesis that modern humans arose outside of Africa from ancestors that migrated from Africa to different regions and maintained species integrity through migration/gene flow.
mutualism	A symbiotic relationship between species that is mutually beneficial.
mycelium	The result of fusion of fungal hyphae.
mycorrhizal	Having to do with fungi, specifically here referring to the mutually beneficial association between plants and fungi.
myelin	Fatty insulating sheath around neuronal axons.
NAD <sup>+</sup>	also nicotinamide adenine dinucleotide; an electron carrier with important roles in cellular respiration.
NADH	The reduced form of NAD <sup>+</sup> .
NADPH	The plant version of an electron carrier.
natural killer cells	A white blood cell and lymphocyte that takes out infected or abnormal cells by poking holes in them with perforin, triggering apoptosis.
negative feedback	The most common way the body maintains system balance or homeostasis; regulation often occurs by pathway inhibition via one of its products.
negative membrane potential	Describes the resting membrane potential of a nerve cell, when the inside of the membrane is negative relative to the outside.

---

nephridia	Kidney-like structures in earthworms.
nephron	The functional unit of the kidney.
neritic zone	Usually stable zone in oceans between the intertidal and oceanic zones, from the low tide mark to the dropoff of the continental shelf.
neural tube	The embryonic structure that arises from neurulation; will develop into the central nervous system.
neuron	A nerve cell.
neurotransmitter	A signaling molecule that operates in message propagation among nerve cells.
Neurula	The embryo after neurulation.
neurulation	The process in early embryonic development that results in production of the brain and spinal cord.
neutrons	A particle with no charge in the nucleus of an atom.
neutrophil	A lymphocyte and a granulocyte and the most common of the white blood cells, charged with destroying invaders through phagocytosis in nonspecific defense.
niche	How an organism/species fits into and uses its environment.
nitrogenous base	A component of a nucleotide, the building block of nucleic acids. Nitrogenous bases determine the identity of the nucleotide; e.g., the nucleotide that contains the nitrogenous base adenine is adenosine, designated as A.
noble gas	The atoms of noble gases have full outer electron shells, so they are both stable and neutral and do not engage in chemical interaction with other atoms.
node	In plants, where the leaf attaches to the stem.

---

nodule	In the symbiotic relationship between plants and bacteria, the structure at the root that harbors the nitrogen-fixing bacteria.
nonpolar	Having no areas of charge. Usually, nonpolar molecules are also hydrophobic.
nonpolar covalent bond	A covalent bond formed between atoms of roughly equal electronegativities.
nuclear pores	Highly regulated exit/entry points located in the nuclear membrane.
nuclear receptors	Proteins in the nucleus that receive chemical messages, usually responding by regulating gene expression.
nucleic acid	A class of the four big biomolecules; the two representatives of this class, which consist of nucleotides linked in a chain, are deoxyribonucleic acid (DNA) and ribonucleic acid (RNA).
nucleolus	Site of ribosomal RNA synthesis in the nucleus.
nucleosome	A level of DNA packing, the "bead" formed by DNA wrapped around histones.
nucleotide	The building block or monomer of a nucleic acid; for DNA or RNA, each nucleotide consists of a sugar (ribose for RNA; deoxyribose for DNA), a phosphate, and a base (AGCT for DNA; AGCU for RNA).
nucleus	Membrane-bound organelle found in many eukaryotic cells; houses the DNA and related proteins and the site of the nucleolus, where ribosomal RNA is transcribed.
obligate	Refers to organisms that must use a specific pathway for metabolism.
oceanic zone	In oceans, the water away from the shore that light penetrates.

Okazaki fragments	Short DNA sequences on the lagging strand in replication, separated by gaps where RNA primers were.
oligodendroglia	In the central nervous system, produce myelin.
oogenesis	Meiosis resulting the production of an egg.
optic nerve	The thick nerve that carries visual sensory information from the retina to the brain.
organic	In chemistry or biology, refers to carbon-containing compounds.
organ of Corti	A structure of the cochlea of the inner ear; has receptor cells that transmit the information of sound wave vibrations to the brain.
organotrophs	Organisms, such as bacteria, that derive their energy from organic compounds.
origin of replication	The meeting point of two replication forks, where replication in each direction begins.
osmosis	A special case of diffusion, referring only to the movement of water molecules from high to low concentration, across a semipermeable membrane.
outgroup	In phylogenetics, the species or taxon that represents the ancestral condition, having no shared, derived traits relative to the other taxa under consideration.
Out of Africa hypothesis	The hypothesis that modern humans arose in Africa and migrated out.
ovary	The female gonad.
ovulation	Release of an egg into the fallopian tube.
oxaloacetate	The four-carbon molecule that binds with acetyl CoA to enter into the Krebs cycle, and the final molecule to emerge from the cycle.
oxidize	When a molecule has an electron removed.

---

oxytocin	A peptide hormone secreted by the posterior pituitary and involved in childbirth, breastfeeding, and trusting.
p53	A protein that plays a critical role in many cancers when it becomes unable to regulate cell division.
P680	Chlorophyll <i>a</i> molecules in photosystem II, absorb at a wavelength of 680 nm.
P700	Chlorophyll <i>a</i> molecules in photosystem I, absorb at a wavelength of 700 nm.
pandemic	A level of illness outbreak affecting two or more geographic areas around the globe, such as occurring on two continents.
panspermia	The idea that life on Earth may have been seeded from extraterrestrial sources.
paracrine signaling	Signaling between neighboring cells.
parasitism	A symbiotic relationship between two species in which the host suffers harm and the parasite benefits.
parasympathetic nervous system	The part of the autonomic nervous system that takes care of involuntary housekeeping processes, "rest and rumination."
parenchyma	In plants, a thin-walled tissue arising from the ground tissue system and forming many of the plants soft or spongy tissues.
parsimony	The approach of preferring the simplest explanation or construct for a biological phenomenon; used in phylogenetics.
passive	Related to movement of molecules, their movement from a high to low concentration, not requiring an energy input. An exergonic reaction that releases energy.
pathogenic	Disease causing.

---

pelagic zone	Open water, non-benthic.
pepsin	A gastric enzyme that breaks down proteins.
peptide	A short sequence of amino acids.
peptide hormone	A type of blood-borne signaling molecule that consists of amino acids.
peripheral nervous system	The motor and sensory nerve system outside of the brain and spinal cord.
peristalsis	Waves of involuntary muscle contraction.
petiole	Where the leaf attaches to the plant.
pH and the pH scale	Indicating the concentration of H <sup>+</sup> ions in a solution and the solution's acidity. The scale uses the negative log of the H <sup>+</sup> concentration, with values from 0 to 14.
phagocytosis	The ingestion of solid particles by the cell, a process requiring energy input.
pharynx	The opening into the trachea and the esophagus.
phenotype	An observable characteristic of an organism.
pheromones	Chemical signaling molecules involved in mating and other behaviors.
phosphatase	An enzyme that removes a phosphate from a molecule.
phospholipid	A kind of lipid and the major component of cell membranes; consists of a polar head that interacts well with water and two fatty acid tails that are hydrophobic. Forms a bilayer in the cell membrane with the tails of each layer oriented inward.
phosphorylation	The process of adding a phosphate to a molecule.

---

phosphorylation cascade	A chain-reaction signaling pathway in which each molecule adds a phosphate to the next in the sequence.
photic zone	In water, the zone where light can penetrate.
photolithotrophs	Organisms that can capture energy from the sun and also use inorganic compounds as electron donors.
photon	The basic unit of light; relevant in photosynthesis.
photosynthesis	The process by which certain organisms, including plants, capture energy from the sun and use it to rearrange carbon-containing molecules and water to build sugars and other organic compounds.
photosystems I and II	The molecular systems involved in the capture and transfer of sunlight energy in photosynthesis. Each photosystem contains a light-harvesting complex, a reaction-center complex, and a primary electron acceptor.
phototrophs	Organisms, such as bacteria, use sunlight as their energy source.
phycobiliprotein	A pigment that is critical to photosynthesis in cyanobacteria.
phycobilisome	The cell structure in prokaryotes that harbors phycobiliprotein.
phylogenetics	The study of biological evolutionary history.
phylogeny	Evolutionary history.
pinocytosis	Known more familiarly as “cell drinking,” the active process by which the cell takes in extracellular fluid and its solid components.
pistil	The reproductive structures of the female angiosperm.

---

pituitary	A brain structure lying below the hypothalamus, involved in many of the homeostatic pathways of the body and divided into anterior and posterior parts.
plasma cells	A type of B cell responsible for producing antibodies.
plasma membrane	The phospholipid bilayer that separates the internal world of the cell from the external world. Also contains proteins, cholesterol, and other molecules and exists as a fluid mosaic that serves as the cell's first line of security.
plasmodesmata	The plant's version of a gap junction: protein channels allowing exchange of materials between plant cells.
plasmogamy	The process of hyphae fusion in fungus to form mycelium.
polar	Having distinct ends or parts, as in a water molecule. Polar molecules are usually hydrophilic.
polar body	In meiosis in females, the three nonfunctional cells that result in addition to the production of a large, functional gamete (the egg).
polar covalent bond	A covalent bond formed between atoms of unequal electronegativities, resulting in a polar molecule.
pollen	The plant male gametophyte that harbors the male gametes.
pollen tube	Extension from pollen into female structure in plants.
pollination	The arrival of a pollen grain at the female micropyle or stigma.
polyadenylation signal sequence	Sequence in eukaryotic DNA that signals termination of transcription.

---

poly-A tail	One of the additions made to the messenger RNA, at the 3' end, before it makes its way to the cytoplasm.
polymer	A large molecule built from smaller units or building blocks referred to as monomers; ex DNA, built from nucleotides, or protein, built from amino acids.
polymerase	Enzyme that builds polymers or chains from building blocks (monomers).
polymorphic	Have more than one form/type/phenotype; noun. polymorphism.
polypeptide	A chain of peptides linked together.
polysaccharide	A polymer built from monomers of single sugars (saccharides).
population	A group of organisms that are all members of the same species, often occupying the same geographical area. The smallest biological unit that evolves.
positive feedback	A less frequently used mechanism of feedback in which an endpoint product increases pathway activity.
post-transcriptional regulation	Regulation of gene expression that happens after transcription but before translation.
post-translational regulation	Regulation of gene expression that happens after translation.
potential energy	The energy of position or location.
prezygotic isolating mechanism	Any block to the formation of a hybrid zygote by organisms that do not belong to the same species.
primary producer	The base of the food chain, the first trophic level, consisting of organisms that photosynthesize. Contains the most biomass of any trophic level in the chain.

---

primary succession	The formation of a community beginning with bare rock; usually occurs over long periods of time.
primase	Enzyme that builds RNA primer “lures” on the lagging strand for DNA polymerase in DNA replication.
primitive trait	A character that is/was present in the common ancestor of a group of organisms.
prion	Infectious proteinaceous particle that can causes other proteins to misfold.
prolactin	A hormone secreted by the anterior pituitary and involved in parenting behaviors and milk production.
prophage	Form of bacteria-infecting virus that does not immediately destroy its host.
protease	A protein that breaks down other proteins.
protonemata	In moss and other bryophytes, the one-cell thick filamentous growths of the gametophyte, the part we see and recognize as “moss.”
protostome	Organism that develops a coelem mouth first.
Punnett square	A visual representation of the genotypes of a pair of gametes and the possible genotypic outcomes of their union.
primary growth	In plants, the lengthening growth driven by the apical meristem.
primary oocyte	The cell that undergoes meiosis I.
primary structure, protein	The order of covalently bonded amino acids in the polypeptide chain.
procambium	Arises from the apical meristem in plants and in turn gives rise to the plant vascular tissue system.
progesterone	A steroid hormone.

---

prokaryote	A single-celled organism lacking a nucleus. Bacteria and Archaea are all prokaryotes. (Adj. prokaryotic; refers to cell type lacking nucleus).
promoter	A sequence in the DNA that allows binding of the machinery that will initiate transcription. A major player in regulation of gene expression.
proprioception	A sense involving self perception and awareness of the organism's relative location in space.
prostate gland	Supports development of sperm in the testes.
protein	A class of the four big biomolecules; proteins consist of amino acids linked together in a chain.
protein pumps	Proteins that use active processes to pump molecules against their concentration gradient, from low to high, usually across the plasma membrane.
protoderm	Arises from the apical meristem in plants and in turn gives rise to the dermal tissue system.
proton	A positively charged particle in the nucleus of an atom; also, a hydrogen ion (H <sup>+</sup> ).
proximal convoluted tubule	The site of the nephron from which ions and other solutes are filtered back into the blood.
purine	One of the two groups of nitrogenous bases that make up one of the components of a nucleotide; the purines are adenine and guanine, and each has two nitrogenous carbon rings.
pyloric sphincter	The ring of muscle at the end of the stomach that leads into the small intestine.
pyrimidines	One of the two groups of nitrogenous bases that make up one of the components of a nucleotide; the pyrimidines are cytosine, thymine, and uracil, and each has one nitrogenous carbon ring.
pyrogen	A chemical produced by the body that triggers fever.

pyruvate	The three-carbon molecule resulting from the process of glycolysis; also called pyruvic acid.
quaternary structure of a protein	A complex protein formed from two or more polypeptide chains in their tertiary structures interacting as a single unit.
reading frame	The reading of nucleotides in groups of three, set by the start codon, AUG.
realized niche	The niche a species occupies when in competition with similar species to use the environment in similar ways.
receptor tyrosine kinase	A membrane receptor that pairs with another such receptor in cellular signaling; the two phosphorylate each other at the amino acid tyrosine.
recessive allele	An allele is considered recessive if two copies are required for the related phenotype to manifest.
redox reaction	The combination of oxidation (taking away electrons) and reduction (adding electrons).
reduced	When a molecule has an electron added to it.
releasing hormone	A general group of hormones secreted from the hypothalamus that trigger release of stimulating hormones from the pituitary.
renal pelvis	Kidney structure where filtrate is funneled before entering the ureters.
replication	The copying of DNA into DNA.
replication bubble	The conformation that results from two replication forks facing each other at their mutual origin of replication.
replication fork	Forklike formation in which each of the two "tines" are parent DNA strands being used as templates for new DNA strands; replication is occurring in the direction where the "tines" intersect to form a "V."

---

resource partitioning	The divvying up of a niche as a resulting of competition between similar species for the same niche.
retina	The sensory tissue of the eye, at the back of the eyeball, home to the light- and color-sensing rods and cones.
retrovirus	A type of virus that uses RNA rather than DNA as genetic material; ex. HIV.
reverse transcriptase	Enzyme of retroviruses that copies the viral RNA into DNA in the host cell.
rhizoid	A filamentous cell or cells that serve to anchor moss gametophytes to the substrate.
ribose	The sugar component of an RNA nucleotide; a pentose sugar.
ribosome	A cellular structure found in the cytoplasm and consisting of RNA and associated proteins assembled into two subunits. Responsible for “reading” the instructions (messenger RNA) for building proteins and the site of protein synthesis. Can occur freely or bound to endoplasmic reticulum.
ribozyme	A form of RNA that behaves as an enzyme; under certain conditions, an RNA ribozyme can catalyze copying of RNA.
ribulose biphosphate	Five carbon sugar that kicks off the light-independent (dark) reactions of photosynthesis. Also called RuBP.
RNA	Ribonucleic acid. The nucleic acid that has three separate major functions in the cell involved with using the genetic code to build proteins.
rod	In the retina of the eye, the rod-shaped cells responsible for sensing light.
root hairs	In plants, cell extensions on the roots to increase nutrient absorption.

---

rough endoplasmic reticulum	Consisting of the endoplasmic reticulum and associate ribosomes; the site of protein synthesis.
rubisco	RuBP carboxylase, the enzyme that fixes carbon from carbon dioxide in the Calvin cycle during the light-independent (dark) reactions of photosynthesis.
S phase	The middle (synthesis) stage of interphase, when DNA synthesis takes place.
saprobe	An organism that eats dead stuff.
sarcomere	Unit of contraction of muscle, consisting overlapping thin (actin) and thick (myosin) filaments that interact.
sarcoplasmic reticulum	A kind of smooth endoplasmic reticulum found in muscle cells and responsible for calcium storage and release that triggers muscle contraction.
saturated fat	A fat consisting of triglycerides lacking double bonds between carbons and that is completely saturated in every possible space with hydrogens single bonded to the carbons in the chain.
Schwann cells	Produce myelin in the peripheral nervous system.
sclerenchyma	A plant tissue that forms part of the ground tissue system and is characterized by consisting of dead cells at maturity. Provides support and storage.
scrotum	The sac that contains the testes.
secondary growth	In plants, the widening growth driven by the lateral meristem.
secondary structure, protein	The various structures that are formed from interactions of amino acids in different parts of a polypeptide chain.
secondary succession	The formation of a community starting with soil; usually occurs over a shorter period of time.

---

self cross	In genetics, using a plant's own pollen to fertilize its ovule.
semi-conservative	Refers to the nature of DNA replication; the result of the process conserves one of the parental strands in each new double strand, so the parental strands are semi-conserved.
seminal vesicles	A pair of glands that secrete seminal fluid and provide nutritional support for sperm.
seminiferous tubules	The location of meiosis in the male testes.
sensitization	Amplification of a response to a repeated stimulus.
serotonin	A neurotransmitter made from the amino acid tryptophan and involved in regulating mood; also a prominent gut neurotransmitter.
Sertoli cells	In the testes, cells that provide nutritional support for the spermatogonia.
sessile	Adhered to the substrate, not mobile.
slow block to polyspermy	A chemical block at fertilization to prevent entry of more than one sperm into the egg.
smooth endoplasmic reticulum	A part of the endoplasmic reticulum involved in lipid synthesis and detoxification.
sodium-potassium pump	A transport protein active in neurons that uses energy to transport potassium into the cell while pushing sodium out.
soma	In neurons, the cell body.
somatic cell	In multicellular organisms, the cells that do not undergo meiosis or are products of meiosis.
SOS mechanism	Identified so far in bacteria, the final resort to save the cell in situations of severe DNA damage.

---

specific heat	The amount of heat required to raise the temperature of 1 g of a substance 1 degree Celsius.
spermatogenesis	Meiosis that results in the production of sperm.
spermatogonia	Cells that will undergo meiosis to make sperm.
sphincter	A circular muscle, found in many organ systems.
spliceosome	Collection of nuclear molecules that removes introns from newly transcribed RNA.
sporangium	In organisms exhibiting alternation of generations, the structure at the tip of the sporophyte that will produce haploid spores by meiosis.
sporophyte	In organisms exhibiting alternation of generations, the multicellular structure that arises from a diploid fertilized cell, destined to produce haploid spores.
stamen	Structure on a male angiosperm consisting of a filament and an anther, harboring the pollen.
starch	A branched polymer of glucose molecules, all oriented in the same way, used for energy storage in plants.
start codon	In translation, the codon that alerts ribosomes to begin the process; always AUG, which is code for the amino acid methionine.
stele	In plants, the combination of xylem and phloem and other tissues.
steroid hormone	A kind of lipid employed as a signaling molecule; includes testosterone, estrogens, and progesterone.
stigma	Tube on the female angiosperm plant leading into the ovule; where the pollen enters at pollination.

---

stimulating hormone	A general type of hormone released from the anterior pituitary in response to releasing hormone signals from the hypothalamus.
stirrup	A bone of the middle ear involved in transmitting sound waves.
stomata	Pores in the leaf and stem for gas exchange; sing. stoma.
stop codon	Three codons that trigger termination of translation: UAG, UGA, UAA.
stroma	In chloroplasts, the fluid that surrounds the internal structures of the organelle.
style	In the female angiosperm, the tube connecting the stigma and the ovary.
substrate	The molecular target of an enzyme.
substrate-level phosphorylation	The process of adding phosphate to an ADP substrate during the final steps of cellular respiration.
suppressor T cells	A type of T cell that inhibits the cell-mediated response.
surface-to-volume ratio	One of the limiting features of cell size; the surface area must be sufficient to transfer the nutrients and other necessities to the entire cell. Limited in prokaryotes by the lack of a cytoskeleton and compartmentalization of processes.
symbiosis	Two species living together.
sympathetic nervous system	The part of the autonomic nervous system responsible for the "fight-or-flight" response.
sympatric	Refers to populations occupying the same geographical area; often used to describe a mechanism of speciation.

---

symplesiomorphy	A shared, primitive or ancestral trait, not so informative for distinguishing evolutionary relationships among taxa.
synapomorphy	A shared, derived trait; useful in determining evolutionary relationships among taxa.
synapsis	The physical pairing of homologous chromosome pairs during prophase of meiosis I, as part of the process of crossing over.
synaptic cleft	The space between an axon terminal of one neuron and the dendrite of the next neuron.
systematics	The study of evolutionary relatedness among organisms.
systole	The period of ventricular contraction; indicated by the second number in a blood pressure reading.
T cell	A type of lymphocyte involved in the cell-mediated immune response; matures in the thymus.
taxon	A group of organisms considered as a related unit, such as a species or all the species in a genus; pl. taxa.
taxonomy	The science of classification.
termination	In transcription or translation, the end of the process, triggered by specialized cell machinery and recognition.
tertiary structure, protein	The final folded structure of a single polypeptide chain, derived from the interactions among the secondary structures along the chain.
testes	The male gonads; singular, testis.
testosterone	A steroid hormone.
thermodynamics	The study of the transfer and transformation of energy.

---

thermophile	Organism that thrives in high-temperature environments, such as deep ocean vents or hot springs.
thylakoid	A membrane-bound compartment in the chloroplasts of plants and in some other photosynthesizing organisms where the light reactions of photosynthesis take place.
thymine	A nitrogenous base found in the nucleotide building blocks of DNA; a pyrimidine.
thymus	Site of maturation of T cells.
tight junctions	Junctions joining cells together so tightly that liquid cannot penetrate.
trace elements	Elements occurring in tiny amounts in an organism but necessary at those low levels for survival or healthy function.
trace fossils	Non-body fossils formed by traces organisms leave behind; ex. footprints.
trachea	The tube leading to the lungs.
trait	A feature of an organism, usually with a genetic component.
transcription	The process of copying the genetic code from DNA into RNA.
transcriptional regulation	Regulation of gene expression that occurs during transcription.
transcription factor	Proteins, usually in the nucleus, that respond to chemical messages by regulating gene transcription.
transduction (signal)	The process cells use to convert signals from one form to another, usually using biochemical pathways.
transformation	Change in genotype or phenotype resulting from uptake of DNA; common in prokaryotes.

---

<i>trans</i> fat	An unsaturated fat chemically modified through the breaking of double carbon bonds and the addition of hydrogens; the <i>trans</i> refers to a specific side of the molecule.
translation	The process of using the code embedded in messenger RNA to build proteins.
transpiration	Evaporation of water from plants.
transport protein	A protein that spans the plasma membrane and plays a role in the transport of molecules across the membrane.
triglyceride	A dietary fat consisting of a glycerol head with three fatty acid tails attached. Can be saturated or unsaturated.
triploblast	An organism that forms three tissue layers from gastrulation.
trisomy	Having three chromosomes, instead of a pair, for one of the chromosome pairs in a chromosome set.
tRNA	Transfer RNA, the nucleic acid that carries the anticodon sequence associated with a specific amino acid. The anticodon sequence, if matched to a codon during translation, will result in the tRNA transferring the amino acid it carries to the growing peptide chain.
trophic	Relating to nutrition.
trophic level	Feeding or energy level in a food chain.
trypsin	A pancreatic digestive enzyme.
tubulin	A common protein used structurally to form the microtubules of the cytoskeleton.
tumor suppressor gene	A gene that encodes a protein that regulates or limits cell division (i.e., if it's doing its job, it suppresses tumor formation).

---

Turner syndrome	A monosomy in which the individual has only one sex chromosome, an X.
uniformitarianism	The philosophy that the natural process we see around us today have been operating throughout Earth's history.
unsaturated fat	A fat consisting of triglycerides containing one or more double-bonded carbons so that it is not completely saturated with hydrogens.
uracil	A nitrogenous base found in the nucleotide building blocks of RNA; a pyrimidine.
ureter	Tube that drains from the kidney to the bladder.
urethra	Tube that drains from the bladder out of you.
uterus	Muscular organ that leads through a neck called the cervix to the vagina; site of egg implantation and gestation.
vacuole	A large storage vesicle, usually for storing water (as in a plant's central vacuole) or molecules suspended in water.
valence	Number of electrons in an atom's outermost shell.
vascular	Having a vessel system for nutrient and fluid transport; a way of classifying plants or plant tissues.
vascular cambium	Arises from the lateral meristem in plants and in turn gives rise to the vascular tissues the plant needs in its widening (secondary) growth.
vas deferens	The tube that delivers sperm from the testes to the urethra.
venation	Patterning of veins, specifically used in classifying plants based leaf venation.
ventricle	A lower chamber of the heart.
venules	Small veins.

vesicle	A small membrane-enclosed sac in the cell used for transporting molecules.
vertebrate	Of the group of animals having a backbone or developmental precursors of one.
villi	In the intestine, finger-like cell projections that increase the surface area for absorption.
viroids	Single-stranded RNA pathogens known to infect plants.
virulence	Refers to how infectious a pathogen is and how severe the consequences of infection are.
vitelline membrane	In non-mammals, the equivalent of the mammalian zona pellucida.
work	The transfer of energy by a force acting over a distance.
X-linked inheritance	Refers to phenotypes traceable to genes on the X chromosome.
xylem	The tubes in a plant that carry water.
yeast	A single-celled fungus.
zona pellucida	A glycoprotein-rich structure surrounding the egg and mediating sperm-egg recognition.
zygote	The cell that results from the union of two gametes, typically with the somatic chromosome number restored.

---