Glossary

A

abscisic acid (ab-siz′ik as′id) (ABA) a growth-inhibiting hormone of plants; it is involved with other hormones in dormancy (p. 197)
abscission (ab-sizh′un) the separation of leaves, flowers, and fruits from plants after the formation of an abscission zone at the base of their petioles, peduncles, and pedicels (p. 122)
achene (uh-keen′) a single-seeded fruit in which the seed is attached to the pericarp only at its base (p. 136)
acid (as′id) a substance that dissociates in water, releasing hydrogen ions (p. 20)
active transport (ak′tiv trans′port) the expenditure of energy by a cell in moving a substance across a plasma membrane against a diffusion gradient (p. 154)
adventitious (ad-ven-tish′uss) said of buds developing in internodes or on roots, or of roots developing along stems or on leaves (p. 71, 259)
aerobic respiration (air-oh′bik res-puh-ray′shun) respiration that requires free oxygen (p. 180)
agar (ah′gur) a gelatinous substance produced by certain red algae and also a few brown algae; it is often used as a culture medium, particularly for bacteria (p. 193, 333)
aggregate fruit (ag′gruh-git froot) a fruit derived from a single flower having several to many pistils (p. 137)
air layering (air lay′urr-ing) an asexual plant propagation technique whereby aerial stems are induced to form roots. The rooted portion of the stem is then cut and planted (p. 260)
algin (al′jin) a gelatinous substance produced by certain brown algae; it is used in a wide variety of food substances and in pharmaceutical, industrial, and household products (p. 329)
allele (uh-leel′) one of at least two alternative forms of a gene (p. 237)
Alternation of Generations (ol-tur-nay′shun uv jen-ur-ay′shunz) alternation between a haploid gametophyte phase and a diploid sporophyte phase in the life cycle of sexually reproducing organisms (p. 221, 374)
amino acid (ah-mee′noh as′id) one of the organic, nitrogen-containing units from which proteins are synthesized; there are about 20 in all proteins (p. 24)
amino group (ah-mee′noh groop) the $–NH_2$ portion of an amino acid (p. 24)
anaerobic respiration (an-air-oh′bik res-puh-ray′shun) respiration in which the hydrogen removed from the glucose during glycolysis is combined with an organic ion (instead of oxygen) (p. 180)
aneuploid (an′you-ploid) an aberration in normal chromosome number in which one or more extra chromosomes are present or one or more chromsomes are missing (p. 235)
angiosperm (an′jee-oh-spurm) a plant whose seeds develop within ovaries that mature into fruits (p. 429)
annual (an′you-ul) a plant that completes its entire life cycle in a single growing season (p. 89, 129, 480)
annual ring (an′you-ul ring) a single season's production of xylem (wood) by the vascular cambium (p. 91)
annulus (an′yu-luss) a specialized layer of cells around a fern sporangium; it aids in spore dispersal through a springlike action; also a membranous ring around the stipe of a mushroom (p. 399)
anther (an′thur) the pollen-bearing part of a stamen (p. 131, 430)
antheridiophore (an-thur-id′ee-oh-for) a stalk that bears an antheridium (p. 376)
antheridium (pl. **antheridia**) (an-thur-id′ee-um; pl. an-thur-id′ee-ah) the male gametangium of certain algae, fungi, bryophytes, and vascular plants other than gymnosperms and angiosperms (p. 323, 343, 376)
anthocyanin (an-thoh-sy′ah-nin) a water-soluble pigment found in cell sap; anthocyanins vary in color from red to blue (p. 44, 122)
antibiotic (an-tee-by-ot′ik) a substance produced by a living organism that interferes with the normal metabolism of another living organism (p. 306, 364, 368, 372)
anticodon (an-tee-koh′don) the three-nucleotide sequence in a tRNA molecule that base-pairs with the complementary mRNA codon for the amino acid carried by that specific tRNA (p. 231)
apical dominance (ay′pi-kul dom′i-nunts) suppression of growth of lateral buds by hormones (p. 199)
apical meristem (ay′pi-kul mair′i-stem) a meristem at the tip of a shoot or root (p. 54, 55)
apomixis (ap-uh-mik′sis) reproduction without fusion of gametes or meiosis in otherwise normal sexual structures (p. 275)
aquifer (ak′wuh-fer) a layer of porous rock or sand found underground and containing water that can be brought to the surface via wells (p. 480)
archegoniophore (ahr-kuh-goh′nee-oh-for) a stalk bearing an archegonium (p. 376)
archegonium (pl. **archegonia**) (ahr-kuh-goh′nee-um; pl. ahr-kuh-goh′nee-ah) the multicellular female gametangium of bryophytes and most vascular plants other than angiosperms (p. 376)
aril (air′il) an often brightly colored appendage surrounding the seed of certain plants (e.g., yew) (p. 415)
ascus (pl. **asci**) (as′kus; pl. as′eye) one of often numerous, frequently fingerlike hollow structures in which the fusion of two haploid nuclei is followed by meiosis; a row of ascospores (usually eight) is ultimately produced in each ascus on or within the sexually initiated reproductive bodies of cup (sac) fungi (p. 351)
asexual reproduction (ay-seksh′yule ree-proh-duk′shun) any form of reproduction not involving the union of gametes (p. 216)
assimilation (uh-sim-i-lay′shun) cellular -conversion of raw materials into protoplasm and cell walls (p. 15, 187)
atom (at′um) the smallest individual unit of an element that retains the properties of the element (p. 16)
ATP (ay-tee-pee) adenosine triphosphate, a molecule with three phosphate groups found in all living cells; it is the principal vehicle for energy storage and exchange in cell metabolism (p. 168)
autotrophic (aw-toh-troh′fik) descriptive of an organism capable of sustaining itself through conversion of inorganic substances to organic material (p. 297)
auxin (awk′sin) a growth-regulating substance produced either naturally by plants or synthetically (p. 259)
axil (ak′sil) the angle formed between a twig and the petiole of a leaf; normally the site of an *axillary bud* (also called *lateral bud*) (p.85)

B

backcross (bak′kross) a cross involving a hybrid and one of its parents (p. 239)
bacteriophage (bak-teer′ee-oh-fayj) a virus whose host is a bacterium (p. 310)
bark (bahrk) tissues of a woody stem between the vascular cambium and the exterior (p. 94)
base (bayss) a substance that dissociates in water, releasing hydroxyl (OH^-) ions (p. 20, 226)
basidiospore (buh-sidd′ee-oh-spor) a spore produced on a basidium (p. 357)
basidium (pl. **basidia**) (buh-sid′ee-um; pl. buh-sid′ee-ah) one of usually numerous, frequently club-shaped hollow struc-tures in which the fusion of two haploid nuclei is followed by meiosis, the four resulting nuclei becoming externally borne basidiospores; basidia are pro-duced on or within sexually initiated repro-

ductive bodies of the club fungi (e.g., mushrooms, puffballs) (p. 356, 357)
berry (bair′ee) a thin-skinned fruit that usually develops from a compound ovary and commonly contains more than one seed (p. 133)
biennial (by-en′ee-ul) a plant that normally requires two seasons to complete its life cycle, the first season's growth being strictly vegetative (p. 129, 480)
biological controls (by-oh-loj′i-kull kun-trohlz′) the use of natural enemies and inhibitors in combating insect pests and other destructive organisms (p. 529)
biomass (by-oh-mass) the total mass of living organisms present (p. 476)
biome (by′ohm) similar biotic communities considered on a worldwide scale (e.g., desert biome, grassland biome) (p. 9)
biotechnology (by-oh-tek-nol′-oh-jee) the manipulation of organisms, tissues, cells, or molecules for specific applications primarily intended for human benefit (p. 252, 253)
biotic community (by-ot′ik kuh-myu′nit-ee) an association of plants, animals, and other organisms (e.g., woodland) (p. 476)
blade (blayd) the conspicuous, flattened part of a leaf (also called *lamina*) or seaweed (p. 85, 107)
bond (bond) a force that holds atoms together (p. 19–20)
bonsai (bon-sy′) container-grown plants (usually trees) that have been dwarfed artificially through skillful pruning and manipulation of the growing medium (p. 579, 580)
botanist (bot′an-ist) someone who studies or specializes in botany (p. 7)
botany (bot′an-ee) science involving the study of plants (p. 7)
botulism (bot′yu-lizm) poisoning from consumption of food infected by botulism bacteria (p. 299–300)
bract (brakt) a structure that is usually leaflike and modified in size, shape, or color (p. 117)
bryophyte (bry′oh-fyt) a photosynthetic, terrestrial, aquatic, or epiphytic, embryo--producing plant without xylem and phloem (e.g., mosses, liverworts, hornworts) (p. 373)
budding (budd′-ing) a form of asexual reproduction in which a new cell develops to full size from a protuberance arising from a mature cell, as in yeasts (p. 351, 582)
bulb (buhlb) an underground food-storage organ that is essentially a modified bud -consisting of fleshy leaves that surround and are attached to a small stem (p. 98, 261)
bundle scar (bun′dul skahr) a small scar left by a vascular bundle within a leaf scar when the leaf separates from its stem through abscission (p. 86)
bundle sheath (bun′dul sheeth) the parenchyma and/or sclerenchyma cells surrounding a vascular bundle (p. 112)

C

callose (kal′ohs) a complex carbohydrate that develops in sieve tubes following an injury; it is commonly associated with the sieve areas of sieve tube members (p. 15)
callus (kal′uss) undifferentiated tissue that develops around injured areas of stems and roots; also the undifferentiated tissue that develops during tissue culture (p. 15)
Calvin cycle (kal′vin sy′kuhl) see *light--independent reactions*
calyptra (kuh-lip′truh) tissue from the enlarged archegonial wall of many mosses that forms a partial or complete cap over the capsule (p. 377)
calyx (kay′liks) collective term for the sepals of a flower (p. 131)
cambium (kam′bee-um) a meristem producing secondary tissues; see *vascular cambium, cork cambium* (p. 54)
capillary water (kap′i-lair-ee waw′tur) water held in the soil against the force of gravity; capillary water is available to plants (p. 81)
capsule (kapp′sool) a dry fruit that splits in various ways at maturity, often along or between carpel margins; also the main part of a sporophyte in which different types of tissues develop (p. 135, 376)
carbohydrate (kahr-boh-hy′drayt) an organic compound containing carbon, hydrogen, and oxygen, with twice as many hydrogen as oxygen atoms per molecule (p. 22, 23)
carboxyl group (khar-bok′sil groop) the —COOH portion of an amino acid (p. 24)
carpel (kahr′pul) an ovule-bearing unit that is a part of a pistil (p. 131, 133, 429)
caryopsis (kare-ee-op′siss) a dry fruit in which the pericarp is tightly fused to the seed; it does not split at maturity (p. 137)
Casparian strip (kass-pair′ee-un strip) a band of suberin around the radial and transverse walls of an endodermal cell (p. 68)
cell (sel) the basic structural and functional unit of living organisms; in plants, it consists of protoplasm surrounded by a cell wall (p. 9)
cell biology (sel by-ol′uh-jee) the biological discipline involving the study of cells and their functions (p. 9)
cell cycle (sel sy′kul) a sequence of events involved in the division of a cell (p. 44)
cell division see *cytokinesis*
cell membrane (sel mem′brayn) see *plasma membrane*
cell plate (sel playt) the precursor of the middle lamella; it forms at the equator during telophase (p. 48)
cell sap (sel sap) the liquid contents of a vacuole (p. 44)
cell wall (sel wawl) the relatively rigid boundary of cells of plants and certain other organisms (p. 33)
central cell nuclei (sen-truhl sell new′klee-eye) nuclei, frequently two in number, that unite with a sperm in an embryo sac, forming a primary endosperm nucleus (p. 430)
centromere (sen′truh-meer) the dense, constricted portion of a chromosome to which a spindle fiber is attached (p. 45, 217)
chemiosmosis (kem-ee-oz-moh′siss) a theory that energy is provided for phos-phorylation by protons being "pumped" across inner mitochondrial and thylakoid membranes (p. 185)
chiasma (pl. **chiasmata**) (kyaz′mah; pl. ky-az′mah-tah) the X-shaped configuration formed by two chromatids of homologous chromosomes as they remain attached to each other during prophase I of meiosis (p. 217)
chlorenchyma (klor-en′kuh-mah) tissue composed of parenchyma cells that contain chloroplasts (p. 56)
chlorophyll (klor′uh-fil) green pigments essential to photosynthesis (p. 40, 170)
chloroplast (klor′uh-plast) an organelle containing chlorophyll, found in cells of most photosynthetic organisms (p. 40)
chromatid (kroh′muh-tid) one of the two strands of a chromosome; they are united by a centromere (p. 45, 217)
chromatin (kroh′muh-tin) a readily staining complex of DNA and proteins found in chromosomes (p. 38)
chromoplast (kroh′muh-plast) a plastid containing pigments other than chlorophyll; the pigments are usually yellow to orange (p. 41)
chromosome (kroh′muh-sohm) a body consisting of a linear sequence of genes and composed of DNA and proteins; chromosomes are found in cell nuclei and appear in contracted form during mitosis and meiosis (p. 38)

cilium (pl. **cilia**) (sil′ee-um; pl. sil′ee-uh) a short hairlike structure usually found on the cells of unicellular aquatic organ-isms, normally in large numbers and arranged in rows; the most common function of cilia is propulsion of the cell (p. 207)
circadian rhythm (sur-kay′dee-an rith′um) a mostly daily rhythm of growth and activity found in living organisms (p. 206)
citric acid cycle (sit′rik-ass-id sy′kul) a complex series of reactions following glycolysis in aerobic respiration that involves ATP, mitochondria, and enzymes and that results in the combining of free oxygen with protons and electrons from pyruvic acid to make water (p. 181)
cladistics (kluh-dis′tiks) analysis of shared features (p. 289)
cladophyll (klad′uh-fil) a flattened stem that resembles a leaf; also called *phylloclade* (p. 98)
class (klas) a category of classification between a division and an order (p. 284)
climax vegetation (kly′maks vej-uh-tay′shun) vegetational association that perpetuates itself indefinitely at the culmination of ecological succession (p. 485, 486)
cloning vector (kloh′ning vek′torr) a DNA molecule that can replicate and transfer DNA between cells (p. 253)
codon (koh′donn) the sequence of three nucleotides in an mRNA molecule that constitutes the code for a specific amino acid or a stop signal in protein synthesis; it is complementary to an anticodon (p. 231, 232)
coenocytic (see′-no-sitt-ik) multinucleate, the nuclei not individually separated from one another by crosswalls, as in the hyphae of water molds (p. 348)
cohesion-tension theory (koh-hee′zhun ten′shun thee′uh-ree) theory that explains the rise of water in plants through a combination of cohesion of water molecules in vessels and tracheids and tension on the water columns brought about by transpiration (p. 156)
coleoptile (koh-lee-op′tul) a protective sheath surrounding the emerging shoot of seedlings of the Grass Family (Poaceae) (e.g., corn, wheat) (p. 143)
coleorhiza (koh-lee-uh-ry′zuh) a protective sheath surrounding the emerging radicle (immature root) of members of the Grass Family (Poaceae) (e.g., corn, wheat) (p. 143)
collenchyma (kuh-len′kuh-muh) tissue composed of cells with unevenly thickened walls (p. 56)
colloid (kol′oyd) a substance consisting of a medium in which fine particles are permanently dispersed (p. 79)
community (kuh-myu′nit-ee) a collective term for all the living organisms sharing a common environment and interacting with one another (p. 476)
companion cell (kum-pan′yun sel) a specialized cell derived from the same parent cell as the closely associated sieve tube member immediately adjacent to it (in angiosperm phloem) (p. 58)
compost (kom′post) a mixture of decomposed organic matter, particularly decomposed plant materials (p. 297)
compound (kom′pownd) a substance whose molecules are composed of two or more elements (p. 17)
compound leaf (kom′pownd leef) a leaf whose blade is divided into distinct leaflets (p. 107)
conidium (pl. **conidia**) (kuh-nid′ee-um; pl. kuh-nid′ee-uh) an asexually pro-duced fungal spore formed outside of a sporangium (p. 351)
conifer (kon′i-fur) a cone-bearing tree or shrub (p. 411)
conjugation (kon-juh-gay′shun) a process leading to the fusion of isogametes in algae, fungi, and protozoa; also the means by which certain bacteria exchange DNA (p. 323)
conjugation tube (kon-juh-gay′shun t(y)oob) a tube permitting transfer of a gamete or gametes between adjacent cells, as in *Spirogyra* or desmids (p. 322)
consumer (kon-soo′muhr) organisms that feed on producers (p. 477)
cork (kork) tissue composed of cells whose walls are impregnated with suberin at maturity; the outer layer of tissue of an older woody stem; produced by the cork cambium (p. 61, 88)
cork cambium (kork kam′bee-um) a narrow cylindrical sheath of cells between the exterior of a woody root or stem and the central vascular tissue; it produces *cork* to its exterior and *phelloderm* to its interior; it is also called *phellogen* (p. 55)
corm (korm) a vertically oriented, thickened food-storage stem that is usually enveloped by a few papery, nonfunctional leaves (p. 98)
corolla (kuh-rahl′uh) collective term for the petals of a flower (p. 131)
cortex (kor′teks) a primary tissue composed mainly of parenchyma; the tissue usually extends between the epidermis and the vascular tissue (p. 68)
cotyledon (kot-uh-lee′dun) an embryo leaf (“seed leaf”) that usually either stores or absorbs food (p. 89, 143)
covalent bond (koh-vay′luhnt bond) a force provided by pairs of electrons that travel between two or more atomic nuclei; holding atoms together and keeping them at a stable distance from each other (p. 19)
crossing-over (kross′ing oh′vur) the exchange of corresponding segments of chromatids between homologous chromosomes during prophase I of meiosis (p. 217)
crown division (krown duh-vizh′unn) the asexual production of multiple plants by division of the base of a stem (crown) (p. 259)
cuticle (kyut′i-kul) a waxy or fatty layer of varying thickness on the outer walls of epidermal cells (p. 59, 109)
cutin (kyu′tin) the waxy or fatty substance of which a cuticle is composed (p. 59, 109)
cutting (kutt′ing) any vegetative plant part used for asexual propagation (p. 259)
cyclosis (sy-kloh′sis) the flowing or streaming of cytoplasm within a cell (p. 15)
cytochrome (sy′toh-krohm) iron-containing protein involved in molecule transfer in an electron transport system (p. 175)
cytogenetics (sy′toh-juh-net-iks) the study of the genetic effects of chromosome structure and behavior (p. 234)
cytokinesis (sy-toh-kuh-nee′sis) division of a cell, usually following mitosis (p. 45)
cytokinin (syt-uh-ky′nin) a growth hormone involved in cell division and several other metabolic activities of cells (p. 197)
cytology (sy-tol′uh-jee) see *cell biology*
cytoplasm (sy′tuh-plazm) the protoplasm of a cell exclusive of the nucleus (p. 33)
cytoplasmic streaming (sy-tuh-plaz′mik streem′ing) see *cyclosis*
cytoskeleton (sy-toh-skel′uh-ton) a net-work of microtubules and micro-filaments involved in movement within a cell (p. 44)
cytosol (sy′toh-sol) fluid, living part of a cell; organelles are distributed within it (p. 33)

D

dark reactions (dahrk ree-ak′shunz) see *light-independent reactions*
day-neutral plant (day new′trul plant) a plant that is not dependent on specific day lengths for the initiation of flowering (p. 209)
deciduous (duh-sij′yu-wuss) shedding leaves annually (p. 86, 107, 122)
decomposer (dee-kuhm-poh′zur) organism (e.g., bacterium, fungus) that breaks down organic material to forms capable of being recycled (p. 477)
dedifferentiate (dee-diff-urr-en′shee-ayt) to become less specialized (usually pertains to cells) (p. 259)
development (duh-vel′up-ment) changes in the form of a plant resulting from growth and differentiation of its cells into tissues and organs (p. 192)
dicotyledon (dy-kot-uh-lee′dun) a class of angiosperms whose seeds commonly have two cotyledons; frequently abbreviated to *dicot* (p. 89)
dictyosome (dik′tee-oh-sohm) an organelle consisting of disc-shaped, often branching hollow tubules that function in accumulating and packaging substances used in the synthesis of materials by the cell (p. 40)
differentially permeable membrane (dif-uh-rensh′uh-lee pur′mee-uh-bul mem′brayn) a membrane through which different substances diffuse at different

rates; see *semipermeable membrane*
differentiation (dif-uh-ren-shee-ay′shun) the change of a relatively unspecialized cell to a more specialized one (e.g., the change of a cell just produced by a meristem to a vessel member or fiber) (p. 192)
diffusion (dif-fyu′zhin) the random movement of molecules or particles from a region of higher concentration to a region of lower concentration, ultimately resulting in uniform distribution (p. 151)
digestion (duh-jes′jin) an enzyme-controlled conversion of complex, usually insoluble substances to simpler, usually soluble substances (p. 15, 187)
dihybrid cross (dy-hy′brid kross) a cross involving two different pairs of genes and heterozygous parents (p. 238)
dikaryotic (dy-kair-ee-ot′ik) having a pair of nuclei in each cell or a type of the mycelium in club fungi (p. 357)
dioecious (dy-ee′shuss) having unisexual flowers or cones, with the male flowers or cones confined to certain plants and the female flowers or cones of the same species confined to other different plants (p. 436)
diploid (dip′loyd) having two sets of chromosomes in each cell; the 2*n* chromosome number characteristic of the sporophyte generation (p. 221)
disinfest (diss′in-fest) the removing of surface contaminants from a plant surface (p. 262)
diuretic (dy-yu-ret′ik) a substance tending to increase the flow of urine (p. 398)
division (duh-vizh′un) the largest undivided category of classification of organisms within a kingdom; con-sidered synonymous with *phylum* (p. 284)
DNA (dee-en-ay) standard abbreviation of deoxyribonucleic acid, the carrier of genetic information in cells and viruses (p. 26, 226)
DNA synthesizer (dee-en-ay sin′thuh-size-urr) a machine that creates specific DNA sequences (p. 253)
dominance (dom′uh-nints) a condition in which one allele of a gene (dominant allele) masks the phenotypic expression of another allele (recessive allele) (p. 237)
dormancy (dor′man-see) a period of growth inactivity in seeds, buds, bulbs, and other plant organs even when environmental conditions normally required for growth are met (p. 143, 211)
double fusion (dub′ul fu′shun) the more or less simultaneous union of one sperm and egg (forming a zygote) and union of another sperm and central cell nuclei (forming a primary endosperm nucleus) that occur in the megagametophyte of flowering plants (p. 432)
drupe (droop) a simple fleshy fruit whose single seed is enclosed within a hard endocarp (p. 133)

E

ecology (ee-kol′uh-jee) the biological discipline involving the study of the relationships of organisms to each other and to their environment (p. 475)
ecosystem (ee′koh-sis-tim) a system involving interactions of living organisms with one another and with their nonliving environment (p. 476)
egg (eg) a nonmotile female gamete (p. 216)
elater (el′uh-tur) a straplike appendage (usually occurring in pairs) attached to a horsetail (*Equisetum*) spore (p. 396); also, a somewhat spindle-shaped sterile cell occurring in large numbers in liverwort sporangia (p. 376); both types of elaters facilitate spore dispersal
electron (ee-lek′tron) a negatively charged particle of an atom (p. 16)
element (el′uh-mint) one of more than 100 types of matter, most existing naturally but some human-made, each of which is composed of one kind of atom (p. 15)
embryo (em′bree-oh) immature sporo-phyte that develops from a zygote within an ovule or archegonium after fertilization (p. 65, 372, 376)
enation (ee-nay′shun) one of the tiny, green leaflike outgrowths on the stems of whisk ferns (*Psilotum*) (p. 387)
endocarp (en′doh-kahrp) the innermost layer of a fruit wall (p. 132)
endodermis (en-doh-dur′mis) a single layer of cells surrounding the vascular tissue (stele) in roots and some stems; the cells have Casparian strips (p. 68)
endoplasmic reticulum (en-doh-plaz′mik ruh-tik′yu-lum) a complex system of interlinked, double-membrane channels subdividing the cytoplasm of a cell into compartments; parts of it are lined with ribosomes (p. 38)
endosperm (en′doh-spurm) a food-storage tissue that develops through divisions of the primary endosperm nucleus; it is digested by the sporophyte after germination in some species (e.g., corn) or before maturation of the seed in other species (e.g., beans) (p. 433)
endosymbiont hypothesis (en–doh-sim′bee-ont hy-poth′uh-sis) the theory that mitochondria and chloroplasts were free-living bacteria that became incorporated in cells (p. 242)
energy (en′ur-jee) the capacity to do work; some forms of energy are heat, light, and kinetic (p. 20)
enzyme (en′zym) one of numerous complex proteins that speeds up a chemical reaction in living cells without being used up in the reaction (i.e., it catalyzes the reaction) (p. 166, 227)
epicotyl (ep′uh-kaht-ul) the part of an embryo or seedling above the attach-ment point of the cotyledon(s) (p. 143)
epidermis (ep-uh-dur′mis) the exterior tissue, usually one cell thick, of leaves, young stems and roots, and other parts of plants (p. 58)
epigynous (ee-pidj′uh-nuss) having flower parts attached above the ovary (p. 436)
epiphyte (ep′uh-fyt) an organism that is attached to and grows on another organism without parasitizing it (p. 318)
ergotism (ur′got-izm) a disease resulting from consumption of goods made with flour containing ergot fungus (p. 353)
essential element (eh-sen′shul el′uh-mint) one of 18 elements generally consid-ered essential to the normal growth, development, and reproduction of most plants (p. 160)
ethylene (eth′uh-leen) a simple, naturally produced, gaseous hormone that inhibits plant growth and promotes the ripening of fruit (p. 198)
etiolation (ee-tee-oh-lay′shun) a condition characterized by long internodes, poor leaf development, and pale, weak appearance due to a plant's having been deprived of light (p. 210)
eukaryotic (yu-kair-ee-ot′ik) pertaining to cells having distinct membrane-bound organelles, including a nucleus with chromosomes (p. 33)
eutrophication (yu-troh-fuh-kay′shun) the gradual enrichment of a body of water through the accumulation of nutrients, resulting in a corresponding increase in algae and other organisms (p. 486)
evolution (ev-oh-loo′shun) the accumulation of genetic changes in populations of living organisms through many generations (p. 268)
exine (ek′syne) the outer layer of the wall of a pollen grain or spore (p. 431)
exocarp (ek′soh-kahrp) the outermost layer of a fruit wall (p. 133)
explant (eks′plant) an excised portion of leaf or stem tissue used for tissue culture (p. 262)
extranuclear DNA (ex-truh-nyu′klee-ahr dee-en-ay) DNA found outside the nucleus, typically in plastids and mitochondria (p. 242)
eyespot (eye′spot) a small, often reddish structure within a motile unicellular organism; it appears to be sensitive to light (also called *stigma*) (p. 333)

F

F_1 (first filial generation) (eff wun) the offspring of a cross between two parent plants (p. 237)

F_2 (second filial generation) (eff too) the offspring of the F_1 generation (p. 237)
FAD (eff-ay-dee) flavin adenine dinucleo-tide, a hydrogen acceptor molecule involved in the Krebs cycle of respiration and in photosynthesis (p. 176)
family (famm′uh-lee) a classification category between genus and order (p. 283)
fat (fat) an organic compound containing carbon, hydrogen, and oxygen but with proportionately much less oxygen than is present in a carbohydrate molecule (p. 23)
fermentation (fur-men-tay′shun) respiration in which the hydrogen removed from the glucose during glycolysis is transferred back to pyruvic acid, creating substances such as ethyl alcohol or lactic acid (p. 180)
fertilization (fur-til-i-zay′shun) formation of a zygote through the fusion of two gametes (p. 221, 431)
fiber (fy′bur) a long, thick-walled cell whose protoplasm often is dead at maturity (p. 56)
filament (fil′uh-mint) threadlike body of certain bacteria, algae, and fungi (p. 321); also the stalk portion of a stamen (p. 131, 294)
fission (fish′un) the division of cells of bacteria and related organisms into two new cells (p. 294)
flagellum (pl. **flagella**) (fluh-jel′um; pl. fluh-jel′uh) a fine, threadlike structure protruding from a motile unicellular organism or the motile cells produced by multicellular organisms; functions primarily in locomotion (p. 207, 294)
floret (flor′et) a small flower that is a part of the inflorescence of members of the Sunflower Family (Asteraceae) and the Grass Family (Poaceae) (p. 466)
florigen (flor′uh-jen) one or more hormones once thought from circumstantial evidence to initiate flowering but which have never been isolated or proved to exist (p. 210)
follicle (foll′uh-kuhl) a dry fruit that splits along one side only (p. 135)
food chain (food chayn) a natural chain of organisms of a community wherein each member of the chain feeds on members below it and is consumed by members above it, with autotrophic organisms (*producers*) being at the bottom; interconnected food chains are referred to as *food webs* (p. 477)
foot (foot) the basal part of the embryo of bryophytes and other plants; it is attached to and absorbs food from the gametophyte (p. 376)
fossil (fos′ul) the remains or impressions of any natural object that has been preserved in the earth's crust (p. 405)
frond (frond) a fern leaf; term occasionally also applied to palm leaves (p. 398)
fruit (froot) a mature ovary usually containing seeds; term also somewhat loosely applied to the reproductive structures of groups of plants other than angiosperms (p. 132)
fucoxanthin (fyu-koh-zan′thin) a brownish pigment occurring in brown and other algae (p. 326)

G

gametangium (pl. **gametangia**) (gam-uh-tan′jee-um; pl. gam-uh-tan′jee-ah) any cell or structure in which gametes are produced (p. 329, 372)
gamete (gam′eet) a sex cell; one of two cells that unite, forming a *zygote* (p. 216)
gametophore (guh-me′toh-for) a stalk on which a gametangium is borne (p. 376)
gametophyte (guh-me′toh-fyte) the haploid (*n*) gamete-producing phase of the life cycle of an organism that exhibits Alternation of Generations (p. 221)
gemma (pl. **gemmae**) (jem′uh; pl. jem′ee) a small outgrowth of tissue that becomes detached from the parent body and is capable of developing into a complete new plant or other organism; gemmae are produced in cuplike structures on liverwort thalli and are also produced by certain fungi (p. 376)
gene (jeen) a unit of heredity; part of a linear sequence of such units occurring in the DNA of chromosomes (p. 227)
gene bank (jeen bank) a collection of plants or seeds maintained for their germ plasm (p. 252)
generative cell (jen′uh-ray-tiv sel) the cell of the male gametophyte of angiosperms that divides, producing two sperms; also, the cell of the male gametophyte of gymnosperms that divides, producing a *sterile cell* and a *spermatogenous cell* (p. 414)
genetic drift (juh-net′ik drift) a change in the genetic makeup of a population that may take place by chance alone (p. 271)
genetic engineering (juh′net′ik en-juh-neer′ing) the introduction, by artificial means, of genes from one form of DNA into another form of DNA (p. 9, 253)
genetics (juh-net′iks) the biological discipline involving the study of heredity (p. 9)
genome (jee′nohm) the sum total of DNA in an organism's chromosomes (p. 228)
genotype (jeen′oh-typ) the genetic constitution of an organism; may or may not be visibly expressed, as contrasted with phenotype (p. 237)
genus (pl. **genera**) (jee′nus; pl. jen′er-ah) a category of classification between a family and a species (p. 281)
germination (jur′min-ay-shun) the beginning or resumption of growth of a seed or spore (p. 143)
germ-line mutation (jurm′-lyn mew-tay′shun) a mutation in a cell from which gametes are derived; the mutation can be passed on to offspring (p. 234)
germ plasm (jurm plaz′im) the sum total of all the genes of a species or group of organisms (p. 252)
gibberellin (jib-uh-rel′in) one of a group of plant hormones that have a variety of effects on growth; they are particularly known for promoting elongation of stems (p. 196)
gill (gil) one of the flattened plates of compact mycelium that radiate out from the stalk on the underside of the caps of most mushrooms (p. 357)
girdling (gurd′ling) the removal of a band of tissues extending inward to the vascular cambium on the stem of a woody plant (p. 260, 582)
gland (gland) a small body of variable shape and size that may secrete certain substances but that also may be functionless (p. 61, 109)
glycine (gly′seen) the most simple amino acid, with H as the R group (p. 24)
glycolysis (gly-kol′uh-sis) the initial phase of all types of respiration in which glucose is converted to pyruvic acid without involving free oxygen (p. 181)
graft (graft) the union of a segment of a plant, the *scion*, with a rooted portion, the *stock* (p. 261)
grain (grayn) see *caryopsis*
granum (pl. **grana**) (gra′num; pl. gra′nuh) a series of stacked thylakoids within a chloroplast (p. 40)
gravitational water (grav-uh-tay′shun-ul waw′tur) water that drains out of the pore spaces of a soil after a rain (p. 81)
gravitropism (grav-uh-troh′pism) growth response to gravity (p. 202)
ground meristem (grownd mair′i-stem) meristem that produces all the primary tissues other than the epidermis and stele (e.g., cortex, pith) (p. 54, 67, 86)
growth (grohth) progressive increase in size and volume through natural development (p. 14, 192)
guard cell (gahrd sel) one of a pair of specialized cells surrounding a stoma (p. 61, 111)
guttation (guh-tay′shun) the exudation from leaves of water in liquid form due to root pressure (p. 108, 158)
gymnosperm (jim′noh-spurm) a plant whose seeds are not enclosed within an ovary during their development (e.g., pine tree) (p. 410)

H

half-life (haf-lyf) the amount of time it takes for a radioactive element to lose half of its radioactivity (p. 269)
haploid (hap′loyd) having one set of chromosomes per cell, as in gameto-phytes; also referred to as having *n* chromo-somes (as contrasted with 2*n* chromosomes in the diploid cells of sporophytes) (p. 221)

haustorium (pl. **haustoria**) (haw-stor′ee-um; pl. haw-stor′ee-uh) a protuberance of a fungal hypha or plant organ such as a root that functions as a penetrating and absorbing structure (p. 74)
heartwood (hahrt′wood) nonliving, usually darker-colored wood whose cells have ceased to function in water conduction (p. 94)
heirloom variety (air′loom vuh-rye′it-ee) a previously popular plant variety that is currently being maintained because of certain desirable qualities (p. 251)
herbaceous (hur-bay′shuss or ur-bay′shuss) referring to nonwoody plants (p. 89)
herbarium (pl. **herbaria**) (hur-bair′ee-um or ur-bair′ee-um; pl. hur-bair′ee-uh) a collection of dried, pressed specimens, usually mounted on paper and provided with a label that gives collection information and an identification (p. 441)
heterocyst (het′uh-roh-sist) a transparent, thick-walled, slightly enlarged cell occurring in the filaments of certain cyanobacteria (p. 304)
heterosis (hett-urr-oh′sis) hybrid vigor; superior qualities of heterozygous offspring as compared with those of their homozygous parents (p. 251)
heterospory (het-uh-ross′por-ee) the production of both microspores and megaspores (p. 390)
heterotrophic (het-ur-oh-troh′fick) incapable of synthesizing food and therefore dependent on other organisms for it (p. 297)
heterozygous (het-uh-roh-zy′guss) having two different alleles at the same locus on homologous chromosomes (p. 237, 250)
holdfast (hold′fast) attachment organ or cell at the base of the thallus or filament of certain algae (p. 321, 328)
homologous chromosomes (hoh-mol′uh-guss kroh′muh-sohmz) pairs of chromosomes that associate together in prophase I of meiosis; each member of a pair is derived from a different parent (p. 217)
homozygous (hoh-moh-zy′guss) having two identical alleles at the same locus on a pair of homologous chromosomes (p. 237, 250)
hormone (hor′mohn) an organic substance generally produced in minute amounts in one part of an organism and transported to another part of the organism where it controls or affects growth and development (p. 193)
hybrid (hy′brid) heterozygous offspring of two parents that differ in one or more inheritable characteristics (p. 251)
hydathode (hy′duh-thohde) structure at the tip of a leaf vein through which water is forced by root pressures (p. 158)
hydrolysis (hy-drol′uh-sis) the breakdown of complex molecules to simpler ones as a result of the union of water with the compound; the process is usually controlled by enzymes (p. 187)
hygroscopic water (hy-gruh-skop′ik waw′tur) water that is chemically bound to soil particles and therefore unavailable to plants (p. 81)
hypha (pl. **hyphae**) (hy′fuh; pl. hy′fee) a single, usually tubular, threadlike filament of a fungus; *mycelium* is a collective term for hyphae (p. 347)
hypocotyl (hy-poh-kot′ul) the portion of an embryo or seedling between the radicle and the cotyledon(s) (p. 143)
hypodermis (hy-poh-dur′mis) a layer of cells immediately beneath the epidermis and distinct from the parenchyma cells of the cortex in certain plants (p. 114, 411)
hypogynous (hi-podj′un-nuss) having flower parts attached below the ovary (p. 436)
hypothesis (hy-poth′uh-sis) a postulated explanation for some observed facts that must be tested experimentally before it can be accepted as valid or discarded if it proves to be incorrect (p. 7)

I

imbibition (im-buh-bish′un) adsorption of water and subsequent swelling of organic materials because of the adhesion of the water molecules to the internal surfaces (p. 153)
inbreeding (in′breed-ing) mating between individuals with a common ancestry (p. 251)
inbreeding depression (in′breed-ing dee-presh′unn) poor performance and low fertility of inbred individuals (p. 250)
incomplete dominance (in′kom-pleet dom′in-uns) a condition in which the heterozygous phenotype is intermediate to the two homozygous phenotypes as a result of one allele only partly masking another allele (p. 239)
indusium (pl. **indusia**) (in-dew′zee-um; pl. in-dew′zee-uh) the small, membranous, sometimes umbrella-like covering of a developing fern sorus (p. 398)
inferior ovary (in-feer′ee-or oh′vuh-ree) an ovary to which parts of the calyx, corolla, and stamens have become more or less united so they appear to be attached at the top of it (p. 132, 436)
inflorescence (in-fluh-res′ints) a collective term for a group of flowers attached to a common axis in a specific arrangement (p. 132)
inorganic (in-or-gan′ik) descriptive of com-pounds having no carbon atoms (p. 21)
integument (in-teg′yu-mint) the outermost layer of an ovule; usually develops into a seed coat; a gymnosperm ovule usually has a single integument, and an angiosperm ovule usually has two integuments (p. 411, 413, 430)
intermediate-day plant (in-tur-me′dee-ut day plant) a plant that has two critical photo-periods; it will not flower if the days are either too short or too long (p. 209)
internode (in′tur-nohd) a stem region between nodes (p. 85, 109)
inversion (chromosomal) (in-verzh′un) a chromosome rearrangement as a result of a segment having been removed, rotated 180°, and then reinserted (p. 234)
in vitro (in vee′troh) “in glass”; growing or being maintained on artificial media, usually in glass test tubes or flasks (p. 262)
ion (eye′on) a molecule or atom that has become electrically charged through the loss or gain of one or more electrons (p. 19)
isogamy (eye-sog′uh-me) sexual reproduction in certain algae and fungi having gametes that are alike in size (p. 322)
isotope (eye′suh-tohp) one of two or more forms of an element that have the same chemical properties but differ in the number of neutrons in the nuclei of their atoms (p. 17)

K

kinetochore (kuh-net′uh-kor) specialized protein complexes that develop on the vertical faces of a centromere during late prophase; spindle fibers are attached to them (p. 45)
kingdom (king′dum) the highest category of classification (e.g., Plant Kingdom, Animal Kingdom) (p. 283)
knot (not) a portion of the base of a branch enclosed within wood (p. 99)

L

lamina (lam′uh-nuh) see *blade*

lateral bud (lat′uh-rul bud) see *axil*
laticifer (luh-tis′uh-fur) specialized cells or ducts resembling vessels; they form branched networks of latex-secreting cells in the phloem and other parts of plants (p. 95)
leaf (leef) a flattened, usually photosynthetic structure arranged in various ways on a stem (p. 54, 107)
leaf gap (leef gap) a parenchyma-filled interruption in a stem's cylinder of vascular tissue immediately above the point at which a branch of vascular tissue (*leaf trace*) leading to a leaf occurs (p. 86)
leaflet (leef′lit) one of the subdivisions of a compound leaf (p. 107)
leaf scar (leef skahr) the suberin-covered scar left on a twig when a leaf separates from it through abscission (p. 86)
leaf trace (leef trays) see *leaf gap*
legume (leg′yoom) a dry fruit that splits along two "seams," the seeds being attached along the edges (p. 135)
lenticel (lent′uh-sel) one of usually numerous, slightly raised, somewhat spongy groups of cells in the bark of woody plants; lenticels permit gas exchange between the interior of a plant and the external atmosphere (p. 61, 89)
leucoplast (loo′kuh-plast) a colorless plastid commonly associated with starch accumulation (p. 41)
light-dependent reactions (lyt-dee-pen-dent ree-ak′shunz) a series of chemical and physical reactions through which light energy is converted to chemical energy with the aid of chlorophyll molecules; in the process, water molecules are split, with hydrogen ions and electrons being produced and oxygen gas being released; ATP and NADPH also are created (p. 171)
light-independent reactions (lyt in-dee-pen-dent ree-ak′shunz) a cyclical series of chemical reactions that utilizes carbon dioxide and energy generated during the light-dependent reactions of photosynthesis, producing sugars, some of which are stored as insoluble carbohydrates, while others are recycled; the reactions are independent of light and occur in the stroma of chloroplasts (p. 171)
lignin (lig′nin) a polymer with which certain cell walls (e.g., those of wood) become impregnated (p. 56)
ligule (lig′yool) the tiny, tongue-like append-age at the base of a spike moss (*Selagi-nella*) or quillwort (*Isoetes*) leaf (p. 390)
linked genes (linked jeens) genes located on the same chromosome (p. 239, 242)
lipid (lip′id) a general term for fats, fatty substances, and oils (p. 22)
locule (lok′yool) a cavity within an ovary or a sporangium (p. 136)
locus (loh′kuss) the position of a gene on a chromosome (p. 237, 244)
long-day plant (long-day plant) a plant in which flowering is not initiated unless exposure to more than a critical day length occurs (p. 208)

M

map unit (map you′nit) a unit of measure equivalent to 1% recombination (p. 244)
mass-flow hypothesis (mass flo hy-poth′uh-sus) see *pressure-flow hypothesis*
mass selection (mass suh-lek′shun) a plant breeding technique in which seeds of plants in a population are used to create each generation (p. 251)
maternal inheritance (muh-terr′nal in-hair′it-ans) inheritance in which the female gamete contributes extranuclear genes to the offspring (p. 242)
megagametophyte (meg-uh-ga-mee′toh-fyt) the female gametophyte of angiosperms, which, in approximately 70% of the species investigated, contains eight nuclei (p. 430)
megaphyll (meg′uh-fill) a leaf having branching veins; it is associated with a *leaf gap* (p. 386)
megasporangium (meg-uh-spor′an-jee-um) a sporangium in which megaspores are formed (p. 413)
megaspore (meg′uh-spor) a spore that develops into a female gametophyte (megagametophyte) (p. 390, 413)
megasporocyte (meg uh-spor′oh-syt) a diploid cell that produces megaspores upon undergoing meiosis (p. 390, 413, 430)
meiocyte (my′oh-syt) see *sporocyte*
meiosis (my-oh′sis) the process of two successive nuclear divisions through which segregation of genes occurs and a single diploid (2*n*) cell becomes four haploid (*n*) cells (p. 217)
mericloning (mair′i-kloh-ning) see *-micropropagation*
meristem (mair′i-stem) a region of undifferentiated cells in which new cells arise (p. 54)
mesocarp (mez′uh-karp) the middle region of the fruit wall that lies between the exocarp and the endocarp (p. 132)
mesophyll (mez′uh-fil) parenchyma (chlorenchyma) tissue between the upper and lower epidermis of a leaf (p. 111)
metabolism (muh-tab′uh-lizm) the sum of all the interrelated chemical processes occurring in a living organism (p. 166)
microfilament (my′kroh-fil′uh-mint) a protein filament involved with cytoplasmic streaming and with contraction and movement in eukaryotic cells (p. 44)
microphyll (my′kroh-fil) a leaf having a single unbranched vein not associated with a *leaf gap* (p. 386)
micropropagation (my-kroh-prop-uh-gay′shun) propagation of plants *in vitro* (p. 262)
micropyle (my′kroh-pyl) a pore or opening in the integuments of an ovule through which a pollen tube gains access to an embryo sac or archegonium of a seed plant (p. 413, 430)
microshoot (my′kroh-shoot) one of several to many shoots produced by a plant growing *in vitro* (p. 263)
microsporangium (my-kro-spor-anj′ee-um) a sporangium in which micro-spores are formed (p. 412)
microspore (my′kroh-spor) a spore that develops into a male gametophyte (microsporocyte) (p. 390, 412, 430)
microsporocyte (my′kroh-spor′oh-syt) a diploid cell that produces microspores upon undergoing meiosis (p. 390, 412, 430)
microsporophyll (my-kroh-spor′uh-fil) a leaf, usually reduced in size, on or within which microspores are produced (p. 390)
microtubule (my′kroh-t(y)oo-byul) an unbranched, tubelike, proteinaceous structure commonly found inside the plasma membrane where it apparently regulates the addition of cellulose to the cell wall (p. 44)
middle lamella (mid′ul luh-mel′uh) a layer of material, rich in pectin, that cements two adjacent cell walls together (p. 36, 50)
midrib (mid′rib) the central (main) vein of a pinnately veined leaf or leaflet (p. 109)
mitochondrion (pl. **mitochondria**) (my-toh-kon′dree-un; pl. my-toh-kon′dree-uh) an organelle containing enzymes that function in the citric acid cycle and the electron transport chain of aerobic respiration (p. 41)
mitosis (my-toh′sis) nuclear division, usually accompanied by cytokinesis, during which the chromatids of the chromosomes separate and two genetically identical daughter nuclei are produced (p. 44)
molecule (mol′uh-kyul) the smallest unit of an element or compound retaining its own identity; consists of two or more atoms (p. 15, 17)
monocotyledon (mon-oh-kot-uh-lee′dun) a class of angiosperms whose seeds have a single cotyledon; commonly abbreviated to *monocot* (p. 89)
monoecious (moh-nee′shuss) having unisexual male flowers or cones and unisexual female flowers or cones both on the same plant (p. 436)
monohybrid cross (mon-oh-hy′brid kross) a cross involving a single pair of genes and heterozygous parents (p. 238)
monokaryotic (mon-oh-kair-ee-ot′ik) having a single nucleus in each cell or unit of the mycelium in club fungi (p. 357)
monomer (mon′oh-mur) a simple individual molecular unit of a polymer (p. 21)
motile (moh′tul) capable of independent movement (p. 294)

multiple fruit (mul′tuh-pul froot) a fruit derived from several to many individual flowers in a single inflorescence (p. 138)
mushroom (mush′room) a sexually initiated phase in the life cycle of a club fungus, usually consisting of an expanded *cap* and a *stalk (stipe)* (p. 357)
mutagen (mew′tuh-jenn) an agent that causes a mutation to occur (p. 232)
mutation (myu-tay′shun) a heritable change in a gene or chromosome (p. 227, 232, 271)
mycelium (my-see′lee-um) a mass of fungal hyphae (p. 347)
mycorrhiza (pl. **mycorrhizae**) (my-kuh-ry′zuh; pl. my-kuh-ry′zee) a symbiotic association between fungal hyphae and a plant root (p. 74)

N

n (en) having one set of chromosomes per cell (*haploid*) (p. 221)
NAD (en-ay-dee) nicotinamide adenine dinucleotide, a molecule that during respiration temporarily accepts electrons whose negative charges are balanced by also accepting protons and thereby hydrogen atoms (p. 181)
NADP (en-ay-dee-pee) nicotinamide adenine dinucleotide phosphate, a high-energy storage molecule that temporarily accepts electrons from photosystem I in the light reactions of photosynthesis (p. 171)
nastic movement (nass′tik moov′mint) a nondirected movement of a flat organ (e.g., petal, leaf) in which the organ alternately bends up and down (p. 201)
neutron (new′tron) an uncharged particle in the nucleus of an atom (p. 16)
node (nohd) region of a stem where one or more leaves are attached (p. 55, 85, 109)
noncoding DNA (non-koh′ding dee-en-ay) DNA that does not code for a gene (p. 231)
nucellus (new-sel′us) ovule tissue within which an embryo sac develops (p. 410, 413)
nuclear envelope (new′klee-ur en′vuh-lohp) a porous double membrane enclosing a nucleus (p. 38)
nucleic acid (new-klay′ik as′id) see *DNA, RNA*
nucleolus (pl. **nucleoli**) (new-klee′oh-luss; pl. new-klee′oh-ly) a somewhat spherical body within a nucleus; contains primarily RNA and protein; there may be more than one nucleolus per nucleus (p. 38)
nucleotide (new′klee-oh-tyd) the structural unit of DNA and RNA (p. 26, 226)
nucleus (new′klee-uss) the organelle of a living cell that contains chromosomes and is essential to the regulation and control of all the cell's functions; also, the core of an atom (p. 16)
nut (nutt) one-seeded, dry fruit with a hard, thick pericarp; a nut develops with a cup or cluster of bracts at the base (p. 136)
nutrient (noo′tree-uhnt) a substance that furnishes the elements and energy for the organic molecules that are the building blocks from which an organism develops (p. 192)

O

oil (oyl) a fat in a liquid state (p. 23)
oogamy (oh-og′uh-mee) sexual reproduction in which the female gamete, or egg, is nonmotile and larger than the male gamete, or sperm, which is motile (p. 324)
oogonium (pl. **oogonia**) (oh-oh-goh′nee-um; pl. oh-oh-goh′nee-ah) a female sex organ of certain algae and fungi; it consists of a single cell that contains one to several eggs (p. 323, 343)
operculum (oh-per′kyu-lum) the lid or cap that protects the peristome of a moss sporangium (p. 380)
orbital (or′buh-till) a volume of space in which a given electron occurs 90% of the time (p. 16)
order (or′dur) a category of classification between a class and a family (p. 283)
organelle (or-guh-nel′) a membrane-bound body in the cytoplasm of a cell; there are several kinds, each with a specific function (e.g., mitochondrion, chloroplast)[1] (p. 33)
organic (or-gan′ik) pertaining to or derived from living organisms and pertaining to the chemistry of carbon-containing compounds (p. 21)
osmosis (oz-moh′sis) the diffusion of water or other solvents through a differen-tially permeable membrane from a region of higher concentration to a region of lower concentration (p. 151)
osmotic potential (oz-mot′ik puh-ten′shil) potential pressure that can be developed by a solution separated from pure water by a differentially permeable membrane (the pressure required to prevent osmosis from taking place) (p. 152)
osmotic pressure (oz-mot′ik presh′ur) see *osmotic potential*
outcrossing (out′kross-ing) cross-pollination between individuals of the same species (p. 251)
ovary (oh′vuh-ree) the enlarged basal portion of a pistil that contains an ovule or ovules and usually develops into a fruit (p. 131)
ovule (oh′vyool) a structure of seed plants that contains a female gametophyte and has the potential to develop into a seed (p. 410)
oxidation-reduction reactions (ok-suh-day′shun ree-duk′shun) chemical reactions involving gain or loss of electrons to or from a compound (p. 167)

P

palisade mesophyll (pal-uh-sayd′ mez′uh-fil) mesophyll having one or more relatively uniform rows of tightly packed, elongate, columnar parenchyma (chlorenchyma) cells beneath the upper epidermis of a leaf (p. 111)
palmately compound; palmately veined (pahl′mayt-lee kom′pownd; pahl′mayt-lee vaynd) having leaflets or principal veins radiating out from a common point (p. 107, 109)
papilla (pl. **papillae**) (puh-pil′uh; pl. puh-pill′ay) a small, usually rounded or conical protuberance (p. 322)
parenchyma (puh-ren′kuh-muh) thin-walled cells varying in size, shape, and function; the most common type of plant cell (p. 55)
parental type (pah-renn′tuhl typ) an off-spring with the same combination of alleles as one of its parents (p. 244)
parthenocarpic (par-thuh-noh-kar′pik) developing fruits from unfertilized ovaries; the resulting fruit is, therefore, usually seedless (p. 434)
particle gun (pahrt′ik-kuhl gunn) a machine capable of changing the genetic makeup of plant tissue by shooting DNA-coated particles into it (p. 254)
passage cell (pas′ij sel) a thin-walled cell of an endodermis (p. 69)
pectin (pek′tin) a water-soluble organic compound occurring primarily in the middle lamella; when combined with organic acids and sugar, it becomes a jelly (p. 35)
pedicel (ped′i-sel) the individual stalk of a flower that is part of an inflorescence (p. 131)
peduncle (pee′dun-kul) the stalk of a solitary flower or the main stalk of an inflorescence (p. 131)

peptide bond (pep′tyd bond) the type of chemical bond formed when two amino acids link together in the synthesis of proteins (p. 24)
perennial (puh-ren′ee-ul) a plant that continues to live indefinitely after flowering (p. 129, 480)
perianth (pari′ee-anth) the calyx and corolla of a flower (p. 131)
pericarp (per′uh-karp) collective term for all the layers of a fruit wall (p. 133)
pericycle (per′uh-sy-kul) tissue sandwiched between the endodermis and phloem of a root; often only one or two cells wide in transverse section; the site of origin of lateral roots (p. 69)
periderm (pair′uh-durm) outer bark; composed primarily of cork cells (p. 61)
perigynous (purr-idj′uh-nuss) having flower parts attached around the ovary; the flower parts are usually attached to a cup (p. 436)
peristome (per′uh-stohm) one or two series of flattened, often ornamented structures (*teeth*) arranged around the margin of the open end of a moss sporangium; the teeth are sensitive to changes in humidity and facilitate the release of spores (p. 380)
petal (pet′ul) a unit of a corolla; it is usually both flattened and colored (p. 131)
petiole (pet′ee-ohl) the stalk of a leaf (p. 85, 107)
$P_{far\text{-}red}$, or $\mathbf{P_{fr}}$ (pee-far-red or pee-ef-ahr) a form of phytochrome; see *phytochrome*) (p. 209)
pH (pee-aitch) a symbol of hydrogen ion concentration indicating the degree of acidity or alkalinity (p. 20, 81)
phage (fayj) see *bacteriophage*
phellogen (fel′uh-jun) see *cork cambium*
phenotype (fee′noh-typ) the physical appearance of an organism (p. 237)
pheromone (fer′uh-mohn) something produced by an organism that facilitates chemical communication with another organism (p. 531)
phloem (flohm) the food-conducting tissue of a vascular plant (p. 58)
photon (foh′ton) a unit of light energy (p. 172)
photoperiodism (foh-toh-pir′ee-ud-izm) the initiation of flowering and certain vegetative activities of plants in response to relative lengths of day and night (p. 208)
photosynthesis (foh-toh-sin′thuh-sis) the conversion of light energy to chemical energy; water, carbon dioxide, and chlorophyll are all essential to the process, which ultimately produces carbohydrate, with oxygen being released as a by-product (p. 15, 166, 508)
photosynthetic unit (foh-toh-sin-thet′ik yew′nit) one of two groups of about 250 to 400 pigment molecules each that function together in chloroplasts in the light reactions of photosynthesis; the units are exceedingly numerous in each chloroplast (p. 171)
photosystem (foh′toh-sis-tum) collective term for a specific functional aggregation of photosynthetic units (p. 173)
phragmoplast (frag′mo-plast) a complex of microtubules and endoplasmic reticulum that develops during telophase of mitosis (p. 44)
phytochrome (fy′tuh-krohm) protein pigment associated with the absorption of light; it is found in the cytoplasm of cells of green plants and occurs in interconvertible active and inactive forms ($P_{far\ red}$ and P_{red}); it facilitates a plant's capacity to detect the presence (or absence) and duration of light (p. 209)
pilus (pl. **pili**) (py′lis; pl. py′lee) the equivalent of a conjugation tube in bacteria (p. 295)
pinna (pl. **pinnae**) (pin′uh; pl. pin′ee) a primary subdivision of a fern frond; the term is also applied to a leaflet of a compound leaf (p. 398)
pinnately compound; pinnately veined (pin′ayt-lee kom′pownd; pin′ayt-lee vaynd) having leaflets or veins on both sides of a common axis (e.g., rachis, midrib) to which they are attached (p. 107, 109)
pistil (pis′tul) a female reproductive structure of a flower, composed of one or more carpels and consisting of an ovary, style, and stigma (p. 131)
pit (pit) a more or less round or elliptical thin area in a cell wall; pits occur in pairs opposite each other, with or without shallow, domelike borders (p. 59)
pith (pith) central tissue of a dicot stem and certain roots; it usually consists of parenchyma cells that become proportionately less of the volume of woody plants as cambial activity increases the organ's girth (p. 86)
plankton (plank′ton) free-floating aquatic organisms that are mostly microscopic (p. 319)
plant anatomy (plant uh-nat′uh-mee) the botanical discipline that pertains to the internal structure of plants (p. 8)
plant community (plant kuh-myu′nuh-tee) an association of plants inhabiting a common environment and interacting with one another (p. 476)
plant ecology (plant ee-koll′uh-jee) the science that deals with the relationships and interactions between plants and their environment (p. 9)
plant geography (plant jee-og′ruh-fee) the botanical discipline that pertains to the broader aspects of the space relations of plants and their distribution over the surface of the earth (p. 9)
plant morphology (plant mor-fol′uh-jee) the botanical discipline that pertains to plant form and development (p. 9)
plant physiology (plant fiz-ee-ol′uh-jee) the botanical discipline that pertains to the metabolic activities and processes of plants (p. 8)
plant systematics (plant sis-tuh′mat-iks) the study of the diversity of organisms and the relationships among them (p. 8)
plant taxonomy (plant tak-son′uh-mee) the botanical discipline that pertains to the classification, naming, and identification of plants (p. 8)
plasma membrane (plaz′muh mem′brayn) the outer boundary of the protoplasm of a cell; also called *cell membrane*, particularly in animal cells (p. 36)
plasmid (plaz′mid) one of up to 30 or 40 small, circular DNA molecules usually present in a bacterial cell (p. 253)
plasmodesma (pl. **plasmodesmata**) (plaz-muh-dez′muh; pl. plaz-muh-dez′muh-tah) minute strands of cytoplasm that extend between adjacent cells through pores in the walls (p. 36)
plasmodium (pl. **plasmodia**) (plaz-moh′dee-um; pl. plaz-moh′dee-ah) the multinucleate, semiviscous liquid, active form of slime mold; it moves in a "crawling-flowing" motion (p. 340)
plasmolysis (plaz-mol′uh-sis) the shrinking in volume of the protoplasm of a cell and the separation of the proto-plasm from the cell wall due to loss of water via osmosis (p. 152)
plastid (plas′tid) an organelle associated primarily with the storage or manufacture of carbohydrates (e.g., leucoplast, chloroplast) (p. 40)
plumule (ploo′myool) the terminal bud of the embryo of a seed plant (p. 143)
pneumatophore (noo-mat′oh-for) spongy root extending above the surface of the water, produced by a plant growing in water; pneumatophores facilitate oxygen absorption (p. 71)
pole (pohl) an invisible focal point toward each end of a cell from which spindle fibers extend in arcs during mitosis or meiosis (p. 218)
pollen grain (pahl′un grayn) a structure derived from the microspore of seed plants that develops into a male gametophyte (p. 131, 412, 431)
pollen tube (pahl′un t(y)oob) a tube that develops from a pollen grain and conveys the sperms to the female gametophyte (p. 431)
pollination (pahl-uh-nay′shun) the transfer of pollen from an anther to a stigma (p. 431)
pollinium (pl. **pollinia**) (pah-lin′ee-um; pl. pah-lin′ee-ah) a cohesive mass of pollen grains commonly found in members of the Orchid Family (Orchidaceae) and the Milkweed Family (Asclepiadaceae) (p. 440)
polymer (pahl′i-mur) a large molecule composed of many monomers (p. 21)
polymerase (poh-limm′err-ace) an enzyme that creates a polymer (e.g., DNA polymerase synthesizes DNA) (p. 229)
polypeptide (pahl-ee-pep′tide) a chain of amino acids (p. 24)
polyploidy (pahl′i-ploy-dee) having more than two complete sets of chromosomes per cell (p. 235)
pome (pohm) a simple fleshy fruit whose flesh is derived primarily from the receptacle (p. 134)
population (pop-yew-lay′shun) a group of organisms, usually of the same species, -occupying a given area at the same time (p. 476)
P_{red} or $\mathbf{P_r}$ (pee-red or pee-ahr) a form of phytochrome; see *phytochrome* (p. 209)

pressure-flow hypothesis (presh′ur floh hy-poth′uh-sis) the theory that food substances in solution in plants flow along concentration gradients between the sources of the food and *sinks* (places where the food is utilized) (p. 159)
prickle (prik′uhl) a pointed outgrowth from an epidermis or cortex beneath the epidermis (p. 115)
primary consumer (pry′mer-ree kon-soo′mur) organism that feeds directly on producers (p. 477)
primary tissue (pry′mer-ee tish′yu) a tissue produced by an apical meristem (e.g., epidermis, cortex, primary xylem and phloem, pith) (p. 54)
primordium (pry-mord′ee-um) an organ or structure (e.g., leaf, bud) at its earliest stage of development (p. 86, 107)
procambium (proh-kam′bee-um) a tissue produced by the primary meristem that differentiates into primary xylem and phloem (p. 54, 67, 86)
producer (pruh-dew′sur) an organism that manufactures food through the process of photosynthesis (p. 477)
prokaryotic (proh-kair-ee-ot′ik) having a cell or cells that lack a distinct nucleus and other membrane-bound organelles (e.g., bacteria) (p. 33)
promoter region (proh-moh′turr ree′jin) the DNA sequence to which RNA polymerase binds to initiate transcription (p. 231)
proplastid (proh-plas′tid) a tiny, undifferentiated organelle that can duplicate itself and that may develop into a chloroplast, leucoplast, or other type of plastid (p. 41)
protein (proh′tee-in or proh′teen) a polymer composed of many amino acids linked together by peptide bonds (p. 23)
protein sequencer (proh′tee-in or proh′teen see′kwens-urr) a machine that reveals the sequence of amino acids in a protein (p. 253)
prothallus (pl. **prothalli**) (proh-thal′us; pl. proh-thal′eye) the gametophyte of ferns and their relatives; also called *prothallium* (p. 399)
protoderm (proh′tuh-durm) the primary meristem that gives rise to the epider-mis (p. 54, 67, 86)
proton (proh′ton) a positively charged particle in the nucleus of an atom (p. 16)
protonema (proh-tuh-nee′muh) a green, usually branched, threadlike or sometimes platelike growth from a bryophyte spore; it gives rise to “leafy” gametophytes (p. 381)
protoplast (proh′toh-plast) the unit of protoplasm within a plant cell wall (p. 252)
protoplast fusion (proh′toh-plast few′szhinn) the process of combining *in vitro* two protoplasts in one cell (p. 252)
pruning (proon′ing) removal of portions of plants for aesthetic purposes, for improving quality and size of fruits or flowers, or for elimination of diseased tissues (p. 578)
pyrenoid (py′ruh-noyd) a small body found on the chloroplasts of certain green algae and hornworts; pyrenoids are associated with starch accumula-tion; they may occur singly on a chloroplast, or they may be numerous (p. 320)
pyruvic acid (py-roo′vik as′id) the organic compound that is the end product of the glycolysis phase of respiration (p. 181)

Q

quantitative trait (kwan′tuh-tay-tiv trait) a trait controlled by several genes and influenced by the environment; it is usually measured on a continuous scale (p. 242)
quiescence (kwy′ess-ens) a state in which a seed or other plant part will not germinate or grow unless environmental conditions normally required for growth are present (p. 211)

R

R group (ahr groop) an atom or group of atoms, bonded to the central carbon, that determines the identity of an amino acid (p. 24)
rachis (ray′kiss) the axis of a pinnately compound leaf or frond extending between the lowermost leaflets or pinnae and the terminal leaflet or pinna (corresponds with the midrib of a simple leaf) (p. 107)
radicle (rad′i-kuhl) the part of an embryo in a seed that develops into a root (p. 65, 143)
ray (ray) radially oriented tiers of parenchyma cells that conduct food, water, and other materials laterally in the stems and roots of woody plants; they are generally continuous across the vascular cambium between the xylem and the phloem; the portion within the wood is called a *xylem ray*, while the extension of the same ray in the phloem is called a *phloem ray* (p. 58)
receptacle (ree-sep′tuh-kuhl) the com-monly expanded tip of a peduncle or pedicel to which the various parts of a flower (e.g., calyx, corolla) are attached (p. 131)
recessive (ree-ses′iv) a condition in which the phenotypic expression of one allele of a gene is masked by the phenotypic expression of another (dominant) allele (p. 237)
recombinant DNA (ree-komm′bin-int dee-en-ay) a molecule created *in vitro* containing DNA from at least two organisms (p. 253)
recombinant type (ree-komm′bin-int typ) an individual offspring that due to recombination has a combination of alleles different from either of its parents (p. 244)
red tide (red tyd) the marine phenomenon that results in the water becoming tem-porarily tinged with red due to the sudden proliferation of certain dinoflagellates that produce substances poisonous to animal life and humans (p. 333)
reproduction (ree-proh-duk′shun) the development of new individual organisms through either sexual or asexual means (p. 14)
resin canal (rez′in kuh-nal′) a tubular duct of many conifers and some angio-sperms that is lined with resin-secreting cells (p. 411)
respiration (res-puh-ray′shun) the cellular breakdown of sugar and other foods, accompanied by release of energy; in aerobic respiration, oxygen is utilized (p. 15, 166, 183)
restriction enzyme (ruh-strikt′shunn en′zym) an enzyme capable of severing a DNA molecule at a specific site (p. 253)
rhizoid (ry′zoyd) a delicate root- or root-hair-like structure of algae, fungi, the gametophytes of bryophytes, and certain structures of a few vascular plants; functions in anchorage and absorption but have no xylem or phloem (p. 348)
rhizome (ry′zohm) an underground stem, usually horizontally oriented, that may be superficially rootlike in appearance but that has definite nodes and internodes (p. 97)
ribosome (ry′boh-sohm) a granular particle composed of two subunits consisting of RNA and proteins; ribosomes lack membranes, are the sites of protein synthesis, and are very numerous in living cells (p. 39, 231)
RNA (ar-en-ay) the standard abbreviation for *ribonucleic acid*, an important cellular molecule that occurs in three forms, all involved in communication between the nucleus and the cytoplasm and in the synthesis of proteins (p. 27, 231)
root (root) a plant organ that functions in anchorage and absorption; most roots are produced below ground (p. 54)
root cap (root kap) a thimble-shaped mass of cells at the tip of a growing root; functions primarily in protection (p. 66)
root hair (root hair) a delicate protuberance that is part of an epidermal cell of a root; root hairs occur in a zone behind the growing tip (p. 68)
root nodule (root nodd′yewl) a small swelling associated with nitrogen-fixing bacteria that invade the roots of leguminous plants and alders (p. 75)
runner (run′ur) a stem that grows horizontally along the surface of the ground; typically has long internodes; see also *stolon* (p. 97)

S

salt (salt) a substance produced by the bonding of ions that remain after hydrogen and hydroxyl ions of an acid and a base combine to form water (p. 19)
samara (sah-mair′uh) a dry fruit whose pericarp extends around the seed in the form of a wing (p. 137)
saprobe (sap′rohb) an organism that obtains its food directly from nonliving organic matter (p. 297)
sapwood (sap′wood) outer layers of wood that transport water and minerals in a tree trunk; sapwood is usually lighter in color than heartwood (p. 94)
schizocarp (skit′soh-karp) a twin fruit unique to the Parsley Family (Apiaceae) (p. 137)
science (sy′ints) a branch of study involved with the systematic observation, recording, organization, and classification of facts from which natural laws are derived and used predictively (p. 7)
scion (sy′un) a segment of plant that is grafted onto a *stock* (p. 261)
sclereid (sklair′id) a sclerenchyma cell that usually has one axis not conspicuously longer than the other; it may vary in shape and is heavily lignified (p. 56)
sclerenchyma (skluh-ren′kuh-muh) tissue composed of lignified cells with thick walls; the tissue functions primarily in strengthening and support (p. 56)
secondary consumer (sek′on-dair-ee kon-soo′mer) an organism that feeds on other consumers (p. 477)
secondary tissue (sek′un-der-ee tish′yu) a tissue produced by the vascular cambium or the cork cambium (e.g., virtually all the xylem and phloem in a tree trunk) (p. 54)
secretory cell, tissue (see′kruh-tor-ee sel, tish′yu) cell or tissue producing a substance or substances that are moved outside the cells (p. 62)
seed (seed) a mature ovule containing an embryo and bound by a protective *seed coat* (p. 132, 216)
seed coat (seed′ koht) the outer boundary layer of a seed; it is developed from the *integument(s)* (p. 411, 414, 430)
semiconservative replication (semm′ee-kon-surv-uh-tiv repp-lee-kay′shun) DNA replication mechanism that ensures each daughter molecule has one parental strand and one new strand (p. 228)
semipermeable membrane (sem-ee-pur′-me-uh-bil mem-brayn) a membrane that allows some molecules to pass through it but not others; see *differentially permeable membrane* (p. 151)
senescence (suh-ness′ints) the breakdown of cell components and membranes that leads to the death of the cell (p. 199)
sepal (see′puhl) a unit of the calyx that frequently resembles a reduced leaf; sepals often function in protecting the unopened flower bud (p. 131)
sessile (sess′uhl) without petiole or pedicel; attached directly by the base (p. 376)
seta (see′tuh) the stalk of a bryophyte sporophyte (p. 376)
sexual reproduction (seksh′yule ree-proh-duk′shun) reproduction involving the union of gametes (p. 216)
short-day plant (short-day plant) a plant in which flowering is initiated when the days are shorter than its critical photoperiod (p. 208)
sieve plate (siv playt) an area of the wall of a sieve tube member that contains several to many perforations that permit cytoplasmic connections between similar adjacent cells, the cytoplasmic strands being larger than plasmodesmata (p. 58)
sieve tube (siv t(y)oob) a column of sieve tube members arranged end to end; food is conducted from cell to cell through *sieve plates* (p. 58)
sieve tube member (siv t(y)oob mem′bur) a single cell of a sieve tube (p. 58)
silique (suh-leek′) a dry fruit that splits along two “seams,” with the seeds borne on a central partition (p. 135)
simple fleshy fruit (sim′pul flesh′ee froot) a fruit that develops from a single pistil (p. 133)
simple leaf (sim′pul leef) a leaf with the blade undivided into leaflets (p. 107)
slime mold (slym mold) a simple organism that moves like an amoeba but resembles a fungus when reproducing (p. 339)
solvent (sol′vent) a substance (usually liquid) capable of dissolving another substance (p. 151)
somatic hybrid (soh-matt′ik hy′brid) a plant produced by protoplast fusion (p. 253)
somatic mutation (soh-matt′ik mew-tay′shun) a mutation in a somatic (body) cell; such a mutation is not passed on to offspring (p. 234)
sorus (pl. **sori**) (sor′uss; pl. sor′eye) a cluster of sporangia; the term is most frequently applied to clusters of fern sporangia (p. 398)
speciation (spee-see-ay′shun) the origin of new species through evolution (p. 234)
species (spee′seez; *species* is spelled and pronounced the same way in either singular or plural form; there is no such thing as a *specie*) the basic unit of classification; a population of individuals capable of interbreeding freely with one another but because of geographic, reproductive, or other barriers, do not in nature interbreed with members of other species (p. 282)
sperm (spurm) a male gamete; except for those of red algae and angiosperms, sperms are frequently motile and are usually smaller than the corresponding female gametes (p. 216, 323, 414)
spice (spyss) an aromatic organic plant product used to season or flavor food or drink (p. 556)
spindle (spin′duhl) an aggregation of fiberlike threads (*microtubules*) that appears in cells during mitosis and meiosis; some threads are attached to the centromeres of chromosomes, whereas other threads extend directly or in arcs between two invisible points designated as *poles* (p. 46, 48)
spine (spyn) a relatively strong, sharp-pointed, woody structure usually located on a stem; it is usually a modified leaf or stipule (p. 115)
spongy mesophyll (spun′jee mez′uh-fil) mesophyll having loosely arranged cells and numerous air spaces; it is generally confined to the lower part of the interior of a leaf just above the lower epidermis (p. 112)
sporangiophore (spuh-ran′jee-uh-for) the stalk on which a sporangium is produced (p. 349)
sporangium (pl. **sporangia**) (spuh-ran′jee-um; pl. spuh-ran′jee-uh) a structure in which spores are produced; it may be either unicellular or multicellular (p. 349, 372)
spore (spor) a reproductive cell or aggregation of cells capable of developing directly into a gametophyte or other body without uniting with another cell (*Note:* a bacterial spore is not a reproductive cell but is an inactive phase that enables the cell to survive under adverse conditions); sexual spores formed as a result of meiosis are often called *meiospores;* spores produced by mitosis may be referred to as *vegetative spores* (p. 340, 349)
sporocyte (spor′oh-site) a diploid cell that becomes four haploid spores or nuclei as a result of undergoing meiosis (p. 221, 376)
sporophyll (spor′uh-fil) a modified leaf that bears a sporangium or sporangia (p. 389)
sporophyte (spor′uh-fyt) the diploid (2*n*) spore-producing phase of the life cycle of an organism exhibiting Alternation of Generations (p. 221)
stamen (stay′min) a pollen-producing structure of a flower; it consists of an anther and usually also a filament (p. 131)
stele (steel) the central cylinder of tissues in a stem or root; usually consists primarily of xylem and phloem (p. 89)
stem (stem) a plant axis with leaves or enations (p. 54)
stigma (stig′muh) the pollen receptive area of a pistil (p. 131)
stipe (styp) the supporting stalk of sea-weeds, mushrooms, and certain other stationary organisms (p. 328)
stipule (stip′yool) one of a pair of appendages of varying size, shape, and texture present at the base of the leaves of some plants (p. 85)
stock (stok) the rooted portion of a plant to which a scion is grafted (p. 579)
stolon (stoh′lun) a stem that grows vertically below the surface of the ground; it typically has relatively long internodes; see also *runner* (p. 98)
stoma (pl. **stomata**) (stoh′muh; pl. stoh′mah-tuh) a minute pore or opening in the epidermis of leaves, herbaceous stems, and the sporophytes of hornworts (*Anthoceros*); it is flanked by two guard cells that regulate its opening and closing and thus regulate gas exchange and transpiration (p. 61, 108, 110)
strobilus (pl. **strobili**) (stroh′buh-luss; pl. stroh′buh-leye) an aggregation of sporophylls on a common axis; it usually resembles a cone or is somewhat cone-

like in appearance (p. 389, 394)
stroma (stroh′muh) a region constituting the bulk of the volume of a chloroplast or other plastid; it contains enzymes that in chloroplasts play a key role in carbon fixation, carbohydrate synthesis, and other photosynthetic reactions (p. 40)
style (styl) the structure that connects a stigma and an ovary (p. 131)
subculture (subb′kull-choor) the transfer of tissue culture plantlets or plant parts to a new medium, usually as a form of propagation (p. 263)
suberin (soo′buh-rin) a fatty substance found primarily in the cell walls of cork and the Casparian strips of endodermal cells (p. 61, 88)
succession (suk-sesh′un) an orderly progression of changes in the composition of a community from the initial development of vegetation to the establishment of a climax community (p. 483)
sucrose (soo′krohs) a disaccharide composed of glucose and fructose; the primary form in which sugar produced by photosynthesis is transported throughout a plant (p. 22)
superior ovary (soo-peer′ee-or oh′vuh-ree) an ovary that is free from the calyx, corolla, and other floral parts, so the sepals and petals appear to be attached at its base (p. 132, 436)
symbiosis (sim-by-oh′siss) an intimate association between two dissimilar organisms that benefits both of them (mutualism) or is harmful to one of them (parasitism) (p. 366)
syngamy (sin′gam-mee) a union of gametes; fertilization (p. 221)

T

2***n*** (too-en) having two sets of chromosomes; diploid (p. 222)
3***n*** (three-en) having three sets of chromosomes; triploid (p. 222)
tendril (ten′dril) a slender structure that coils on contact with a support of suitable diameter; it usually is a modified leaf or leaflet and aids the plant in climbing (p. 98)
thallus (pl. **thalli**) (thal′uss; pl. thal′eye) a multicellular plant body that is usually flattened and not organized into roots, stems, or leaves (p. 328, 366, 375)
thorn (thorn) a pointed specialized stem (p. 115)
thylakoid (thy′luh-koyd) coin-shaped membranes whose contents include chlorophyll; they are arranged in stacks that form the grana of chloroplasts (p. 40)
tip layering (tipp lay′urr-ing) asexual propagation involving the burying of the tip of a flexible stem in soil to induce the formation of adventitious roots; the rooted portion is then cut from the parent plant and grown separately (p. 260)
tissue (tish′yu) an aggregation of cells having a common function (p. 54)
tissue culture (tish′yu kul′chur) the culture of isolated living tissue on an artificial medium (p. 262)
totipotency (toh-tuh-poh′ten-see) the potential of a cell to develop into a complete plant (p. 262)
tracheid (tray′kee-id) a xylem cell that is tapered at the ends and has thick walls containing pits (p. 58)
transcript (tran′skriptt) the RNA molecule formed by transcription (p. 231)
transcription (trans-krip′shun) the copying of a sequence of DNA nucleotides into an RNA sequence (p. 230)
transformation (trans-forr-may′shun) the transfer of DNA from one organism to another (p. 253)
transgenic plant (trans-jeen′ik plant) a plant containing recombinant DNA (p. 253)
translation (trans-lay′shun) the process of decoding RNA into protein (p. 231, 234)
translocation (trans-loh-kay′shun) a chromosomal rearrangement resulting from a segment of one chromosome being moved to another chromosome (p. 234)
transpiration (trans-puh-ray′shun) loss of water in vapor form; most transpiration takes place through the stomata (p. 108, 259)
transposable genetic element (trans-poh′suh-bil juh-nett′ik el′uh-mint) a DNA sequence (*transposon*) capable of being moved from one chromosomal location to another (p. 225)
transposition (trans-poh-zish′unn) the movement of a transposable genetic element (p. 225)
tropism (troh′pizm) response of a plant organ or part to an external stimulus, usually in the direction of the stimulus (p. 202)
tuber (t(y)oo′bur) a swollen, fleshy underground stem (e.g., white potato) (p. 98)
turgid (tur′jid) firm or swollen because of internal water pressures resulting from osmosis (p. 152)
turgor movement (turr′gor moov′mint) the movement that results from changes in internal water pressures in a plant part (p. 204)
turgor pressure (tur′gur presh′ur) pressure within a cell resulting from the uptake of water (p. 152)

U

unisexual (yu-nih-seksh′yu-ul) a term usually applied to a flower lacking either stamens or a pistil (p. 436)

V

vacuolar membrane (vak-yu-oh′lur mem′brayn) the delimiting membrane of a cell vacuole; also called *tonoplast* (p. 43)
vacuole (vak′yu-ohl) a pocket of fluid that is separated from the cytoplasm of a cell by a membrane; it may occupy more than 99% of a cell's volume in plants; also, food-storage or contractile pockets within the cytoplasm of unicellular organisms (p. 43)
vascular bundle (vas′kyu-lur bun′dul) a strand of tissue composed mostly of xylem and phloem and usually enveloped by a bundle sheath (p. 89)
vascular cambium (vas′kyu-lur kam′bee-um) a narrow, cylindrical sheath of cells that produces secondary xylem and phloem in stems and roots (p. 54, 88, 261)
vascular plant (vas′kyu-lur plant) a plant having xylem and phloem (p. 372)
vein (vayn) a term applied to any of the vascular bundles that form a branching network within leaves (p. 112)
velamen root (vel′uh-min root) an aerial root with a multilayered epidermis believed to function in retarding moisture loss (p. 58)
venter (ven′tur) the site of the egg in the enlarged basal portion of an archegonium (p. 380)
vessel (ves′uhl) one of usually very numerous cylindrical "tubes" whose cells have lost their cytoplasm; occur in the xylem of most angiosperms and a few other vascular plants; each vessel is composed of vessel members laid end to end; the perforated or open-ended walls of the vessel members permit water to pass through freely (p. 58)
vessel element (ves′uhl el′uh-ment) a single cell of a vessel (p. 58)
viability (vy-uh-bill′it-ee) capacity of a seed or spore to germinate (p. 258)
virus (vy′riss) a minute particle consisting of a core of nucleic acid, usually surrounded by a protein coat; it is incapable of growth alone and can repro-duce only within, and at the expense of, a living cell (p. 311, 312)
vitamin (vyt′uh-min) a complex organic compound produced primarily by photosynthetic organisms; various vitamins are essential in minute amounts to

facilitate enzyme reactions in living cells (p. 192)

W

water-splitting (photolysis) (waw′tuhr split-ing foh-tohl′uh-siss) a process in photosystem II of photosynthesis whereby water molecules are split with the release of oxygen (p. 175)
whorled (wirld) having three or more leaves or other structures at a node (p. 109)

X

xylem (zy′lim) the tissue through which most of the water and dissolved minerals utilized by a plant are conducted; it consists of several types of cells (p. 58)

Z

zoospore (zoh′uh-spor) a motile spore occurring in algae and fungi (p. 321)
zygote (zy′goht) the product of the union of two gametes (p. 216, 221, 432)

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1. Ribosomes, which are considered organelles, are an exception in that they are not bounded by a membrane.