Biology Vocabulary List

6.1

atom	building block of matter
electron	negatively charged particles that are located outside the nucleus
neutron	particles with no charge that are located in the nucleus
nucleus	center of an atom that contains protons and neutrons
proton	positively charged particles that are located in the nucleus
compound	a substance formed by the chemical combination of two or more elements in fixed proportions
covalent bond	a chemical bond between two atoms produced when electrons are shared
element	a substance that cannot be broken down into other substances
ion	an atom that has lost or gained one or more electrons
ionic bond	a chemical bond that is formed between two ions with opposite charges, when one or more electrons are passed from one atom to another
isotope	each of two or more forms of a chemical element with the same atomic number but different numbers of neutrons, eg. Carbon-14 is an isotope
molecule	the smallest physical unit of a substance that can exist independently
van der Waals force	an attraction between oppositely charged regions of molecules

6.2

activation energy	minimum amount of energy needed for reactants to form products in a chemical reaction
active site	location where a substrate binds on an enzyme
catalyst	substance that lowers the activation energy needed to start a chemical reaction
chemical reaction	process by which atoms or groups of atoms in substances are reorganized into different substances
enzyme	protein that speeds up a chemical reaction in a biological process
product	substance formed during a chemical reaction
reactant	starting substance in a chemical reaction
substrate	reactant that binds to an enzyme
coefficient	number in front of a reactant or a product in a chemical equation

6.3

base	substance that releases hydroxide ions when dissolved in water
acid	substance that releases hydrogen ions when dissolved in water
solvent	substance in which another substance is dissolved

buffer	mixture that can react with an acid or a base to keep the pH within a particular range
pH	measure of concentration of hydrogen ions in a solution
solute	substance that is dissolved in a solvent
hydrogen bond	weak interaction involving a hydrogen atom and a fluorine, oxygen, or nitrogen atom
polar molecule	molecule that has oppositely charged regions
solution	mixture that has a uniform composition throughout
mixture	combination of two or more substances in which each substance retains its individual characteristics and properties

6.4

amino acid	component of protein that is a compound made of carbon, nitrogen, oxygen, hydrogen, and sometimes sulfur
carbohydrate	compound composed of carbon, hydrogen, and oxygen in a ratio of one oxygen and two hydrogen atoms for each carbon atom
lipid	molecule made mostly of carbon and hydrogen that makes up the fats, oils, and waxes
macromolecule	large molecule that is formed by joining smaller organic molecules
nucleic acid	complex macromolecule that stores and transmits genetic information
nucleotide	repeating subunit of a nucleic acid
polymer	molecule made from repeating units of identical or nearly identical compounds called monomers that are linked together by a series of covalent bonds
protein	compound made of small carbon compounds called amino acids

7.1

organization	orderly structure of cells in an organism
cell	basic unit of all living things
cell theory	theory that all organisms are made of one or more cells, which are the basic units of life, and that all cells come from other cells
eukaryotic cell	cell with specialized structures, which include the nucleus and other organelles
nucleus	cell organelle that controls the cell's activities and contains DNA
organelle	membrane-bound structure with special functions within eukaryotic cells
plasma membrane	boundary that helps control what enters and leaves a cell
prokaryotic cell	simple cell without specialized structures

7.2

fluid mosaic model	structural model of the plasma membrane where phospholipids and proteins float within the surface of the membrane

phospholipid bilayer	large molecule with a glycerol backbone, two fatty acid chains, and a phosphate group
selective permeability	process in which a membrane allows some molecules to pass through while keeping others out
transport protein	protein that moves needed substances or waste materials through the plasma membrane into or out of the cell

7.3 (Cell structure shown in Figure 1 and Figure 2)

cell wall	a strong layer that surrounds each cell in some living things
centriole	organelle that functions during cell division
chloroplast	plant organelle that captures light and converts it to a chemical
cilium	short, hairlike projection that aids in locomotion
cytoplasm	semifluid material inside the organelles or plasma membrane in which cell processes take place directly
cytoskeleton	supporting network of long, thin protein fibers forming a framework for the cell and providing an anchor for organelles
endoplasmic reticulum	an intricate system of tubular membranes in the cytoplasm of a cell, contain rough endoplasmic reticulum and smooth endoplasmic reticulum
flagellum	long, hairlike projection that aids in locomotion
Golgi apparatus	a membranous structure in the cytoplasm of cells consisting of layers of flattened sacs and functioning in the processing and transporting of proteins
lysosome	a membrane-bound cavity in living cells that contains enzymes that are responsible for degrading and recycling molecules
mitochondrion	in plants and animals, converts energy to a form cells can use
nucleolus	a small round body inside a cell nucleus, composed of protein and RNA and associated with the formation of ribosomes and ribosomal RNA
ribosome	a submicroscopic cluster of proteins and RNA, occurring in great numbers in the cytoplasm of living cells, that takes part in the manufacture of proteins
vacuole	storage compartment in a cell

7.4

endocytosis	process by which the plasma membrane surrounds a substance outside the cell and moves it inside the cell
active transport	movement of substances from a region of lower concentration to a region of higher concentration
diffusion	net movement of particles from an area where there are many particles of the substance to an area where there are fewer
hypertonic solution	solution that has a higher concentration of solutes in the cell
isotonic solution	solution in which the inside of the cell and the solution it is in have the same concentration of water and solutes

exocytosis	process by which the plasma membrane surrounds a substance inside the cell and moves it outside the cell
osmosis	diffusion of water across a selectively permeable membrane
facilitated diffusion	form of transport that uses transport proteins to move other ions and small molecules across the plasma membrane
dynamic equilibrium	condition in which there is continuous movement but no overall change in concentration
hypotonic solution	solution that has a lower concentration of solutes in the cell

8.1

adenosine triphosphate	energy-storing molecule in cells, made of an adenosine molecule, a ribose sugar, and three phosphate groups
cellular respiration	catabolic pathway in which organic molecules are broken down to release energy
energy	the ability to do work
metabolism	all of the chemical reactions in a cell
photosynthesis	anabolic pathway in which light energy from the Sun is harvested as chemical energy for use by living things
thermodynamics	the study of how energy flows and is transformed in the universe

8.2

Calvin cycle	series of reactions during the light-independent phase of photosynthesis in which energy is stored in simple sugars
granum	a stack of thylakoid membranes on the inside of chloroplasts
NADP+	final electron-carrying molecule in light-dependent reactions; combines with electrons to form the energy-storage molecule NADPH
pigments	molecules that absorb specific wavelengths of light
rubisco	an enzyme in the Calvin cycle that converts inorganic carbon molecules into organic molecules that can be used by the cell
stroma	the fluid-filled space outside the grana; location of the light-independent reactions of photosynthesis
thylakoid	flattened saclike membranes inside chloroplasts; location of the light-dependent reactions of photosynthesis

8.3

anaerobic process	metabolic process that does not require oxygen
glycolysis	in cellular respiration, a series of anaerobic chemical reactions in the cytoplasm that break down glucose into pyruvic acid; forms a net profit of two ATP molecules
aerobic	metabolic processes that require oxygen
Krebs cycle	in cellular respiration, a cycle of chemical reactions that break down glucose and produce ATP; energizes electron carriers that pass the energized electrons on to the electron transport chain

fermentation	a series of anaerobic reactions in the cytoplasm that regenerate NAD+ for glycolysis and produce ATP; supplies energy for aerobic organisms when oxygen is low
aerobic respiration	in cellular respiration, the processes that take place in the mitochondrion and require oxygen; includes the Krebs cycle and electron transport

9.1

cell cycle	the sequence of events by which cells grow and divide
chromatin	the relaxed form of DNA in the cell's nucleus
chromosome	structure in the nucleus that contains the genetic material
cytokinesis	the stage of the cell cycle in which the cytoplasm divides and a new cell is created
interphase	the stage of the cell cycle during which the cell grows, carries out normal functions, and copies its DNA
mitosis	the stage of the cell cycle during which the nucleus and nuclear material divide

9.2

anaphase	the third stage of mitosis, during which the centromeres separate and the chromatids are pulled apart
centromere	structure at the center of the chromosome to which the sister chromatids attach
metaphase	the second stage of mitosis, during which the sister chromatids line up along the equator of the cell
prophase	the first stage of mitosis, during which the chromatid condenses into chromosomes
sister chromatid	structures in a chromosome containing identical copies of the DNA
spindle apparatus	structure that helps move and organize the chromosomes during mitosis; made of spindle fibers, centrioles, and aster fibers
telophase	the final stage of mitosis, during which the chromosomes migrate to the poles of the cell and then decondense

9.3

apoptosis	process of programmed cell death
cancer	uncontrolled growth and division of cells; results from a failure of cell cycle regulation
carcinogen	substance known to cause cancer
cyclin	protein that binds to cyclin-dependent kinases to regulate the activities of the cell cycle
cyclin-dependent kinase	enzymes that are activated by cyclins and serve to regulate the activities of the cell cycle
stem cell	unspecialized cells that have the potential to develop into specialized cells

10.1

diploid	A diploid cell contains two copies of each chromosome.
gamete	a specialized male or female cell with half the normal number of chromosomes that unites with a cell of the opposite sex in the process of sexual reproduction
gene	a segment of DNA on a chromosome that controls the production of a protein
haploid	contain one copy of each chromosome.
homologous chromosomes	pairs of chromosomes, one from each parent
meiosis	in organisms that reproduce sexually, a process of cell division during which the nucleus divides into four nuclei, each of which contains half the usual number of chromosomes.
fertilization	the union of male and female reproductive cells to produce a fertilized reproductive cell
crossing over	the interchange of segments between homologous chromosomes during cell division , resulting in new combinations of gene types and therefore variability in inherited characteristics

10.2

allele	one of two or more alternative forms of a gene, occupying the same position on paired chromosomes and controlling the same inherited characteristic
genetics	the study of how the individual features and behaviour of living things are passed on through their genes
hybrid	an organism produced from different genetic constituents
law of independent assortment	every individual has two alleles of each gene and when gametes are produced, each gamete receives one of these alleles
law of segregation	genes for different traits are inherited independently of each other
dominant trait	an observed trait that masks the recessive form of a trait
genotype	the allele combination an organism contains
heterozygous	an organism’s genotype when two alleles for a trait are different
homozygous	an organism’s genotype when two alleles for a trait are the same
phenotype	the way an organism looks and behaves
recessive trait	trait that can be observed if the dominant trait is not present

10.3

genetic recombination	new combinations of genes that result from crossing over and independent assortment
polyploidy	the occurrence of one or more extra sets of all chromosomes in an organism

12.1

double helix	shape of a DNA molecule consisting of two strands of nucleotides that are twisted into a coil and held together by the nitrogenous bases
nucleosome	a structure found in chromosomes in which DNA is coiled around histone proteins

12.2

DNA polymerase	enzyme that creates chemical bonds between nucleotides using a DNA strand as a template
Okazaki fragment	small segments of DNA made as DNA polymerase copies DNA 3' to 5' on the lagging strand
semiconservative replication	method of DNA replication in which strands separate, serve as templates, and produce DNA molecules each containing one original strand and one new strand

12.3

transcription	process in which RNA is synthesized from DNA
codon	a group of three nitrogenous bases in DNA or mRNA that code for one amino acid
RNA	nucleic acid made of ribose, phosphate, and one of four nitrogenous bases—adenine, cytosine, guanine, or uracil
intron	intervening DNA sequences that are transcribed and then removed from the final mRNA
translation	process by which mRNA directs the synthesis of a protein
messenger RNA	long strands of RNA that are complementary to one strand of DNA
exon	protein coding sequences in DNA that are transcribed into mRNA and translated into protein
transfer RNA	small RNA molecules that transport amino acids to the ribosome
RNA polymerase	an enzyme that catalyzes the synthesis of mRNA using DNA as a template
ribosomal RNA	RNA molecules that make up part of the ribosome

12.4

gene regulation	the ability of an organism to control the expression of genes in response to the environment
mutagen	a substance, such as chemicals or radiation, that causes mutations
mutation	a permanent change in the DNA sequence
operon	a section of prokaryotic DNA that contains the genes for the proteins in a metabolic pathway

Figure1 Animal Cell

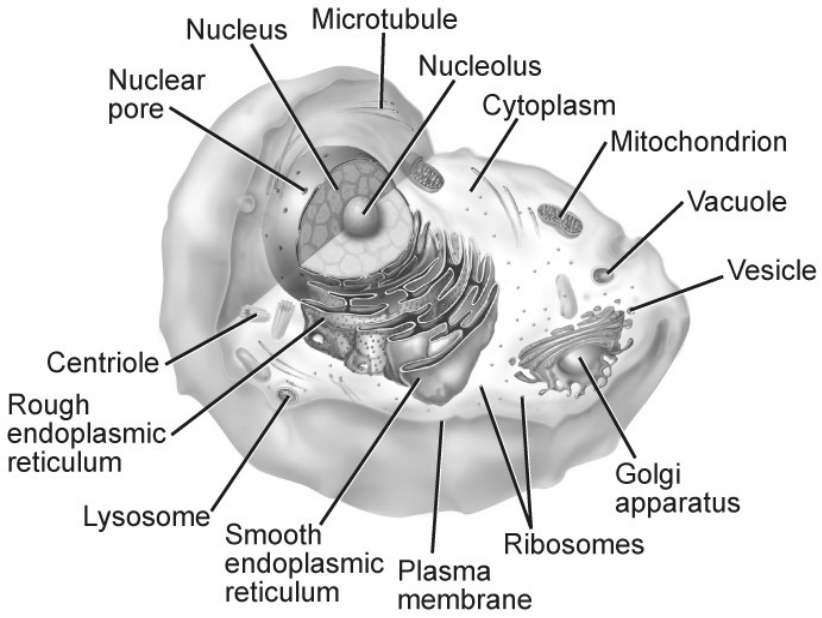

Figure 2 Plant Cell