Biology Key Terms

DNA, RNA and Protein Synthesis

Double helix - the shape of the DNA molecule; consists of two nucleotide chains that wrap around each other to form a double spiral.

Nucleotides - The monomers that make up DNA and RNA; consists of a nitrogen base (A, C, T, U, or G), a sugar and a phosphate molecule.

Adenine (A) - nitrogenous base found in DNA and RNA; pairs with T or U.

Guanine (G) - nitrogenous base found in DNA and RNA; pairs with C.

Cytosine (C) - nitrogenous base found in DNA and RNA; pairs with G.

Thymine (T) - nitrogenous base found in DNA only; pairs with A.

Uracil (U) - nitrogenous base found in RNA only; pairs with T.

Purines - nitrogenous bases that have a double ring of carbon and nitrogen atoms; Adenine and Guanine.

Pyrimidines - nitrogenous bases that have a single ring of carbon and nitrogen atoms; Cytosine, Thymine and Uracil.

Complementary - matching, as in complementary bases: A, matches T or U; C matches G.

Semi-conservative replication - specific type of replication in DNA that results in two, double stranded DNA molecules. Each new molecule has half of the original strand, and half that is a complimentary (newly built) strand.

Hydrogen Bonds - weak attractions between molecules; hydrogen bonds hold the rungs of the DNA ladder together, but can be easily broken and reformed again.

Helicase - enzyme that unwinds and unzips DNA.

Ligase - enzyme that creates bonds between sugars and phosphates in a growing DNA or RNA strand as it is being built.

DNA Polymerase - enzymes that can bind to a single (unwound and separated) DNA strand, read it, and synthesize a new strand of complementary DNA; some are able to proofread their work.

Protein synthesis - the formation of proteins using information coded on DNA and carried out by RNA in the ribosome.

Messenger RNA (or mRNA) - a single uncoiled strand of RNA that transmits information from DNA to the ribosomes during protein synthesis.
Transfer RNA (or tRNA) - a single folded strand of RNA that bonds with and carries a specific amino acid.

Ribosomal RNA (rRNA) - a globular form of RNA that is the major constituent of the ribosomes.

Transcription - the process of forming a mRNA strand from a DNA strand in the nucleus

RNA polymerase - enzyme used in protein synthesis (translation) read a DNA gene and compose a complementary mRNA strand

Codon - a 3-nucleotide mRNA sequence that codes for one specific amino acid.

Start codon - mRNA transcription begins at a specific coding sequence referred to as the start codon.

Stop codon - a coding sequence that signals the end of the gene to be transcribed.

Translation - the formation of proteins in the cytoplasm using information coded on mRNA and carried out by the ribosome.

Anticodon - one end of a tRNA molecule that contains a set of three nucleotides that will compliment codons on the mRNA during translation; has a site for a specific amino acid on the opposite end

Mutations - A mutation is any change in the DNA’s letter (nitrogenous base) sequence

Point mutation - a change in a single nitrogen base in DNA; may or may not cause a change in the amino acid depending on position of letter changed

Frameshift mutation - the addition or deletion of a nitrogen base, causing a shift in codons so that the gene sequence is nonsense

Mutagen - anything that causes a mutation.

Human Genome Project - an international effort to determine all the base pairs of the human genome.

DNA Fingerprinting - Scientists utilize the genetic “fingerprints” where DNA is broken into pieces and examined for patterns.

Gene therapy - treats a genetic disorder by introducing a gene into a cell or by correcting a defect in a cell’s genome

Genetic engineering - used to identify genes for specific traits or to transfer genes from one organism to another organism. It involves the making of recombinant DNA in a lab.

Recombinant DNA - a combination of DNA from two or more sources

Genetically Modified Organisms (GMOs) - Any organism whose DNA has been modified by genetic engineering.
**Cloning** - refers to any of a number of biotechnologies that aim to reproduce a genetic copy of an entire organism.