Lesson 78: DNA, RNA, Protein Synthesis Terms Biology with Lab

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 A

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 the original strand and have 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

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 (or 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) to 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 – specific coding sequence where mRNA transcription begins

Stop codon – a coding sequence signaling 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

Mutation – 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; 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