**Unit 5 Vocabulary - DNA & Protein Synthesis**

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| 1. DNA (deoxyribonucleic acid) | Polymer of nucleotides that contains all hereditary information; located in the nucleus |
| 1. Nucleotide | Monomer of nucleic acids; made of 5-carbon sugar, a phosphate group, a nitrogen base |
| 1. Chromosomes | The form of DNA, densely packed and tightly coiled, found in the nucleus |
| 1. RNA (ribonucleic acid) | Polymer of nucleotides that carries the message of DNA into the cytoplasm |
| 1. Nitrogen Bases | Nitrogen-containing compounds that make up the internal structure of both DNA & RNA, including adenine, thymine, guanine, cytosine & uracil; the ‘rungs of the ladder’ |
| 1. mRNA (Messenger RNA) | End product of transcription, molecule that transcribes the genetic information from DNA, then leaves the nucleus to carry the message to the ribosomes located in the cytoplasm |
| 1. rRNA (Ribosomal RNA) | Molecule that makes up the RNA component of ribosomes and is essential in the process of translation |
| 1. tRNA (Transfer RNA) | RNA-containing molecule that carries an anticodon, bonds with specific amino acids and transfers them to ribosomes to build proteins |
| 1. Transcription | First step in the process of building proteins (protein synthesis); occurs in the nucleus - involves the formation of mRNA from DNA so the genetic message can leave the nucleus |
| 1. Translation | Second step in the process of building proteins (protein synthesis); occurs in the cytoplasm at the ribosomes; involves the assembling of amino acids into proteins from the information coded in RNA |
| 1. Codon | 3 mRNA nucleotides in sequence to code for ONE amino acid |
| 1. Amino Acids | Molecules that are assembled into proteins at the ribosomes; the monomers of proteins |
| 1. Protein | Organic compound made up of amino acids, responsible for cell specialization, gene expression, growth, repair and many critical cellular functions |
| 1. Mutation | Any change in a nucleotide (base) that causes a change to DNA sequence and the resulting protein |
| 1. Point (Substitution) Mutation | Genetic mutation that occurs when one base pair in the DNA sequence is replaced by another, often causing adverse effects in development or functioning of an organism |
| 1. Frameshift Mutation | Genetic mutation caused by an insertion or deletion in a DNA sequence shifting the way the sequence is read, causing the incorporation of many incorrect amino acids to a protein |
| 1. Gel Electrophoresis (DNA fingerprint) | Technique used to create a DNA fingerprint by separating fragments of DNA molecules through an electrically charged field |
| 1. Transgenic Organism [Genetically Modified Organism (GMO)] | An organism with genes inserted from another organism to achieve a specific beneficial outcome; bacteria that produce human insulin, for example |
| 1. Human Genome Project | Complete mapping of the entire human genetic code |
| 1. Gene Therapy | Use of DNA to treat genetic disorders and diseases, by replacing mutated genes that do not work properly with functional genes in order to produce necessary proteins |
| 1. Restriction Enzyme | Enzyme that is used to cut DNA into segments to run through gel electrophoresis |
| 1. Genetic Engineering | Using biotechnology to change the genetic makeup of an organism. |
| 1. Bacterial Transformation | Changing an organism by inserting DNA into the bacteria organism; inserting recombinant DNA into a living cell, usually a bacterial cell. |
| 1. Recombinant DNA | DNA that results when DNA from two organisms is combined |
| 1. Plasmid | Circular ring of DNA found in prokaryotic cells |
| 1. Heredity | Passing of traits from parents to offspring |
| 1. Sister Chromatid | Two identical strands joined together as a result of a chromosome that duplicated during the cell cycle |
| 1. Centromere | The point of attachment for sister chromatids to form a chromosome; the place of attachment for spindle fibers during cell division. |
| 1. Complementary Base Pairing | Pair of nucleotide bases (A-T or G-C) that form the middle of the DNA molecule |
| 1. Hydrogen Bonds | Bond that holds the complementary bases together; weak bond that breaks easily during DNA replication. |
| 1. Protein Synthesis | The process of making proteins from DNA (central dogma of molecular biology); DNA → RNA → protein |
| 1. Anticodon | Sequence of 3 tRNA bases where the tRNA and mRNA bind; complementary to the mRNA codon |

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