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|  | **Topic: Molecules: Proteins and Nucleic Acids**  **Learning Objective: I can explain how sugar molecules are rearranged to form other macromolecules.** |
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| **Essential Question**: What is the structure and function of proteins and nucleic acids? | |
| **Questions:** | What are Proteins?   * Proteins are very complex! Their specific structure determines their function.   + Structure:     - Contain Carbon (C), Hydrogen (H), Oxygen (O), and Nitrogen (N) + “R” group (amino group)     - Monomer (the bricks) = Amino Acids connected by “peptide bonds”     - Polymer (the house) = Multiple amino acids => Peptides or PROTEINS     - Peptide bonds connect amino acids to form polypeptide chains     - One or more polypeptide chains make up a protein   + Function:     - Immune System       * Binding of antibodies (proteins) to foreign substances     - Transport       * Membrane transport proteins that move substances across cell membranes       * Hemoglobin carries oxygen, iron, and other substances through the body in your blood.     - Muscle Contraction       * Certain muscle fibers work together to contract or extend.     - Signaling       * Hormones such as insulin regulate sugar levels in blood. * 20 different amino acids exist   What are Nucleic Acids?   * Structure:   + Contain elements Carbon (C), Hydrogen (H), Oxygen (O), Nitrogen (N), and Phosphorus (P)   + Monomer (Bricks)= Nucleotides   + Polymer (House)= DNA or RNA strand * Function:   + Nucleic acids store and transmit hereditary information   + Located in the nucleus (DNA) and cytoplasm (RNA)   + Genes     - Are the units of inheritance     - Program the sequence of amino acids (monomers) which create genes     - Programs your physical characteristics (like hair or eye color) * Two Kinds of Nucleic Acids   + DNA (Deoxyribonucleic acid)     - double stranded     - Shaped like double helix (looks like a twisted ladder)     - can self-replicate     - makes up genes which code for proteins is passed from one generation to another   + RNA (Ribonucleic acid)     - single stranded     - functions in actual synthesis (creation) of proteins coded for by DNA  |  |  | | --- | --- | | DNA | RNA | |