**Bio.4.1 Understand how biological molecules are essential to the survival of living organisms.**

Bio.4.1.1 Compare the structures and functions of the major biological molecules (carbohydrates, proteins, lipids, and nucleic acids) as related to the survival of living organisms.

Bio.4.1.2 Summarize the relationship among DNA, proteins and amino acids in carrying out the work of cells and how this is similar in all organisms.

Bio.4.1.3 Explain how enzymes act as catalysts for biological reactions.

**Bio.4.2 Analyze the relationships between biochemical processes and energy use in the cell.**

Bio.4.2.1 Analyze photosynthesis and cellular respiration in terms of how energy is stored, released, and transferred within and between these systems.

Bio 4.2.2 Explain ways that organisms use released energy for maintaining homeostasis (active transport).

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| **4 Biological MOlecules** | |
| Any compound that contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: A large molecule formed when many small molecules bond together. | monomer polymer.jpg |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Small molecules that make up a polymer |
| 1. **Carbohydrates (Polymer) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(monomer)** | |
| * **Use**: Provides cell with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Two Types | |
| 1. Simple Carbohydrates | 1. Complex Carbohydrates |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_& \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| * **Taste:** Sweet-tasting Carbs | * **Taste:** Starchy Carbs |
| * **Food Examples Found in my refrigerator:** | * **Food Examples found in my refrigerator:** |
| * **Examples of monosaccharides:** * **Examples of Disaccharides**: | * Glycogen: |
| * Starch: |
| * Cellulose: |
| * **Carbohydrate Tests** |  |
| **2 Tests** | |
| **Monosaccharides** | **Polysaccharides** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Solution  Negative Test:  Positive Test: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Test  Negative Test:  Positive Test: |
| **2. Lipids (Polymer) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (monomer)** | |
| * Do Not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in water * **Use**: Serve as cell’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | |
| * **Lipid Structure Blank.JPGStructure** | * **Lipid Test**   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Test  Negative Test:  Positive Test: |
| * **Food Examples found in my refrigerator:** | * **Other examples of lipids:**  1. Phospholipids: 2. Steroids |
| **3, Nucleic Acids (Polymer) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Monomer)** | |
| * **Use**: Carries \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | |

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| Two Types of Nucleic Acids | | | |
| DNA | | RNA | |
| 3 Differences   1. Structure 2. Bases 3. Sugar | | 1. Structure 2. Bases 3. Sugar | |
| * **Structure of a Nucleotide**   **Nucleotide Blank.JPG** | | * **Food Source:**   Any and all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| * **Nucleic Acid Test:** | |
| **4, Protein (Polymer) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Monomer)** | | | |
| Use: Provides \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for tissues and organs | | | |
| Proteins are specialized based on how they \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Protein Strucure 4 levels color.gif | | * **Protein Test:**   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Test  Negative Test:  Positive Test: | |
| * **Examples of Proteins (End in –in)** | |
| * **Examples of Proteins found in my refrigerator:** | |
| Enzymes: Proteins that speed up chemical reactions(\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) by lowering the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | | |
| Enzyme Activation Energy.png | | Enzymes have names that end in \_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  And are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Enzyme Locke & Key.jpg | |
| Enzyme Structure.JPG | | | |
| Enzymes are affected by 2 things | | | |
| Temperature | | pH | |
| Enzymes & Heat.jpg  Enzyme Temp Effect Graph.JPG | | Enzyme pH Effect Graph.JPGEnzymes & pH.JPG | |
|  | |  | |
| What is pH? | | | |
| pH Scale.gif | | | |
| Extreme Temperatures and/or pH Can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an enzyme!! | | | |
| **Biochemical Processes and Energy Use** | | | |
| **Photosynthesis**: | | | |
| Reactants  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | Products  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Equation | | | |
| Occurs in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  chloroplast organelle.jpg | | Factors that Affect the rate of Photosynthesis:  1.  2.  3.  4. | |
| **Cellular Respiration** | | | |
| Reactants | | Products | |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| Equation | | | |

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| Occurs in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  mitochondria organelle.jpg | | |  | | |
| There are 2 kinds of Cellular Respiration | | | | | |
| Aerobic | | Anaerobic  (A.K.A) “Fermentation” | | | |
| Breaking down \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to get energy in the presence of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | Breaking down \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to get energy in the absence of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | | |
| Produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ATP (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) | | Produces only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ATP (Not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) | | | |
|  | | Alcoholic Fermentation | | Lactic Acid Fermentation | |
| * Small Organisms ( ) | | * Larger Organisms ( ) | |
| * Makes ethyl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ instead of water | | * Makes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ instead of water | |
| * Examples: | | * Makes us \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when we work out. | |
| **What do organisms do with this energy?**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!!! | | | | | |
| 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |