

Module 3: Organic Molecules

Comprehension & Critical Thinking Questions

Part 1: Understanding Core Concepts

1. The Nature of Organic Molecules

- What does it mean for a molecule to be "organic"? Why is Carbon considered the "backbone" of life?
- Define **Functional Group**. Give one example (e.g., Hydroxyl, Amino) and explain how it changes a molecule's properties.

2. Building Blocks

- Explain the relationship between **Monomers** and **Polymers**.
- Describe the reactions involved in building polymers (**Dehydration Synthesis**) and breaking them down (**Hydrolysis**). Which one requires water? Which one releases water?

3. The Four Classes of Biomolecules

- Create a summary table comparing **Carbohydrates**, **Lipids**, **Proteins**, and **Nucleic Acids**. Include:
 - Monomer name
 - Key function(s)
 - Example molecule

Part 2: Applying Biological Principles

1. Protein Folding

- Protein function is entirely dependent on shape. Explain the four levels of protein structure:
 - **Primary**: Sequence of amino acids.

- **Secondary:** Alpha helices and Beta sheets.
 - **Tertiary:** 3D folding (R-group interactions).
 - **Quaternary:** Multiple polypeptide chains.
- **Apply:** What happens during **denaturation**? Does a cooked egg turn back into a raw egg when cooled? Why?

2. Lipids and Diet

- Distinguish between **Saturated** and **Unsaturated** fatty acids. How does the double bond in unsaturated fats affect their physical state at room temperature (solid vs. liquid)?

Part 3: Analyzing & Evaluating

1. Structure Determines Function

- Cellulose (in plants) and Starch (in potatoes) are both made of glucose. Why can we digest starch but not cellulose (fiber)? Analyze how the bonding structure affects enzymatic breakdown.

2. ATP as Energy

- ATP (Adenosine Triphosphate) is a nucleic acid derivative. Analyze its structure. Where is the "energy" actually stored? Why is it considered the "energy currency" of the cell?