Name: **Date:** **Section:**

Molecule Mania Activity: Biological Macromolecules

Sorting Life's Molecules

Phase 1: ENGAGE (5 minutes)

Getting Started:

Open peebedu.com and navigate to Biological Molecule Structure Organizer

You're a molecular detective sorting life's building blocks!

First Impressions:

1. How many different molecules do you see? _____
2. Can you spot any patterns? _____

Challenge Question:

If you had to group these molecules into 4 bins, what would your categories be?

Phase 2: EXPLORE (18 minutes)

Station 1: Carbohydrate Hunt

Find all the sugars and starches!

Carbohydrate Checklist:

Pattern Alert: All carbohydrates have C:H:O in ratio _____

Station 2: Lipid Laboratory

Identify the fats and oils!

Lipid Lineup:

- --------- 3 chains + backbone Head: Yes, Tail: No _____

Key Discovery: Lipids are mostly _____ (polar/nonpolar)

Station 3: Protein Puzzle

Spot the proteins and amino acids!

Protein Properties:

- -------- NH_2 and COOH groups _____ _____

Amazing Fact: 20 amino acids make thousands of different proteins!

Station 4: Nucleic Acid Navigator

Find DNA and RNA components!

Nucleic Acid Notes:

- ---------- Yes _____ _____

Double Helix Detective: DNA has _____ strands, RNA has _____

Phase 3: EXPLAIN (15 minutes)

The Big Four Macromolecules

1. **Carbohydrates - Quick Energy & Structure**

General formula: $(CH_2O)n$

Types:

- Monosaccharides: _____ (examples)
- Polysaccharides: _____ (examples)

Jobs: Energy storage, cell walls, recognition

1. **Lipids - Long-term Storage & Barriers**

Mostly C and H, little O

Types:

- Fats & oils: Energy storage
- Steroids: _____

Why water-repelling? _____

1. **Proteins - The Workers**

Made of amino acids with:

- Amino group (NH_2)
- Carboxyl group (COOH)
- Variable R group

Functions:

- Enzymes: _____
- Structural: _____

1. **Nucleic Acids - Information Storage**

Made of nucleotides with:

- Sugar (ribose or deoxyribose)
- Phosphate group
- Nitrogenous base

Types:

- DNA: _____

Base pairing rules: A with _____, G with _____

Phase 4: ELABORATE (10 minutes)

Real-World Connections

1. **In Your Body Right Now:**

After eating bread:

- Starch breaks down to: _____
- Excess stored as: _____

Your cell membranes:

- Made of: _____
- Why important: _____

1. **Molecular Medicine:**

Diabetes involves:

- Molecule type: _____
- Treatment targets: _____

High cholesterol:

- Molecule type: _____
- Dietary changes: _____

1. **Sports Science:**

For quick energy: Eat _____

For endurance: Store _____

For muscle building: Need _____

For recovery: Repair with _____

Design Challenge:

Create a meal with all 4 macromolecules:

- Carbohydrate source: _____
- Protein source: _____

Phase 5: EVALUATE (7 minutes)

Assessment Questions

1. **Molecule Sorting:**

Place in correct category:

- Insulin: _____
- DNA: _____

1. **Structure-Function Match:**

Draw lines to connect:

Long hydrocarbon chains • • Information storage

Amino acid sequence • • Energy storage

Sugar rings • • Quick fuel

Nucleotide chains • • Specific 3D shape

1. **Problem Solving:**

A molecule has only C, H, and O with many CH_2 groups.

It's probably a:

Evidence: _____

1. **Analysis:**

Why can you digest starch but not cellulose?

Both are made of glucose, but:

- Bond angles: _____
- Result: _____

1. **Application:**

Design a test to identify an unknown biological molecule:

- Test 1: _____
- Test 3: _____

Synthesis Question:

Why do all living things use these same 4 types of molecules? _____