Molecule Mania Activity: Biological Macromolecules

AP Biology/College Level Teacher Guide

Overview

This guide supports implementation of the Molecule Mania Activity: Biological Macromolecules using the 5E instructional model.

Learning Objectives

- Students will categorize biological molecules based on structural properties
- Students will analyze structure-function relationships in macromolecules
- Students will identify patterns in molecular composition and bonding

Standards Alignment

- **ESSENTIAL KNOWLEDGE 1.3.A.1:** Hydrolysis is a chemical reaction involving the cleaving of covalent bonds.
- **ESSENTIAL KNOWLEDGE 1.3.A.2:** Dehydration synthesis occurs when two smaller molecules are joined together.
- **ESSENTIAL KNOWLEDGE 1.4.A.1:** Monosaccharides are the monomers for polysaccharides.

Prerequisites

- Understanding of chemical bonding
- Knowledge of functional groups
- Familiarity with monomers and polymers

Time Estimate

50 minutes

Materials Needed

- Computer/tablet with internet access
- Student Activity Sheet
- Molecular model kit (optional)

Teaching Tips by Phase

Phase 1: ENGAGE (5-10 minutes)

- Start with the phenomenon or problem presented
- Elicit student predictions and prior knowledge
- Create cognitive dissonance if possible
- Build excitement for investigation

Phase 2: EXPLORE (15-20 minutes)

- Allow students to investigate with minimal guidance
- Circulate and ask probing questions
- Encourage systematic data collection
- Note common discoveries and difficulties

Phase 3: EXPLAIN (10-15 minutes)

- Have students share their findings first
- Build on their observations to introduce concepts
- Address misconceptions directly
- Connect to broader biological principles

Phase 4: ELABORATE (10 minutes)

- Apply knowledge to new scenarios
- Make real-world connections
- Encourage deeper investigation

- Support transfer of learning

Phase 5: EVALUATE (5-10 minutes)

- Use varied assessment strategies
- Focus on conceptual understanding
- Provide immediate feedback
- Plan follow-up based on results

> **Remember:**
>
> The goal is student discovery through guided inquiry. Resist the urge to explain concepts before students have explored them!
