

Name: _____ Period: _____ Date: _____

Open **peebedu.com** and navigate to **Molecule Mania**. Click the **Let's Play!** button to begin. Read the introduction popup, which describes the four macromolecule categories you will sort: Lipids, Proteins, Carbohydrates, and Nucleic Acids.

Free Response Questions

Question 1 — Conceptual Analysis

Simulation Task: Click the *Toggle Hints* button to enable structural highlighting. Locate the saturated fatty acid and the unsaturated fatty acid and hover over each to read their descriptions and chemical formulas. Sort both into the correct category. Click *Statistics* to check your Lipids accuracy.

(A) (1 pt) **Describe** the structural feature of fatty acid chains that determines whether a lipid is classified as saturated or unsaturated.

(B) (1 pt) **Explain** why a lipid whose fatty acid tails contain double bonds is more likely to be liquid at room temperature than a lipid whose tails contain only single bonds.

(C) (1 pt) **Predict** how the physical state of a triglyceride at room temperature would change if its saturated fatty acid tails were replaced with unsaturated fatty acid tails.

(D) (1 pt) **Justify** your prediction.

Question 2 — Analyze Model / Visual Representation

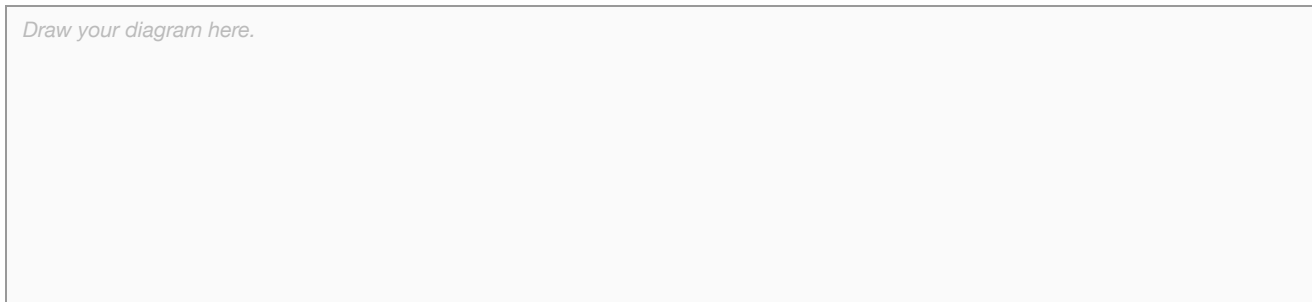
Simulation Task: Play through Level 1 and sort all six molecules into their correct categories. Hover over glucose and note its chemical formula. Then hover over the phospholipid and note its formula. Finally, hover over DNA and observe its structural diagram. Compare the elements present across these three molecules.

(A) (1 pt) **Describe** the elemental composition of biological macromolecules.

(B) (1 pt) **Explain** why the chemical formula of a phospholipid contains elements that are not present in the chemical formula of glucose.

(C) (1 pt) **Represent** a nucleotide, showing where its phosphorus and nitrogen atoms are located.

Draw your diagram here.



(D) (1 pt) **Explain** how the polarity of water molecules allows them to form hydrogen bonds with the polar regions of biological molecules.

1.2.A.1