

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 the type of fatty acid in a phospholipid affects how tightly phospholipid molecules pack together in a cell membrane.

(C) (1 pt) **Predict** how increasing the proportion of unsaturated fatty acids in an animal cell membrane would affect the organism's ability to maintain membrane function at low temperatures.

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

Question 2 — Analyze Model / Visual Representation

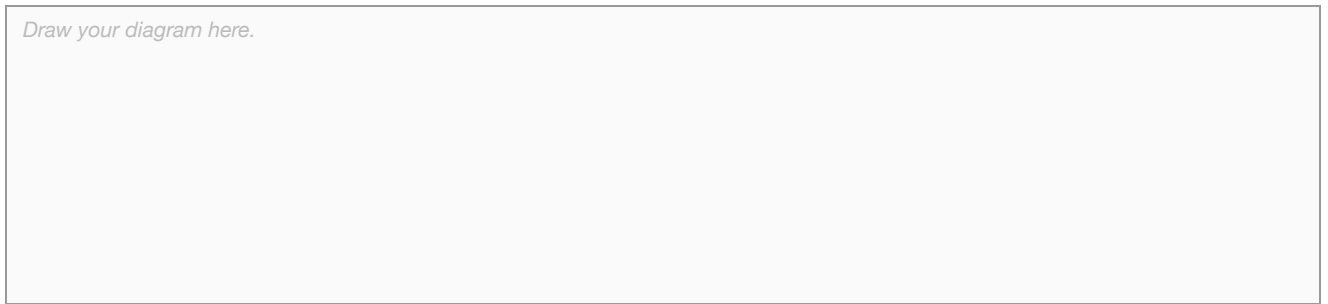
Simulation Task: Play through Level 1 and sort all six molecules into their correct categories. Hover over glucose and note its chemical formula. Then hover over the phospholipid and note its formula. Finally, hover over glycine and observe its structural diagram. Compare the elements present across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

Draw your diagram here.



(D) (1 pt) **Explain** how the availability of elements required to build biological macromolecules functions as a limiting abiotic factor in ecosystems.

1.2.A.1