Glycogen Hydrolysis Lab

Name: _____ **Period:** _____ **Date:** _____

> Open **peebedu.com** and navigate to **Glycogen Hydrolysis Lab**. Click the **Start Experimenting** button to begin. Read the tutorial popup, which describes how to use six tools to break bonds, form bonds, harvest molecules, and add monosaccharides to the workspace.

Free Response Questions

Question 1 — Conceptual Analysis

> **Simulation Task:** *Select the Hydrolyze tool and click on three different bonds in the glycogen polymer. After each bond break, note the change in the water count and the molecules released on either side of the broken bond. Then select the Dehydrate tool and bond two free glucose molecules together to form maltose.*

(A) (1 pt) **Describe** the chemical reaction that cells use to break down polymers into individual monomers.

(B) (1 pt) **Explain** why the water count in the environmental inventory decreases each time a bond in the glycogen polymer is broken.

(C) (1 pt) **Predict** how a cell's inability to hydrolyze stored glycogen would affect the number of free glucose monomers available to that cell.

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

Question 2 — Analyze Model / Visual Representation

> **Simulation Task:** *Use the Reset Glycogen button to restore the branched glycogen polymer. Observe the branching pattern of the polymer and count the number of exposed ends. Then compare this structure to a linear chain of six glucose molecules that you build using the Dehydrate tool.*

(A) (1 pt) **Describe** the relationship between monosaccharides and polysaccharides.

(B) (1 pt) **Explain** why glycogen can provide glucose to a cell more quickly than a linear polysaccharide containing the same number of glucose monomers.

(C) (1 pt) **Represent** the structural difference between a linear polysaccharide and a branched polysaccharide.

Draw your diagram here.

(D) (1 pt) **Explain** how the loss of the equivalent of a water molecule allows two glucose monomers to become joined by a covalent bond.

1.4.A.1