PEEBEDU

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 amount of available water decreases when bonds in glycogen are broken but increases when glucose monomers are bonded together.

(C) (1 pt) **Predict** how a cell's inability to perform hydrolysis of stored glycogen would affect the amount of glucose available for cellular respiration.

(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** why two cell types in the same organism with identical DNA can differ in their ability to break down glycogen.

1.4.A.1