ANSWER KEY.

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Carbohydrates

Biology | ANSWER KEY

Answer in complete sentences. Show your setup for calculations.

1. Classify each carbohydrate by size.

Molecule	Monosaccharide, disaccharide, or polysaccharide?
Glucose	**monosaccharide**
Sucrose	**disaccharide**
Cellulose	**polysaccharide**

Count the sugar units in each molecule.

2. Maltose is a disaccharide made of two glucose molecules, $C_6H_{12}O_6$, joined by dehydration synthesis.

(a) Write the formula of maltose. Show your setup.

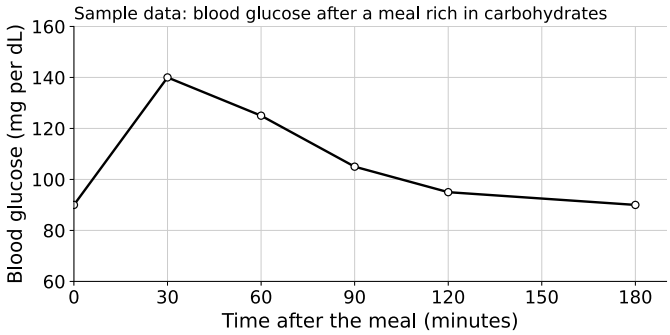
(b) Glycogen is a chain of 1,200 glucose units. How many molecules of water were released when it formed?

(a) C: 6 + 6 = 12. H: 12 + 12 − 2 = 22. O: 6 + 6 − 1 = 11. **$C_{12}H_{22}O_{11}$**

(b) 1,200 − 1 = **1,199 molecules of water**

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3. The graph shows blood glucose after a meal rich in carbohydrates (sample data).



(a) By how many mg per dL did blood glucose rise from 0 to 30 minutes?

(b) Explain why blood glucose fell between 30 and 180 minutes.

(a) 140 − 90 = **50 mg per dL**

(b) **Cells took up glucose to use as fuel, and extra glucose was stored as glycogen in the liver and muscles.**

4. Starch and cellulose are both polymers of glucose.

(a) Explain why humans can get energy from starch but not from cellulose.

(b) Which polysaccharide do your muscles use to store glucose?

(c) Which polysaccharide do plants use to store glucose?

(a) **The bonds and shape of cellulose are different from those of starch, so human digestive enzymes cannot break cellulose down into glucose.**

(b) **Glycogen**

(c) **Starch**

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