Comparing Photosynthesis and Respiration

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

In a simplified model, photosynthesis uses CO_2 and H_2O plus light to make glucose and O_2. Aerobic respiration uses glucose and O_2 to make CO_2 and H_2O and releases energy that cells can use.

1 Which substance is a product of photosynthesis and a reactant in aerobic respiration?

(1) Glucose

(2) Carbon dioxide

(3) Water

(4) Light

2 Compare the energy roles of the two processes. [1]

Answer and work

3 Which process returns carbon from glucose to carbon dioxide in the simplified model?

(1) Photosynthesis

(2) Aerobic respiration

(3) Both consume carbon dioxide.

(4) Neither process involves carbon.

4 A plant in bright light produces oxygen and also consumes it. Explain how both can happen. [1]

Answer and work

Tracking Oxygen in a Model

Use the information below to answer the questions.

The model counts O_2 made by photosynthesis and O_2 used by respiration over equal intervals. The net oxygen change is the amount made minus the amount used.

Setting	O_2 made (units)	O_2 used (units)
Bright	12	4
Dim	5	4
Dark	0	4

5 Which setting shows the largest net oxygen gain?

(1) Bright

(2) Dim

(3) Dark

(4) All three are equal.

6 Calculate the net oxygen change in the dark setting. Include the sign. [1]

Answer and work

7 Which quantity is constant across all three rows?

(1) Oxygen production

(2) Oxygen use by respiration

(3) Net oxygen change

(4) Light level

8 The dim setting has a net gain of only one unit. Explain why that does not mean photosynthesis produced only one unit. [1]

Answer and work