

Photosynthesis Respiration

KS3 Biology · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Compare photosynthesis and aerobic respiration.

Step 1 · Word summaries

Photosynthesis: carbon dioxide + water → glucose + oxygen. Respiration: glucose + oxygen → carbon dioxide + water.

Step 2 · Relationship

The products of one are the reactants of the other — they are almost the reverse.

Step 3 · Where and when

Photosynthesis: chloroplasts, only in light, only in plants and algae. Respiration: mitochondria, all the time, in all living cells.

Answer: They are near-reverse processes: one stores energy in glucose, the other releases it

Check: Plants do both; animals only respire.

2. Now try one with the steps

A plant is kept in a sealed jar in bright light. What happens to the oxygen level, and why?

Step 1 · Processes

Step 2 · Compare rates

Step 3 · Result

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Write the word summary for photosynthesis. [2]

2. Write the word summary for aerobic respiration. [2]

3. Which organisms carry out respiration? [1]

4. When do plants photosynthesise? [1]

5. When do plants respire? [1]

6. Name the organelle where photosynthesis happens and the one where aerobic respiration happens. [2]

7. Which gas do plants give out overall in bright light? [1]

8. Which gas do plants give out overall in the dark? [1]

9. Explain why the products of photosynthesis are needed for respiration. [2]

10. Give ONE way humans increase the amount of carbon dioxide in the air. [1]

11. A plant made 60 cm³ of oxygen by photosynthesis in an hour and used 15 cm³ in respiration. How much oxygen did it give out overall, in cm³? [1]

12. In dim light a plant photosynthesises at exactly the same rate respire. What would you observe about gas exchange? [2]

13. STRETCH: Name the factors that can limit the rate of photosynthesis. [3]

14. Explain why cutting down rainforests can increase carbon dioxide in the atmosphere in two ways. [2]

4. Before you hand it in

"Plants photosynthesise in the day and respire at night."

Plants respire 24 hours a day. In the day they also photosynthesise, usually faster, so they give out oxygen overall.

"Humans make carbon dioxide in anaerobic respiration."

Humans: glucose → lactic acid. Yeast: glucose → ethanol + carbon dioxide.

"Respiration makes energy."

Respiration RELEASES energy stored in glucose; photosynthesis STORES light energy in glucose.