

# Multiple Choice: Photosynthesis and Cellular Respiration

Biology · Year 11

Name: \_\_\_\_\_ Date: \_\_\_\_\_



**I am learning to:** Explain how photosynthesis and cellular respiration are complementary metabolic processes that transform energy and matter in living organisms

*This worksheet tests your understanding of photosynthesis and cellular respiration as interconnected metabolic processes. Read each question carefully and select the most accurate answer from the four options. Circle or highlight the letter of your choice. You have 20 minutes to complete this assessment. Show your working where indicated. If you are unsure about an answer, make your best attempt and note your reasoning on the back of the sheet.*

1. Which of the following is the correct word equation for photosynthesis?  
A. carbon dioxide + water → glucose + oxygen  
B. glucose + oxygen → carbon dioxide + water + ATP  
C. glucose → ethanol + carbon dioxide  
D. oxygen + glucose → carbon dioxide + water + ATP
2. In which cellular organelle does the majority of ATP production occur during aerobic cellular respiration?  
A. Ribosome  
B. Golgi apparatus  
C. Mitochondrion  
D. Chloroplast
3. A sealed jar contains a healthy plant and is placed in sunlight for 24 hours. A carbon dioxide indicator solution in the jar remains blue throughout. What does this most likely indicate?  
A. The plant is only respiring, not photosynthesising.  
B. Photosynthesis is occurring at a faster rate than cellular respiration.  
C. Cellular respiration is occurring at a faster rate than photosynthesis.  
D. Neither photosynthesis nor cellular respiration is occurring.
4. Which statement accurately describes the relationship between the products of photosynthesis and the reactants of cellular respiration?  
A. They are unrelated processes that happen to use similar molecules.  
B. The products of photosynthesis are the reactants of cellular respiration.  
C. The reactants of photosynthesis are the products of cellular respiration.  
D. Both B and C are correct.

5. 5. A Year 11 student observes that the word equation for photosynthesis appears to be the reverse of the word equation for cellular respiration. Which of the following best explains why these two processes do not simply cancel each other out in living cells? A. Photosynthesis and cellular respiration occur in different organisms. B. The two processes are separated in time, location, and purpose: photosynthesis captures light energy to build glucose; cellular respiration releases chemical energy to produce ATP for cellular work. C. Cellular respiration is more important than photosynthesis. D. Photosynthesis produces oxygen, which cellular respiration cannot use.
6. 6. A graph shows the rate of oxygen production and carbon dioxide consumption measured in a pond plant over a 24 hour period. From midnight to dawn, the plant consumes oxygen and produces carbon dioxide, with no net change in glucose. Which metabolic process is dominant during this period, and why? A. Photosynthesis is dominant because the plant is preparing for daylight. B. Cellular respiration is dominant because there is no light available to drive photosynthesis. C. Both processes occur at equal rates. D. Neither process is occurring because the plant is resting.
7. 7. Which of the following scenarios would most likely result in a net increase in glucose and biomass in a plant over one week? A. The plant is kept in darkness with abundant water and carbon dioxide. B. The plant is exposed to sunlight for 16 hours each day with access to water and carbon dioxide, and the rate of photosynthesis exceeds the rate of cellular respiration. C. The plant receives abundant water and minerals but is kept in a room with very low carbon dioxide. D. The plant is kept at a temperature so low that cellular respiration is inhibited completely.
8. 8. A student compares two organisms: a green plant and a rabbit. Which statement most accurately reflects the dependence of these organisms on photosynthesis and cellular respiration? A. The rabbit depends only on cellular respiration; the plant depends only on photosynthesis. B. The rabbit obtains glucose by consuming the plant (which performed photosynthesis), then breaks it down through cellular respiration; the plant performs both photosynthesis and cellular respiration. C. Both organisms perform only cellular respiration, but the plant also captures light energy. D. The rabbit performs photosynthesis indirectly through the plant it eats.
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