

CHAPTER

5

DIRECTED READING

Photosynthesis and Cellular Respiration

► Section 5-1: Energy and Living Things

Energy Flows Between Organisms in Living Systems

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|-------------------------------|--|
| _____ 1. photosynthesis | a. building molecules that can be used as an energy source, or breaking down molecules in which energy is stored |
| _____ 2. autotroph | b. the process by which light energy is converted to chemical energy |
| _____ 3. heterotroph | c. an organism that uses sunlight or inorganic substances to make organic compounds |
| _____ 4. cellular respiration | d. an organism that consumes food to get energy |
| _____ 5. metabolism | e. the process of getting energy from food |

Study the following steps in the flow of energy through living systems. Determine the order in which the steps take place. Write the number of each step in the space provided.

- _____ 6. Animals eat plants to get energy.
- _____ 7. Plants absorb sunlight.
- _____ 8. Plants use chemical energy to make organic compounds.
- _____ 9. Light from the sun reaches Earth.
- _____ 10. Plants convert sunlight to chemical energy.

Read each question, and write your answer in the space provided.

11. What is the difference between cellular respiration and getting energy from a log by burning it?

12. Why is ATP called an “energy currency”?

ATP Stores and Releases Energy

Read each question, and write your answer in the space provided.

13. How is energy released from ATP?

14. How is ATP important to cell metabolism?

► Section 5-2: Photosynthesis

Photosynthetic Organisms Use the Energy in Sunlight

Study the following stages of photosynthesis. Determine the order in which the stages take place. Write the order of each stage in the space provided.

- _____ 1. Energy stored in ATP and NADPH powers the formation of organic compounds, using carbon dioxide.
- _____ 2. Energy is captured from sunlight.
- _____ 3. Light energy is converted to chemical energy, which is temporarily stored in ATP and NADPH.

Read each question, and write your answer in the space provided.

4. Where does the energy we use come from?

5. Write the chemical equation that is used to summarize photosynthesis.

In Stage One, Light Energy Is Absorbed

Complete each statement by writing the correct term or phrase in the space provided.

6. _____ are light-absorbing substances.
7. Pigments found in plants include chlorophyll *a*, chlorophyll *b*, and _____.
8. Electrons that leave chlorophyll molecules are replaced by electrons from split _____ molecules.

In Stage Two, Light Energy Is Converted to Chemical Energy

Complete each statement by writing the correct term or phrase in the space provided.

- ATP and _____ are produced in the second stage of photosynthesis.
- The series of molecules through which excited electrons are passed down a thylakoid membrane is called a(n) _____ chain.
- ATP is made from ADP by adding a(n) _____ group to a molecule of ADP.

In Stage Three, Energy Is Stored in Organic Compounds

Read each question, and write your answer in the space provided.

- What is the role of the Calvin cycle in photosynthesis?

- What are three environmental factors that affect photosynthesis?

► Section 5-3: Cellular Respiration

Cellular Respiration Produces ATP

Complete each statement by writing the correct term or phrase in the space provided.

- Cells harvest the energy in organic compounds to make ATP through a process called _____.
- Metabolic processes that require oxygen are called _____ processes.

In Stage One, Glucose Is Broken Down During Glycolysis

Complete each statement by underlining the correct term or phrase in the brackets.

- The breakdown of glucose to pyruvate is called [glycolysis / respiration].
- The primary fuel for cellular respiration is [glucose / fat].
- In the first stage of cellular respiration, glucose is broken down to [pyruvate / carbon dioxide].

In Stage Two, More ATP Is Made by Aerobic Respiration

Read each question, and write your answer in the space provided.

6. How is acetyl-CoA produced?

7. What are the products of the electron transport chain in the second stage of cellular respiration?

Fermentation Follows Glycolysis in the Absence of Oxygen

Complete each statement by underlining the correct term or phrase in the brackets.

8. When oxygen is not present, [the electron transport chain / glycolysis] does not function.
9. Two types of fermentation are [alcoholic / catabolic] and [lactic acid / NADH] fermentation.
10. The role of fermentation in cellular respiration is to recycle [NAD⁺ / lactic acid].

Read each question, and write your answer in the space provided

11. What causes muscle soreness during exercise?

12. Why do cells produce more ATP under aerobic conditions than under anaerobic conditions?
