Name _____ Class _____

9.1 Cellular Respiration: An Overview

Lesson Objectives

- Explain where organisms get the energy they need for life processes.
- Define cellular respiration.
- Compare photosynthesis and cellular respiration.

Lesson Summary

Chemical Energy and Food Chemical energy is stored in food molecules.

- Energy is released when chemical bonds in food molecules are broken.
- Energy is measured in a unit called a **calorie**, the amount of energy needed to raise the temperature of 1 gram of water 1 degree Celsius.
- Fats store more energy per gram than do carbohydrates and proteins.

Overview of Cellular Respiration **Cellular respiration** is the process that releases energy from food in the presence of oxygen.

- Cellular respiration captures the energy from food in three main stages:
  - glycolysis
  - the Krebs cycle
  - the electron transport chain
- Glycolysis does not require oxygen. The Krebs cycle and electron transport chain both require oxygen.
  - **Aerobic** pathways are processes that require oxygen.
  - **Anaerobic** pathways are processes that occur without oxygen.

Comparing Photosynthesis and Cellular Respiration The energy in photosynthesis and cellular respiration flows in opposite directions. Their equations are the reverse of each other.

- Photosynthesis removes carbon dioxide from the atmosphere, and cellular respiration puts it back.
- Photosynthesis releases oxygen into the atmosphere, and cellular respiration uses oxygen to release energy from food.

Chemical Energy and Food

For Questions 1–4, complete each statement by writing the correct word or words.

1. A calorie is a unit of _____.

2. The Calorie used on food labels is equal to _____calories.

3. A Calorie is also referred to as a _____.

4. Cells use the energy stored in chemical bonds of foods to produce compounds that directly power the cell's activities, such as _____.

Overview of Cellular Respiration

For Questions 5–10, complete each statement by writing the correct word or words.

5. The equation that summarizes cellular respiration, using chemical formulas, is _____.

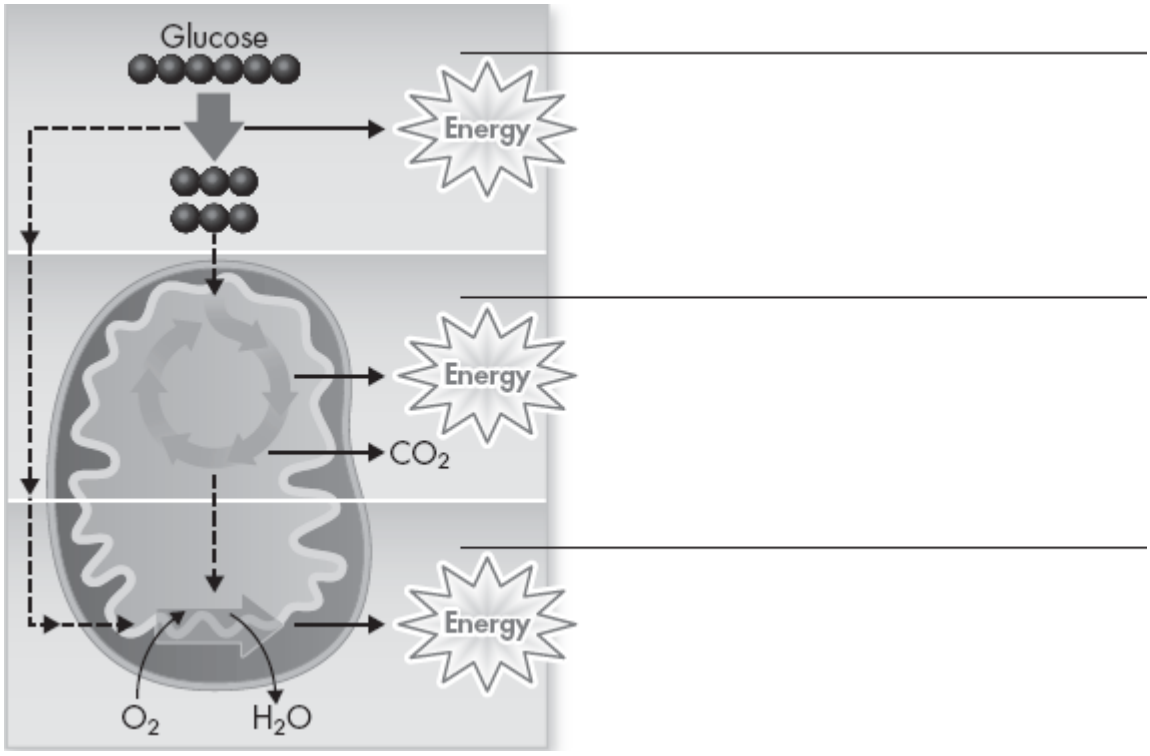
6. If cellular respiration took place in just one step, most of the _____would be lost in the form of light and _____.

7. Cellular respiration begins with a pathway called _____, which takes place in the _____of the cell.

9. Cellular respiration continues in the _____ of the cell with the _____ and electron transport chain.

10. The pathways of cellular respiration that require oxygen are said to be _____. Pathways that do not require oxygen are said to be _____.

11. **THINK VISUALLY** Complete the illustration by adding labels for the three main stages of cellular respiration.



Comparing Photosynthesis and Cellular Respiration

For Questions 12–15, write True if the statement is true. If the statement is false, change the underlined word or words to make the statement true.

_____ **12.** The energy flow in photosynthesis and cellular respiration occurs in the same direction.

_____ **13.** Photosynthesis deposits energy in Earth's "savings account" for living organisms.

_____ **14.** Cellular respiration removes carbon dioxide from the air.

_____ **15.** Photosynthesis takes place in nearly all life.

16. Complete the table comparing photosynthesis and cellular respiration.

A Comparison of Photosynthesis and Cellular Respiration

Aspect	Photosynthesis	Cellular Respiration
Function	energy capture	
Location of reactions	chloroplasts	
Reactants		
Products		