

**Reinforcement and Study Guide** 

Section 9.1 The Need for Energy

In your textbook, read about cell energy.

Use each of the terms below just once to complete the passage.

	energy	phosphate	adenine	charged			
	AIP	chemical bonds	WOLK	ribose			
	To do biological	(1)	, cells re	, cells require energy. A quick source			
of energy that cells use is the molecule (2) The (3)							
in this molecule is stored in its (4) ATP is composed of a(n)							
(5)		molecule bon	ded to a(n) <b>(6)</b>		sugar.		
Three	nree (7) molecules called (8) grou						

are attached to the sugar.

In your textbook, read about forming and breaking down ATP and the uses of cell energy.

Examine the diagram below. Then answer the questions.



**9.** How is energy stored and released by ATP?

# **10.** How do cells use the energy released from ATP?



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**Energy in a Cell,** *continued* 

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Section 9.2 Photosynthesis: Trapping the Sun's Energy

In your textbook, read about trapping the sun's energy.

Determine if the statement is true. If it is not, rewrite the italicized part to make it true.

1. Photosynthesis is the process plants use to trap the sun's energy to make *glucose*.

2. ATP molecules are made during the *light-independent* reactions of photosynthesis.

- **3.** *Carbon dioxide* gas is produced during photosynthesis.
- **4.** The light-dependent reactions of photosynthesis take place in the membranes of the thylakoid discs in *mitochondria*.
- 5. The thylakoid membranes contain chlorophyll and other pigments that *absorb* sunlight.

In your textbook, read about the light-dependent reactions of photosynthesis.

Number the following steps of the light-dependent reactions in the order in which they occur.

 <b>6.</b> The energy lost by electrons as they pass through the electron transport chain is used to make ATP.
 <b>7.</b> The electrons pass from the chlorophyll to an electron transport chain.
 <b>8.</b> Sunlight strikes the chlorophyll molecules in the thylakoid membranes.
 <b>9.</b> NADP <sup>+</sup> molecules change to NADPH as they carry the electrons to the stroma of the chloroplast.
 <b>10.</b> The sunlight's energy is transferred to the chlorophyll's electrons.
 <b>11.</b> The electrons are passed down a second electron transport chain.

# Answer the following questions.

**12.** How are the electrons that are lost by the chlorophyll molecules replaced?

**13.** How do plants produce oxygen during photosynthesis?

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In your textbook, read about the light-independent reactions.									
Circle the letter of the choice that best completes the statement or answers the question.         14. The Calvin cycle includes         a. the light-dependent reactions.         b. an electron transport chain.         c. the light-independent reactions.         d. photolysis.									
<ul><li><b>15.</b> The Calvin cycle takes place in the</li><li><b>a.</b> mitochondria.</li><li><b>c.</b> nucleus.</li></ul>	<ul><li>b. stroma.</li><li>c. thylakoid membrane.</li></ul>								
<ul><li>16. What product of the light-dependent reactions</li><li>a. oxygen</li><li>b. carbon dioxide</li></ul>	s is used in the Calvin cycle? c. NADPH d. chlorophyll								
<ul><li><b>17.</b> What gas is used in the first step of the Calvin a. oxygen</li><li><b>b.</b> carbon dioxide</li></ul>	cycle? c. hydrogen d. water								
<ul><li><b>18.</b> A carbon atom from carbon dioxide is used to a <b>a.</b> ATP.</li><li><b>b.</b> two molecules.</li></ul>	change the five-carbon sugar RuBP into c. PGA. d. a six-carbon sugar.								
<ul><li><b>19.</b> How many molecules of the three-carbon suga</li><li><b>a.</b> two</li><li><b>b.</b> one</li></ul>	r PGA are formed? <b>c.</b> six <b>d.</b> three								
<ul><li><b>20.</b> ATP, NADPH, and hydrogen ions are used to a. PGAL.</li><li><b>b.</b> glucose.</li></ul>	convert PGA into c. RuBP. d. carbon dioxide.								
<ul><li>21. How many rounds of the Calvin cycle are need</li><li>a. one</li><li>b. six</li></ul>	ed to form one glucose molecule? c. two d. three								
<ul><li>22. What two molecules leave the Calvin cycle and</li><li>a. RuBP</li><li>b. PGA</li></ul>	are combined to form glucose? <b>c.</b> PGAL <b>d.</b> CO <sub>2</sub>								

23. Which molecule from the Calvin cycle is used to replenish the five-carbon sugar, RuBP, which is used at the beginning of the cycle?
a. NADP
b. CO<sub>2</sub>
c. PGA
d. PGAL

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In your textbook, read about the cellular respiration and fermentation.

Fill in the names of the molecules to complete the glycolysis reaction. Use these choices: 2PGAL, 4ATP, glucose, 2ADP, 2 pyruvic acid, 2NADH + 2H<sup>+</sup>. Then answer the questions.



7. What happens to pyruvic acid before entering the citric acid cycle?

**8.** What happens to the electrons carried by the NADH and FADH<sub>2</sub> molecules produced during the citric acid cycle?

9. During which stages of cellular respiration are ATP molecules formed?

**10.** Why is oxygen necessary for cellular respiration?

**11.** How is fermentation different from cellular respiration?

In your textbook, read about comparing photosynthesis and cellular respiration.

### Answer the following question.

12. Describe two ways in which cellular respiration is the opposite of photosynthesis.

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In your textbook, read about the chemistry of life.

Label the diagram below, using these choices:



In your textbook, read about eukaryotic cells, prokaryotic cells, and organelles.

# Complete each statement.

7. Every cell is surrounded by a plasma \_\_\_\_\_\_.

**8.** \_\_\_\_\_\_ contain membrane-bound structures called organelles within the cell.

9. Organisms having cells without internal membrane-bound structures are called

- **10.** The plasma membrane is composed of a \_\_\_\_\_\_ with embedded proteins.
- **11.** The \_\_\_\_\_\_ controls cell functions.

\_\_\_.

**12.** Ribosomes are organelles found in the cytoplasm that produce \_\_\_\_\_\_.

- **13.** The \_\_\_\_\_\_ and Golgi apparatus transport and modify proteins.
- 14. Plant cells contain \_\_\_\_\_\_ that capture the sun's light energy so that it can be transformed into usable chemical energy.
- **15.** A network of microfilaments and microtubules attached to the cell membrane give the cell
- **16.** \_\_\_\_\_\_\_ are long projections from the surface of the plasma membrane and move in a whiplike fashion to propel a cell.

BioDigest **The Life of a Cell,** continued

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In your textbook, read about diffusion and osmosis.

### Answer the following questions.

**17.** What is diffusion? \_\_\_\_\_

**18.** What is osmosis? \_

**19.** What is active transport? \_\_\_\_\_

In your textbook, read about mitosis.

### For each item in Column A, write the letter of the matching item in Column B.

	Column A	С	olumn B
20	• Duplicated chromosomes condense and mitotic spindles form on the two opposite ends of the cell.	a. :	anaphase
21	Chromosomes slowly separate to opposite ends of cells.	<b>b.</b>	interphase
22	• Chromosomes uncoil, spindle breaks down, and nuclear envelope forms around each set of chromosomes.	<b>C.</b> 1	netaphase
23	• Cells experience a period of intense metabolic activity prior to mitosis.	<b>d</b> .	prophase
24	Chromosomes line up in center of cell.	<b>e.</b> 1	telophase

In your textbook, read about energy in a cell.

Decide if each of the following statements is true. If it is not, rewrite the italicized part to make it true.

**25.** Adenosine triphosphate (ATP) is the most commonly used source of protein in a cell.

 **26.** Light-dependent reactions convert energy into starch through the Calvin cycle.

 **27.** Mitochondria convert food energy to ATP through a series of chemical reactions.

 **28.** Glycolysis produces a net gain of two ATP for every two molecules of glucose.