

## Section 9–2 The Krebs Cycle and Electron Transport (pages 226–232)



**TEKS FOCUS:** 4B Cellular processes; 9B Compare photosynthesis and cellular respiration;  
**TEKS SUPPORT:** 9A Structure and function of biomolecules

*This section describes what happens during the second stage of cellular respiration, called the Krebs cycle. It also explains how high-energy electrons are used during the third stage, called electron transport.*

### Introduction (page 226)

1. At the end of glycolysis, how much of the chemical energy in glucose is still unused?

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2. Because the final stages of cellular respiration require oxygen, they are said to be \_\_\_\_\_.

\_\_\_\_\_.

### The Krebs Cycle (pages 226–227)

3. In the presence of oxygen, how is the pyruvic acid produced in glycolysis used?

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4. What happens to pyruvic acid during the Krebs cycle? \_\_\_\_\_

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5. Why is the Krebs cycle also known as the citric acid cycle? \_\_\_\_\_

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6. When does the Krebs cycle begin? \_\_\_\_\_

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7. What happens to each of the 3 carbon atoms in pyruvic acid when it is broken down?

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8. What happens to the carbon dioxide produced in breaking down pyruvic acid?

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9. How is citric acid produced? \_\_\_\_\_

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10. During the energy extraction part of the Krebs cycle, how many molecules of CO<sub>2</sub> are released? \_\_\_\_\_

11. What is the energy tally from 1 molecule of pyruvic acid during the Krebs cycle?

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12. When electrons join  $\text{NAD}^+$  and FAD during the Krebs cycle, what do they form?

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13. Why is the 4-carbon compound generated in the breakdown of citric acid the only permanent compound in the Krebs cycle? \_\_\_\_\_

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### Electron Transport (pages 228–229)

14. What is the electron transport chain? \_\_\_\_\_

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15. What does the electron transport chain use the high-energy electrons from the Krebs cycle for? \_\_\_\_\_

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16. How does the location of the electron transport chain differ in eukaryotes and prokaryotes? \_\_\_\_\_

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17. Where does the electron transport chain get the high-energy electrons that are passed down the chain? \_\_\_\_\_

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18. Is the following sentence true or false? Hydrogen serves as the final electron acceptor of the electron transport chain. \_\_\_\_\_

19. What is the energy of the high-energy electrons used for every time 2 high-energy electrons move down the electron transport chain? \_\_\_\_\_

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20. What causes the  $\text{H}^+$  ions in the intermembrane space to move through the channels in the membrane and out into the matrix? \_\_\_\_\_

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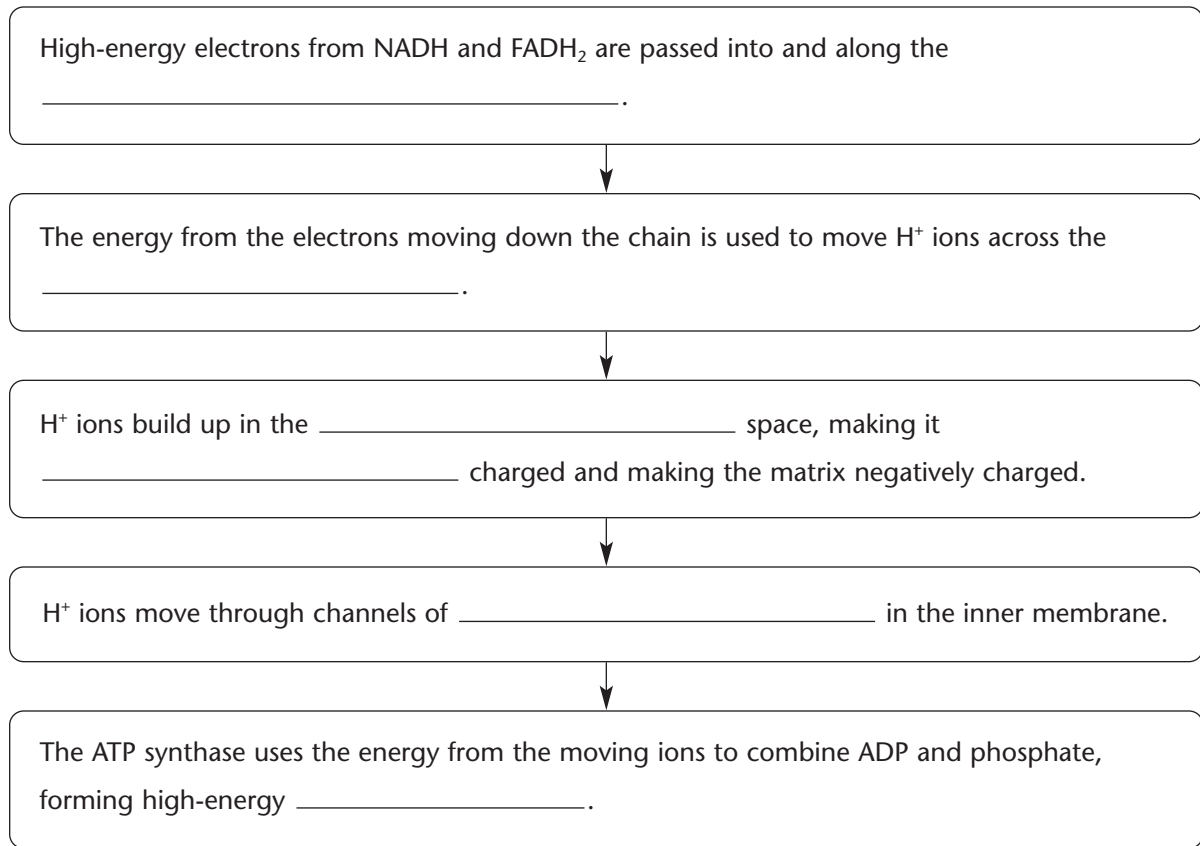
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21. On average, how many ATP molecules are produced as each pair of high-energy electrons moves down the electron transport chain? \_\_\_\_\_

22. Complete the flowchart about electron transport.



**The Totals** (page 229)

23. What is the total number of ATP molecules formed during cellular respiration?  
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24. Why can 18 times as much ATP be generated from glucose in the presence of oxygen than when oxygen is not available? \_\_\_\_\_  
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\_\_\_\_\_  
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25. What happens to the 62 percent of the total energy of glucose that is not used to make ATP molecules? \_\_\_\_\_
26. What are the final waste products of cellular respiration? \_\_\_\_\_

**Energy and Exercise** (pages 230–231)

27. What are three sources of ATP a human body uses at the beginning of a race?  
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\_\_\_\_\_  
\_\_\_\_\_

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

28. When a runner needs quick energy for a short race, what source can supply enough ATP for about 90 seconds? \_\_\_\_\_  
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29. Why does a sprinter have an oxygen debt to repay after the race is over? \_\_\_\_\_  
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30. A runner needs more energy for a longer race. How does the body generate the necessary ATP? \_\_\_\_\_
31. Why are aerobic forms of exercise so beneficial for weight control? \_\_\_\_\_  
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**Comparing Photosynthesis and Cellular Respiration** (page 232)

32. If photosynthesis is the process that “deposits” energy in a “savings account,” then what is cellular respiration? \_\_\_\_\_  
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33. How are photosynthesis and cellular respiration opposite in terms of carbon dioxide? \_\_\_\_\_  
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34. How are photosynthesis and cellular respiration opposite in terms of oxygen? \_\_\_\_\_  
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