

2

Chapter Review

the **BIG** idea

All cells need energy and materials for life processes.



CONTENT REVIEW
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KEY CONCEPTS SUMMARY

1 Chemical reactions take place inside cells.

All cells are made of the same elements. Cells contain four types of large molecules—**carbohydrates**, **lipids**, **proteins**, and **nucleic acids**—that support cell function.

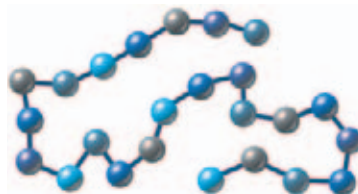
About two thirds of every cell is water. The properties of water are important to cell function.



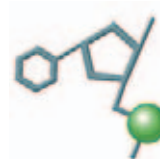
carbohydrates



lipids



proteins



nucleic acids

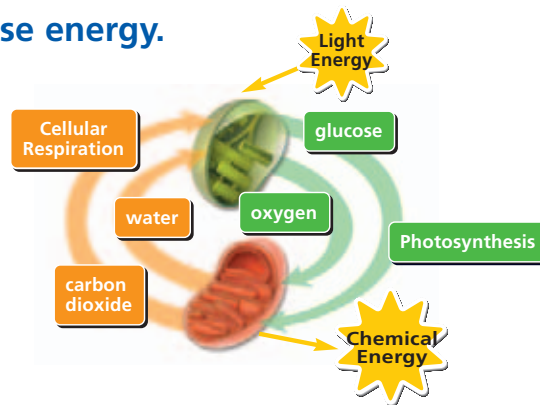
VOCABULARY

chemical reaction p. 42
carbohydrate p. 42
lipid p. 43
protein p. 43
nucleic acid p. 43

2 Cells capture and release energy.

All cells need energy. Some cells capture light energy through **photosynthesis**. All cells release chemical energy from glucose.

Cellular respiration and **fermentation** are two ways that cells release energy from glucose.



VOCABULARY

chemical energy p. 47
glucose p. 47
photosynthesis p. 48
chlorophyll p. 48
cellular respiration p. 50
fermentation p. 52

3 Materials move across the cell's membranes.

Passive transport is the movement of materials from an area of higher concentration to an area of lower concentration. **Diffusion** and **osmosis** are examples of passive transport.

Active transport is the movement of materials from an area of lower concentration to an area of higher concentration. Cells need energy to perform active transport.



passive transport



active transport

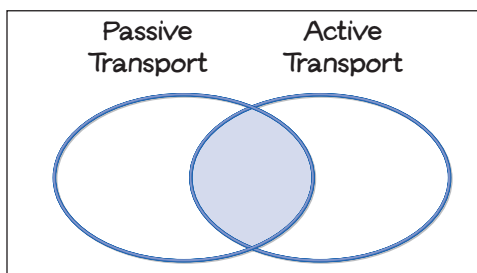
VOCABULARY

diffusion p. 56
passive transport p. 58
osmosis p. 59
active transport p. 60

Reviewing Vocabulary

Use words from the vocabulary lists on page 66 to answer these questions.

1. Which molecule stores information?
2. Which word describes the process when two or more atoms bond together?
3. What kind of energy do cells use?
4. Which term describes the process in which cells release energy without using oxygen?
5. Which process occurs in chloroplasts?
6. From what sugar molecule do many living things release energy?
7. Which chemical that aids in photosynthesis do you find in a chloroplast?
8. Which word means "diffusion of water across cell membranes"?
9. Choose two pairs of opposite processes.
10. Use a Venn diagram to compare and contrast passive transport and active transport.



Reviewing Key Concepts

Multiple Choice Choose the letter of the best answer.

11. The fats, oils, and waxes found in living things are known as
 - a. lipids
 - b. proteins
 - c. carbohydrates
 - d. glucose
12. What do cells use as a source of energy and for energy storage?
 - a. proteins
 - b. water
 - c. cytoplasm
 - d. carbohydrates
13. Leaf cells use chlorophyll to absorb
 - a. oxygen
 - b. light energy
 - c. carbon dioxide
 - d. glucose
14. The cells of a redwood tree require oxygen for the process of
 - a. photosynthesis
 - b. cellular respiration
 - c. fermentation
 - d. endocytosis
15. In fermentation, cells release energy without
 - a. alcohol
 - b. water
 - c. glucose
 - d. oxygen
16. Both a whale and a seaweed use which of the following to change glucose into energy?
 - a. water
 - b. photosynthesis
 - c. cellular respiration
 - d. bonding
17. The movement of materials across a cell membrane, requiring energy, is called
 - a. diffusion
 - b. osmosis
 - c. passive transport
 - d. active transport

Short Answer Write a short answer to each question.

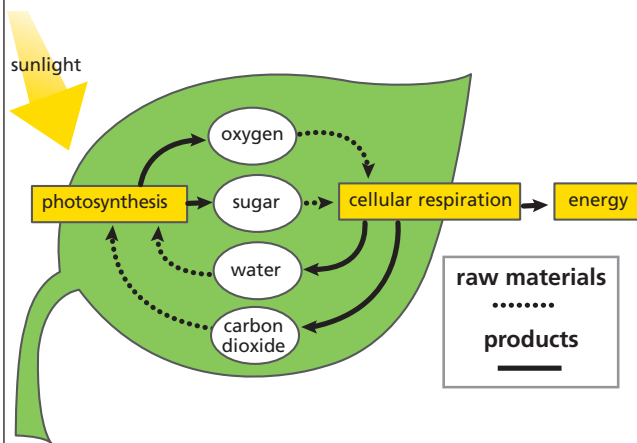
18. Why is water needed by cells?
19. Describe the main function of nucleic acids.
20. What is the role of chlorophyll in a plant's leaves?
21. Explain why a carrot feels spongy after being soaked in salt water.
22. Explain how the ways in which plants and animals get their energy differ.

Thinking Critically

23. RECOGNIZE CAUSE AND EFFECT Explain why chemical reactions are essential to living creatures.

24. MODEL How does a glass filled with oil and water illustrate the properties of a cell membrane? What properties does it not illustrate?

The illustration below summarizes the relationship between photosynthesis and cellular respiration. Use it to answer the next three questions.



25. OBSERVE What are the starting materials of photosynthesis? What are the starting materials of cellular respiration?

26. OBSERVE What are the products of photosynthesis? What are the products of cellular respiration?

27. DRAW CONCLUSIONS What does the diagram above reveal about the connections between photosynthesis and cellular respiration?

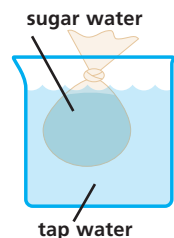
Process	Requires Energy?	Moves from Higher to Lower Concentration?
Diffusion	no	yes
Osmosis		
Active transport		
Passive transport		

28. CHART INFORMATION Copy and complete this chart. The first line is done for you.

29. INFER The French scientist Louis Pasteur mixed yeast and grape juice in a sealed container. When he opened the container, the grape juice contained alcohol. Explain what happened.

30. DRAW CONCLUSIONS Why would it be harmful to your health to drink seawater?

31. PREDICT Look at the diagram at the right. The bag has pores that are bigger than the sugar molecules. What will be true of the concentration of the sugar water after a few hours?



the BIG idea

32. COMPARE AND CONTRAST Look again at the picture on pages 38–39. Why do you think the sunflowers are facing the Sun?

33. INFER Does your body get all its energy from the Sun? Explain.

34. WRITE Imagine that your community has a high level of carbon dioxide emission from cars and factories. A developer wants to build a shopping center on the remaining forest land. Would this action increase or decrease carbon dioxide levels? Why? Write a paragraph explaining your answer.

UNIT PROJECTS

Check your schedule for your unit project. How are you doing? Be sure that you have placed data or notes from your research in your project folder.

Analyzing Data

Elodea plants in beakers of water were placed at different distances from a light source. The number of bubbles that formed on the plants was counted and recorded. The data table shows the results.

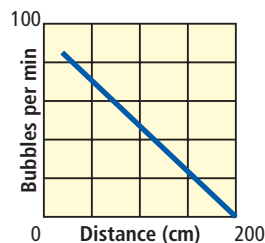
Beaker	Distance from light	Bubbles per minute
1	200 cm	2
2	100 cm	10
3	50 cm	45
4	20 cm	83

Study the data and answer the questions below.

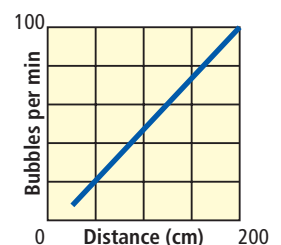
- What gas do the bubbles consist of?
 - carbon dioxide
 - hydrogen
 - water vapor
 - oxygen
- What is the relationship between the distance from the light source and the rate of bubble formation?
 - The rate increases as the distance increases.
 - The rate decreases as the distance increases.
 - The rate stays the same as the distance increases.
 - The rate changes in a way unrelated to distance.
- If another beaker with *elodea* were placed 150 cm from the light, about how many bubbles would form each minute?
 - 1
 - 7
 - 11
 - 24

- What is the independent variable in this experiment?
 - type of plant
 - number of bubbles
 - distance from light
 - amount of time
- Which graph best represents the data shown in the table?

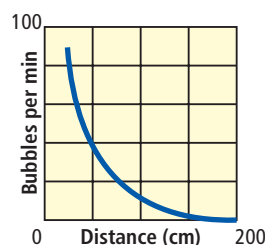
a.



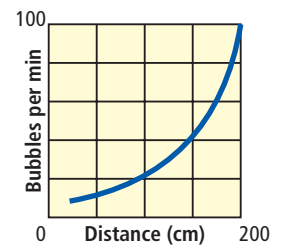
c.



b.



d.



Extended Response

Answer each question. Include some of the terms shown in the word box. In your answers underline each term you use.

- A person rides his bicycle several miles. What process is used by the cells in his legs to release energy at the beginning of the ride? At the end of the ride? Explain.

chemical energy	cellular respiration
osmosis	chloroplasts
fermentation	glucose
photosynthesis	diffusion

- A student places a plant in a sealed container and puts the container on a window sill. She leaves the plant there for a week. Will the plant have the starting materials it needs to carry out photosynthesis during the entire week? Explain.