

Chapter 2 Study Guide

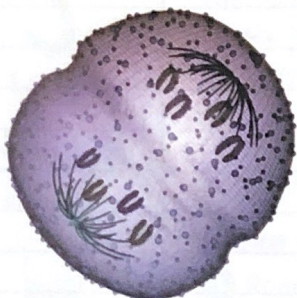


A cell is made up of structures that provide support and movement; process energy; and transport materials into, within, and out of a cell.

Key Concepts Summary

Vocabulary

Lesson 1: Cells and Life

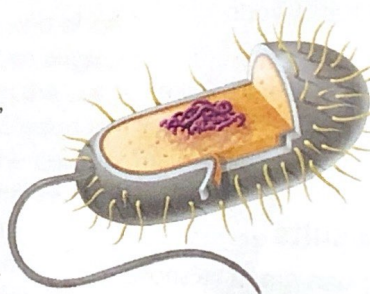


- The invention of the microscope led to discoveries about cells. In time, scientists used these discoveries to develop the **cell theory**, which explains how cells and living things are related.
- Cells are composed mainly of water, **proteins, nucleic acids, lipids, and carbohydrates.**

cell theory p. 44
 macromolecule p. 45
 nucleic acid p. 46
 protein p. 47
 lipid p. 47
 carbohydrate p. 47

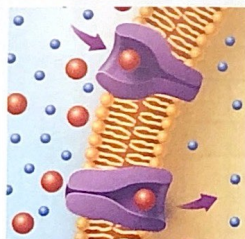
Lesson 2: The Cell

- Cell structures have specific functions, such as supporting a cell, moving a cell, controlling cell activities, processing energy, and transporting molecules.
- A prokaryotic cell lacks a nucleus and other **organelles**, while a eukaryotic cell has a nucleus and other organelles.



cell membrane p. 52
 cell wall p. 52
 cytoplasm p. 53
 cytoskeleton p. 53
 organelle p. 54
 nucleus p. 55
 chloroplast p. 57

Lesson 3: Moving Cellular Material

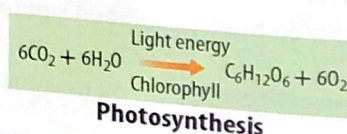
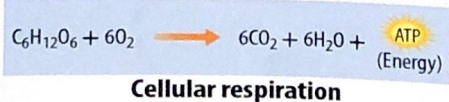


- Materials enter and leave a cell through the cell membrane using **passive transport or active transport, endocytosis, and exocytosis.**
- The ratio of surface area to volume limits the size of a cell. In a smaller cell, the high surface-area-to-volume ratio allows materials to move easily to all parts of a cell.

passive transport p. 61
 diffusion p. 62
 osmosis p. 62
 facilitated diffusion p. 63
 active transport p. 64
 endocytosis p. 64
 exocytosis p. 64

Lesson 4: Cells and Energy

- All living cells release energy from food molecules through **cellular respiration** and/or **fermentation.**
- Some cells make food molecules using light energy through the process of **photosynthesis.**



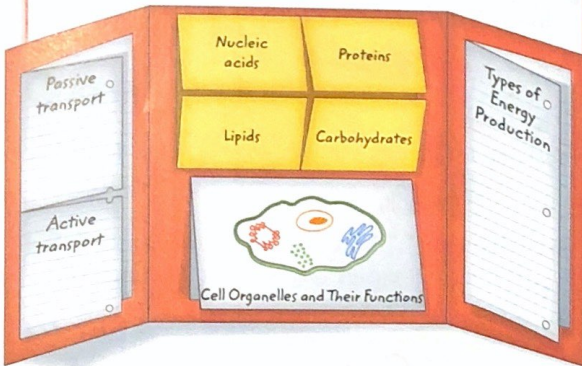
cellular respiration p. 69
 glycolysis p. 69
 fermentation p. 70
 photosynthesis p. 71



FOLDABLES®

Chapter Project

Assemble your lesson Foldables as shown to make a Chapter Project. Use the project to review what you have learned in this chapter.



Use Vocabulary

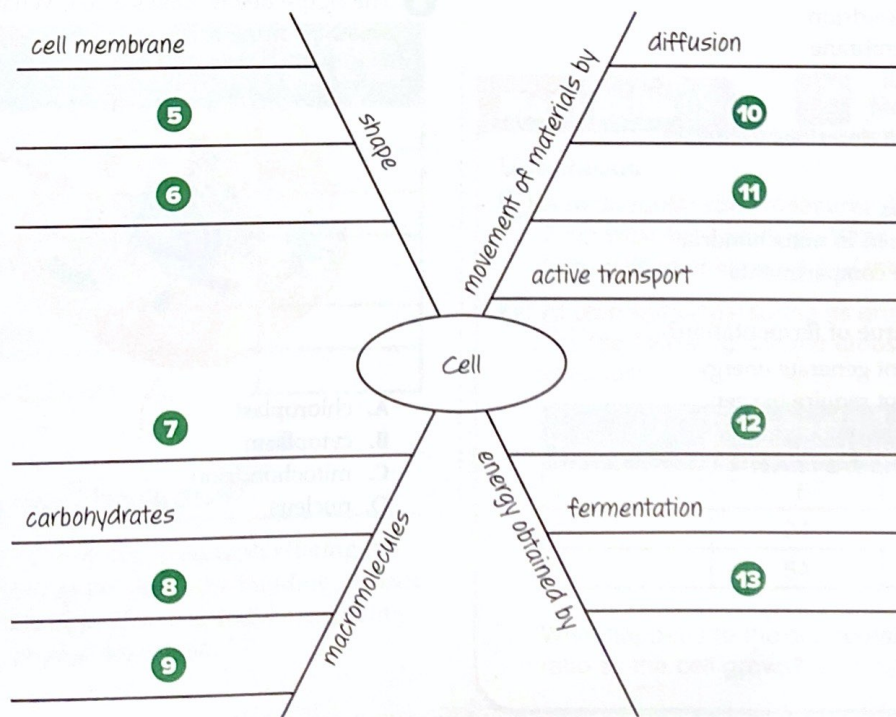
- 1 Substances formed by joining smaller molecules together are called _____.
- 2 The _____ consists of proteins joined together to create fiberlike structures inside cells.
- 3 The movement of substances from an area of high concentration to an area of low concentration is called _____.
- 4 A process that uses oxygen to convert energy from food into ATP is _____.

Link Vocabulary and Key Concepts



Interactive Concept Map

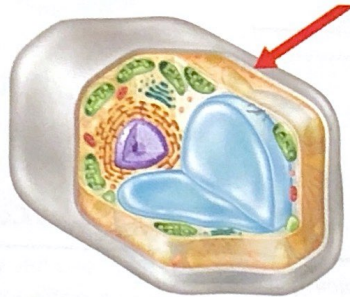
Copy this concept map, and then use vocabulary terms from the previous page to complete the concept map.



Chapter 2 Review

Understand Key Concepts

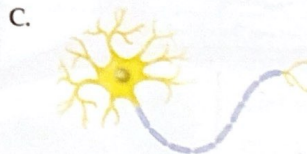
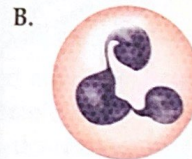
- 1 Cholesterol is which type of macromolecule?
 - A. carbohydrate
 - B. lipid
 - C. nucleic acid
 - D. protein
- 2 Genetic information is stored in which macromolecule?
 - A. DNA
 - B. glucose
 - C. lipid
 - D. starch
- 3 The arrow below is pointing to which cell part?



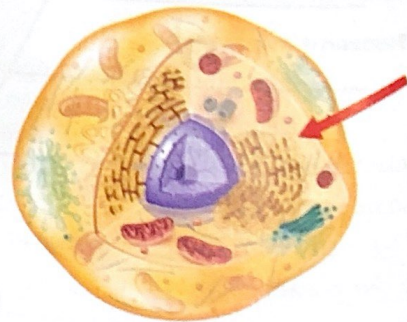
- A. chloroplast
 - B. mitochondrion
 - C. cell membrane
 - D. cell wall
- 4 Which best describes vacuoles?
 - A. lipids
 - B. proteins
 - C. contained in mitochondria
 - D. storage compartments
 - 5 Which is true of fermentation?
 - A. does not generate energy
 - B. does not require oxygen
 - C. occurs in mitochondria
 - D. produces lots of ATP

- 6 Which process eliminates substances from cells in vesicles?
 - A. endocytosis
 - B. exocytosis
 - C. osmosis
 - D. photosynthesis

- 7 Which cell shown below can send signals long distances?



- 8 The figure below shows a cell. What is the arrow pointing to?



- A. chloroplast
- B. cytoplasm
- C. mitochondrion
- D. nucleus

Critical Thinking

- 10 **Evaluate** the importance of the microscope to biology.
- 11 **Summarize** the role of water in cells.
- 10 **Hypothesize** how new cells form from existing cells.
- 12 **Distinguish** between channel proteins and carrier proteins.
- 13 **Explain** osmosis.
- 14 **Infer** Why do cells need carrier proteins that transport glucose?
- 15 **Compare** the amounts of ATP generated in cellular respiration and fermentation.
- 16 **Assess** the role of fermentation in baking bread.
- 17 **Hypothesize** how air pollution like smog affects photosynthesis.
- 18 **Compare** prokaryotes and eukaryotes by copying and filling in the table below.

Structure	Prokaryote (yes or no)	Eukaryote (yes or no)
Cell membrane		
DNA		
Nucleus		
Endoplasmic reticulum		
Golgi apparatus		
Cell wall		

Writing in Science

- 19 **Write** a five-sentence paragraph relating the cytoskeleton to the walls of a building. Be sure to include a topic sentence and a concluding sentence in your paragraph.

REVIEW THE BIG IDEA

- 20 How do the structures and processes of a cell enable it to survive? As an example, explain how chloroplasts help plant cells.
- 21 The photo below shows a protozoan. What structures enable it to get food into its mouth?



Math Skills

Math Practice

Use Ratios

- 22 A rectangular solid measures 4 cm long by 2 cm wide by 2 cm high. What is the surface-area-to-volume ratio of the solid?
- 23 At different times during its growth, a cell has the following surface areas and volumes:

Time	Surface area (μm^2)	Volume (μm^3)
1	6	1
2	24	8
3	54	27

What happens to the surface-area-to-volume ratio as the cell grows?

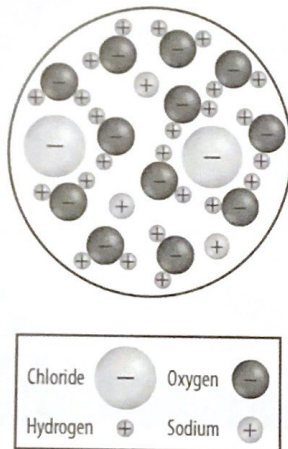
Standardized Test Practice

Record your answers on the answer sheet provided by your teacher or on a sheet of paper.

Multiple Choice

- 1 Which process do plant cells use to capture and store energy from sunlight?
- A endocytosis
 - B fermentation
 - C glycolysis
 - D photosynthesis

Use the diagram below to answer question 2.



- 2 The diagram shows salt dissolved in water. What does it show about water molecules and chloride ions?
- A A water molecule consists of oxygen and chloride ions.
 - B A water molecule is surrounded by several chloride ions.
 - C A water molecule moves away from a chloride ion.
 - D A water molecule points its positive end toward a chloride ion.
- 3 Which transport process requires the use of a cell's energy?
- A diffusion
 - B osmosis
 - C active transport
 - D facilitated diffusion

- 4 Diffusion differs from active cell transport processes because it
- A forces large molecules from a cell.
 - B keeps a cell's boundary intact.
 - C moves substances into a cell.
 - D needs none of a cell's energy.

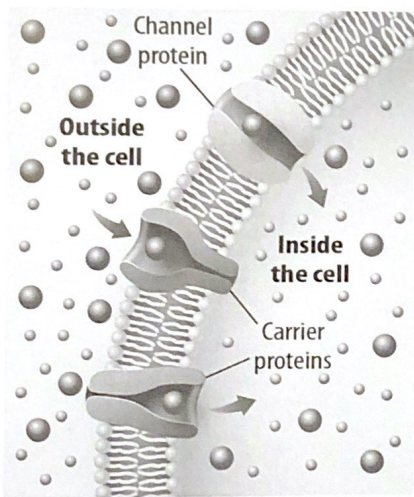
Use the diagram below to answer questions 5 and 6.



- 5 Which structure does the arrow point to in the eukaryotic cell?
- A cytoplasm
 - B lysosome
 - C nucleus
 - D ribosome
- 6 Which feature does a typical prokaryotic cell have that is missing from some eukaryotic cells like the one above?
- A cytoplasm
 - B DNA
 - C cell membrane
 - D cell wall

- 7 Which explains why the ratio of cell surface area to volume affects the cell size? Cells with a high surface-to-volume ratio
- A consume energy efficiently.
 - B produce waste products slowly.
 - C suffer from diseases frequently.
 - D transport substances effectively.

Use the diagram below to answer question 8.



- 8 Which statement is NOT true of carrier proteins and channel proteins?
- A Carrier proteins change shape as they function but channel proteins do not.
 - B Carrier proteins and channel proteins extend through the cell membrane.
 - C Channel proteins move items inside a cell but carrier proteins do not.
 - D Channel proteins and carrier proteins perform facilitated diffusion.

Constructed Response

- 9 Copy the table below and complete it using these terms: *cell membrane, cell wall, chloroplast, cytoplasm, cytoskeleton, nucleus.*

Cell Structure	Function
	Maintains the shape of an animal cell
	Controls the activities of a cell
	Traps energy from the Sun
	Controls the materials going in and out of a cell
	Holds the structures of a cell in a watery mix
	Maintains the shape of some plant cells

- 10 Name the kinds of organisms that have cells with cell walls. Name the kinds of organisms that have cells without cell walls. Briefly describe the benefits of cell walls for organisms.
- 11 Draw simple diagrams of an animal cell and a plant cell. Label the nucleus, the cytoplasm, the mitochondria, the cell membrane, the chloroplasts, the cell wall, and the central vacuole in the appropriate cells. Briefly describe the main differences between the two cells.

NEED EXTRA HELP?											
If You Missed Question...	1	2	3	4	5	6	7	8	9	10	11
Go to Lesson...	4	1	3	3	2	2	3	3	2	2	2