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Section 7–1 Life Is Cellular (pages 169–173)

This section explains what the cell theory is. It also describes the characteristics of two categories of cells, prokaryotes and eukaryotes.

Introduction (page 169)

1. What is the structure that makes up every living thing? _____

The Discovery of the Cell (pages 169–170)

2. What was Anton van Leeuwenhoek one of the first to see in the 1600s? _____

_____

_____

3. What did a thin slice of cork seem like to Robert Hooke when he observed it through a microscope? _____

_____

4. What did the German botanist Matthias Schleiden conclude? _____

_____

_____

5. What did the German biologist Theodor Schwann conclude? _____

_____

_____

6. How did Rudolph Virchow summarize his years of work? _____

_____

_____

7. What are the three concepts that make up the cell theory?

a. _____

b. _____

c. _____

Exploring the Cell (pages 170–172)

8. Why are electron microscopes capable of revealing details much smaller than those seen through light microscopes? _____

_____

_____

Name_____ Class_____ Date_____

Prokaryotes and Eukaryotes (pages 172–173)

9. Circle the letter of each sentence that is true about prokaryotes.

a. They grow and reproduce.

b. Many are large, multicellular organisms.

c. They are more complex than cells of eukaryotes.

d. They have cell membranes and cytoplasm.

10. Are all eukaryotes large, multicellular organisms? _____

_____

_____

11. Complete the table about the two categories of cells.

TWO CATEGORIES OF CELLS

Category	Definition	Examples
	Organisms whose cells lack nuclei	
	Organisms whose cells contain nuclei	

Name_____ Class_____ Date_____

Section 7–2 Eukaryotic Cell Structure (pages 174–181)

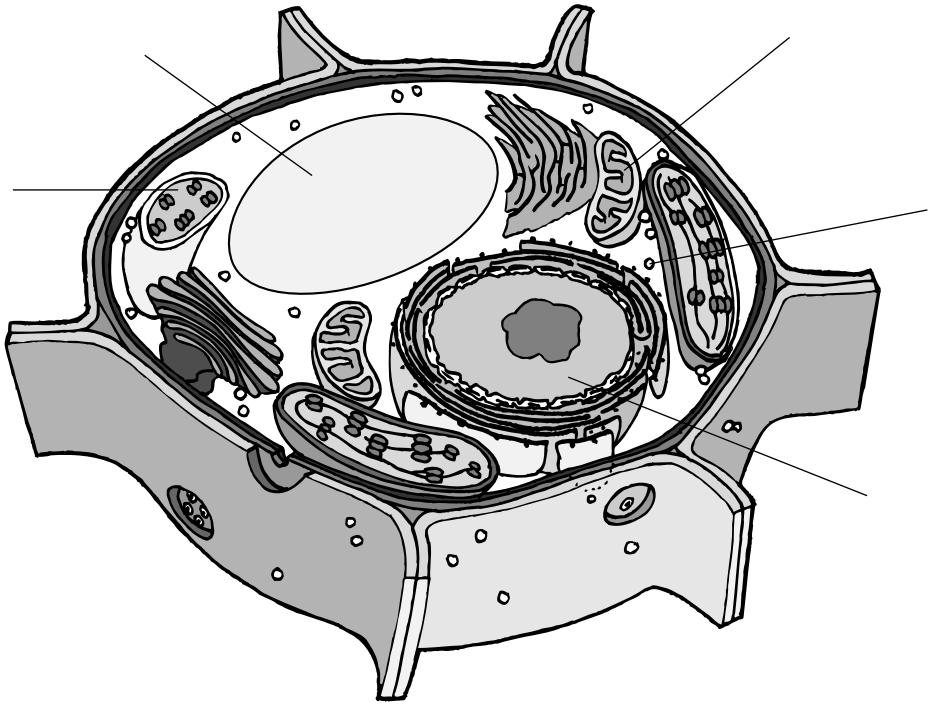
This section describes the functions of the major cell structures.

Comparing a Cell to a Factory (page 174)

1. What is an organelle? _____

_____

2. Label the structures on the illustration of the plant cell.



3. Circle the letter of each structure that animal cells contain.

a. chloroplasts **b.** lysosomes **c.** mitochondria **d.** ER

4. Circle the letter of each structure that plant cells contain.

a. cell wall **b.** ER **c.** lysosomes **d.** chloroplast

Nucleus (page 176)

5. What is the function of the nucleus? _____

_____

6. What important molecules does the nucleus contain? _____

_____

7. The granular material visible within the nucleus is called _____.

Name _____ Class _____ Date _____

8. What does chromatin consist of? _____

_____

9. What are chromosomes? _____

_____

_____

_____

10. Most nuclei contain a small, dense region known as the _____.

11. What occurs in the nucleolus? _____

_____

12. What is the nuclear envelope? _____

_____

Ribosomes (page 177)

13. What are ribosomes? _____

_____

_____

Endoplasmic Reticulum (pages 177–178)

14. What is the difference between rough ER and smooth ER? _____

_____

_____

Golgi Apparatus (page 178)

15. Using the cell as a factory analogy, describe the role of the Golgi apparatus in the cell.

_____

_____

_____

Lysosomes (page 179)

16. Circle the letter of each sentence that is true about lysosomes.

a. They contain enzymes that help synthesize lipids.

b. They break down organelles that have outlived their usefulness.

c. They produce proteins that are modified by the ER.

d. They contain enzymes that break down lipids, carbohydrates, and proteins.

Name_____ Class_____ Date_____

Vacuoles (page 179)

17. What are vacuoles? _____

_____

_____

18. What is the role of the central vacuole in plants? _____

_____

_____

_____

_____

19. How does the contractile vacuole in a paramecium help maintain homeostasis?

_____

_____

_____

_____

Mitochondria and Chloroplasts (pages 179–180)

20. Is the following sentence true or false? Both chloroplasts and mitochondria are enclosed by two membranes. _____

21. Chloroplasts and mitochondria contain their own genetic information in the form of _____.

22. Biologist Lynn Margulis has suggested that mitochondria and chloroplasts are descendants of what kind of organisms? _____

_____

Cytoskeleton (page 181)

23. What is the cytoskeleton? _____

_____

_____

Name_____ Class_____ Date_____

24. Complete the table about structures that make up the cytoskeleton.

STRUCTURES OF THE CYTOSKELETON

Structure	Description	Functions
		Maintain cell shape, help build cilia and flagella, form centrioles in cell division
		Support the cell, help cells move

Match the organelle with its description.

Organelle

_____ **25.** Ribosome

_____ **26.** Endoplasmic reticulum

_____ **27.** Golgi apparatus

_____ **28.** Lysosome

_____ **29.** Vacuole

_____ **30.** Chloroplast

_____ **31.** Mitochondrion

Description

a. Uses energy from sunlight to make energy-rich food

b. Stack of membranes in which enzymes attach carbohydrates and lipids to proteins

c. Uses energy from food to make high-energy compounds

d. An internal membrane system in which components of cell membrane and some proteins are constructed

e. Saclike structure that stores materials

f. Small particle of RNA and protein that produces protein following instructions from nucleus

g. Filled with enzymes used to break down food into particles that can be used

Reading Skill Practice

A flowchart can help you remember the order in which events occur. On a separate sheet of paper, create a flowchart that describes the steps by which proteins are made in the cell. You will find that the steps of this process are explained on pages 176–178. For more information about flowcharts, see Organizing Information in Appendix A in your textbook.

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Section 7–3 Cell Boundaries (pages 182–189)

This section describes the main functions of the cell membrane. It also explains what happens during diffusion and explains what osmosis is.

Cell Membrane (page 182)

1. What are the functions of the cell membrane? _____

_____

2. The core of nearly all cell membranes is a double-layered sheet called a(an) _____.

3. What is the difference in the function of the proteins and the carbohydrates attached to a cell membrane? _____

_____

_____

Cell Walls (page 183)

4. In what organisms are cell walls found? _____

_____

5. Is the following sentence true or false? The cell wall lies inside the cell membrane.

_____

6. What is the main function of the cell wall? _____

_____

7. What are plant cell walls mostly made of? _____

_____

Diffusion Through Cell Boundaries (pages 183–184)

8. The cytoplasm of a cell is a solution of many different substances in _____.

9. What is the concentration of a solution? _____

_____

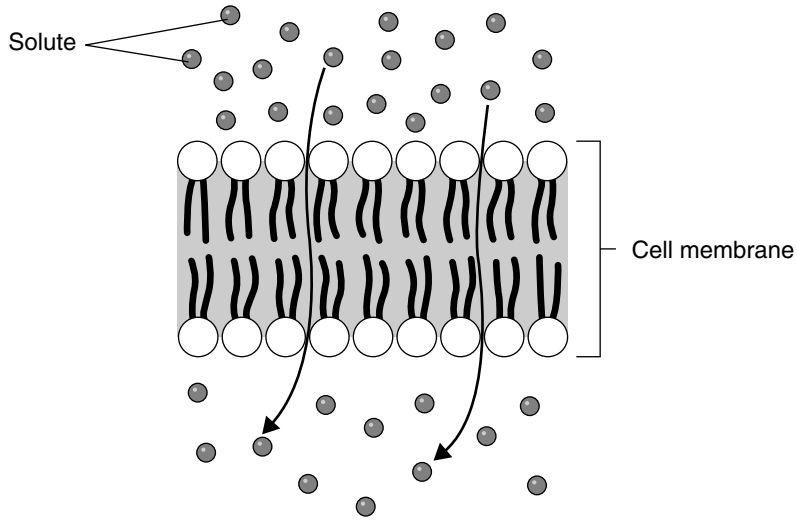
10. What is diffusion? _____

_____

_____

Name_____ Class_____ Date_____

11. The molecules of solute in the illustration are moving through the cell membrane from top to bottom. Indicate with labels which side of the membrane has a high concentration of solute and which has a low concentration.



Osmosis (pages 185–186)

12. What does it mean that biological membranes are selectively permeable?

_____

_____

13. What is osmosis? _____

_____

14. Is the following sentence true or false? Water tends to diffuse from a region where it is less concentrated to a region where it is highly concentrated. _____

15. When will water stop moving across a membrane? _____

_____

_____

Match the situation to the description.

Situation	Description
_____ **16.** Two solutions are isotonic.	**a.** The solution is above strength in solute.
_____ **17.** A solution is hypertonic.	**b.** The solutions are the same strength.
_____ **18.** A solution is hypotonic.	**c.** The solution is below strength in solute.

19. On which side of a selectively permeable membrane does osmosis exert a pressure?

_____

_____

Name_____ Class_____ Date_____

Facilitated Diffusion (page 187)

20. What happens during the process of facilitated diffusion? _____

_____

_____

21. What is the role of protein channels in the cell membrane? _____

_____

_____

22. Is the following sentence true or false? Facilitated diffusion does not require the cell to use energy. _____

Active Transport (pages 188–189)

23. The energy-requiring process that moves material across a cell membrane against a concentration difference is called _____.

24. Is the following sentence true or false? Active transport always requires transport proteins during the process. _____

25. Complete the table about types of active transport.

TYPES OF ACTIVE TRANSPORT

Type	Description
Endocytosis	
Phagocytosis	
Exocytosis	

26. During endocytosis, what happens to the pocket in the cell membrane when it breaks loose from the membrane? _____

_____

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Reviewing Key Concepts

Short Answer *On the lines provided, answer the following questions.*

1. Why do multicellular organisms contain specialized cells?

_____

_____

2. Give two examples of specialized cells and explain the cell's unique role in the human body.

_____

_____

Identifying Structures *On the lines provided, place the following terms in order from smallest to largest level of organization.*

_____ **3.** tissues

_____ **4.** organ systems

_____ **5.** organs

_____ **6.** individual cells

Reviewing Key Skills

7. Comparing and Contrasting Compare the activities of a specialized cell in a multicellular organism to those of a unicellular organism.

_____

_____

_____

8. Using Analogies The specialized cells in a multicellular organism have unique roles to play. Create an analogy that describes a situation in which specific organisms or objects have unique roles in a system.

_____

_____

_____

9. Applying Concepts Is your tongue a tissue, an organ, or an organ system? Explain your answer.

_____

_____

_____

10. Comparing and Contrasting How are tissues and organs different?

_____

_____

_____