Name_____ Class_____ Date_____

Chapter 7

Cell Structure and Function

Section 7–1 Life Is Cellular (pages 169–172)

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 Cell Theory (pages 169–170)

2. What was Anton van Leeuwenhoek 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 scientist 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. _____

Basic Cell Structures (page 171)

8. Complete the table about structures that are common to most cells.

COMMON CELL STRUCTURES

Structure	Description
Cell membrane	
Cell wall	
Nucleus	
Cytoplasm	

Prokayotes and Eukaryotes (page 172)

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

TWO CATEGORIES OF CELLS

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

10. 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.
11. What is an organelle? _____

_____

_____

12. Are all eukaryotes large, multicellular organisms? No, _____

_____

_____

Section 7–2 Cell Structures (pages 173–183)

This section describes the functions of the major cell structures.

Cell Wall (pages 173–174)

1. In what organisms are cell walls found? _____

_____

2. Is the following sentence true or false? The cell wall lies inside the cell membrane. _____
3. What is the main function of the cell wall? _____

_____

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

_____

5. Is the following sentence true or false? Some cell structures are specific to either plant or animal cells. _____

Name_____ Class_____ Date_____

Chapter 7, Cell Structure and Function *(continued)*

Match the organelle with its description

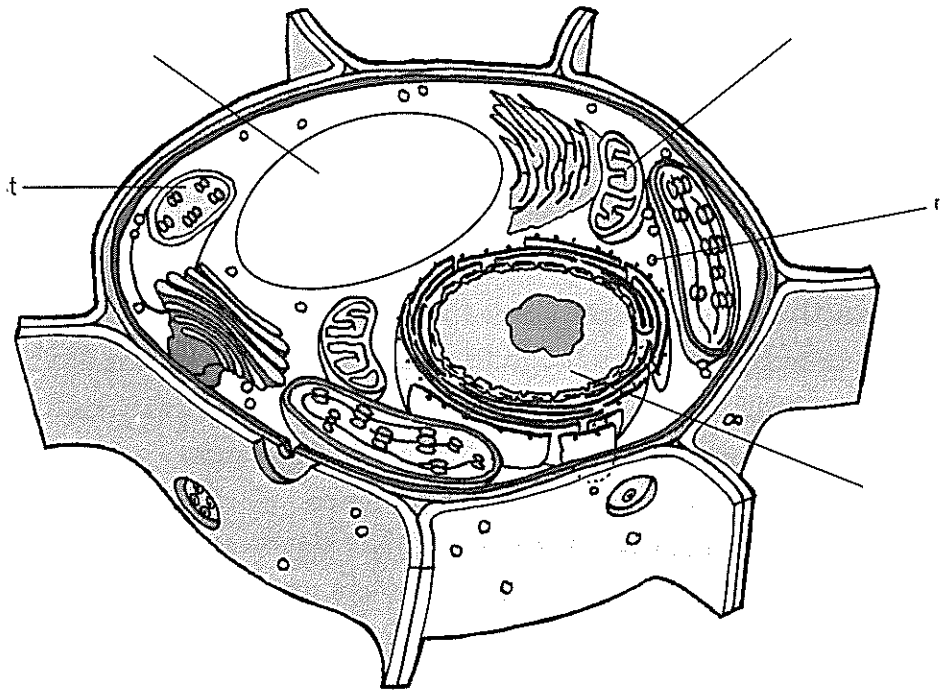
Organelle	Description
_____ 18. Ribosome	a. Uses energy from sunlight to make energy-rich food
_____ 19. Endoplasmic reticulum	b. Stack of membranes in which enzymes attach carbohydrates and lipids to proteins
_____ 20. Golgi apparatus	c. Uses energy from food to make high-energy compounds
_____ 21. Lysosome	d. An internal membrane system in which components of cell membrane and some proteins are constructed
_____ 22. Vacuole	e. Saclike structure that stores materials
_____ 23. Chloroplast	f. Small particle of RNA and protein that produces protein following instructions from nucleus
_____ 24. Mitochondrion	g. Filled with enzymes used to break down food into particles that can be used

25. The process that occurs in chloroplasts is called _____.

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

_____

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



Name_____ Class_____ Date_____

Nucleus (pages 175–176)

6. What is the function of the nucleus? _____

_____

7. What important molecules does the nucleus contain? _____

_____

8. The granular material visible within the nucleus is called

_____.

9. What does chromatin consist of? _____

10. What are chromosomes? _____

_____

_____

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

_____.

12. What occurs in the nucleolus? _____

_____

13. What is the nuclear envelope? _____

Cytoskeleton (page 176)

14. What is the cytoskeleton? _____

_____

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

STRUCTURES OF THE CYTOSKELETON

Structure	Description	Functions
		Maintain cell shape, serve as "tracks" for organelles, form centrioles in cell division
		Supports the cell, moves organelles within the cell

Organelles in the Cytoplasm (pages 177–180)

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

_____

17. 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.

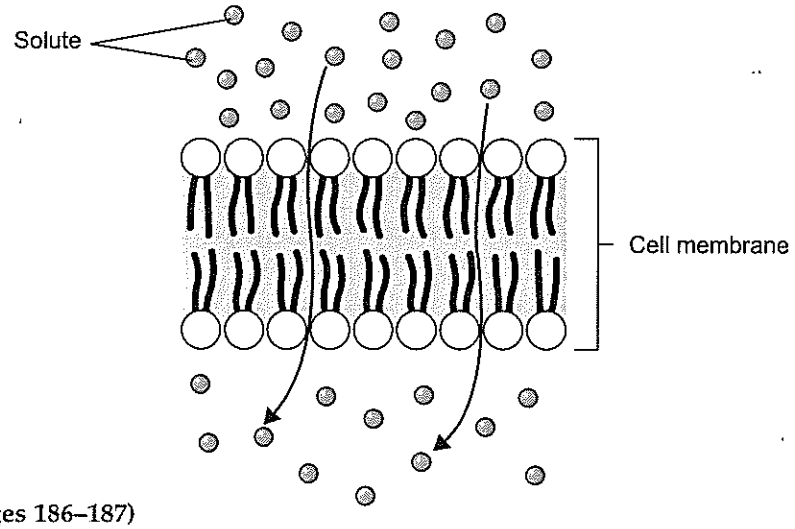
c. They produce proteins that are modified by the ER.

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

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

Diffusion (page 185)

4. The cytoplasm of a cell is a solution of many different substances in _____.
5. What is the concentration of a solution? _____
6. What is diffusion? _____
7. 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 186–187)

8. What does it mean that biological membranes are selectively permeable? _____
9. What is osmosis? _____
10. 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. _____
11. When will water stop moving across a membrane? _____

Name_____ Class_____ Date_____

Organelle DNA (page 181)

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

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

The Cell as a Factory (page 182)

Match the cell structure with the part of a factory it is like.

Cell Structure	Factory Part
_____ 30. Cytoskeleton	a. Oil-burning furnaces
_____ 31. Nucleus	b. Customization shop
_____ 32. Ribosome	c. Solar power plants
_____ 33. Golgi apparatus	d. Steel beams and columns
_____ 34. Chloroplasts	e. Factory machines
_____ 35. Mitochondria	f. Main office

Comparing Cells (page 183)

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

a. chloroplasts b. lysosomes c. cytoskeleton d. ER

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

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

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 in the subsections *Nucleus* and *Organelles in the Cytoplasm*. For more information about flowcharts, see Organizing Information in Appendix A in your textbook.

Section 7–3 Movement Through the Membrane (pages 184–189)

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 184)

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) _____.

Section 7–4 The Diversity of Cellular Life (pages 190–193)

This section explains what cell specialization is. It also describes the four levels of organization in multicellular organisms.

Unicellular Organisms (page 190)

1. A single-celled organism is also called a(an) _____ organism.
2. Circle the letter of each sentence that is true about unicellular organisms.
   a. Some types of algae are single-celled.
   b. They include prokaryotes and eukaryotes.
   c. Some even live within the human body.
   d. They can grow but cannot reproduce.
3. What are colonial organisms? _____

Multicellular Organisms (page 191)

4. What is cell specialization in a multicellular organism? _____
5. Circle the letter of each sentence that is true about cell specialization.
   a. Specialized cells perform particular functions within the organism.
   b. Only unicellular organisms have specialized cells.
   c. The human body contains scores of different cell types.
   d. Some cells are specialized to react to the environment.

Levels of Organization (pages 192–193)

6. What are four levels of organization in a multicellular organism?
   a. _____ c. _____
   b. _____ d. _____
7. What is a tissue? _____
8. What are the four main types of tissue in multicellular organisms?
   a. _____ c. _____
   b. _____ d. _____
9. What is the function of epithelial tissues? _____
10. Circle the letter of each type of connective tissue.
    a. blood b. skin c. bone d. lymph

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Match the situation to the description

Situation	Description
_____ 12. Two solutions are isotonic.	a. The solution is above strength in solute.
_____ 13. A solution is hypertonic.	b. The solutions are the same strength.
_____ 14. A solution is hypotonic.	c. The solution is below strength in solute.

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

16. What is the function of a contractile vacuole in some single-celled organisms? _____

Facilitated Diffusion (page 188)

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

18. What kinds of substances do the protein channels allow to cross membranes? _____

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

Active Transport (page 189)

20. The energy-requiring process that moves molecules and ions across a cell membrane against a concentration difference is called _____.

21. Is the following sentence true or false? Active transport does not require transport proteins during the process. _____

22. Complete the table about types of active transport.

TYPES OF ACTIVE TRANSPORT

Type	Description
Endocytosis	
Phagocytosis	
Exocytosis	

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

Name_____ Class_____ Date_____

11. Groups of tissues that work together to perform a specific function are called a(an) _____.
12. What kinds of tissues can be found within a muscle in your body? _____
13. What is an organ system? _____

WordWise

Use the clues below to identify vocabulary terms from Chapter 7. Write the terms on the lines, putting one letter in each blank. When you finish, the words enclosed in the diagonal will reveal an important term related to cell structure and function.

Clues

1. An organelle that uses the energy from sunlight to make energy-rich food molecules
2. A specialized structure in eukaryotic cells that performs an important cellular function
3. A saclike structure in which cells store materials
4. A network of protein filaments that helps the cell maintain its shape
5. Cells that have a nucleus
6. The organelle that uses energy from food to make high-energy compounds
7. A theory that states that all living things are composed of cells
8. The diffusion of water through a selectively permeable membrane
9. The process of taking materials into the cell by means of infoldings of the cell membrane
10. A group of cells that perform similar functions

Vocabulary Terms