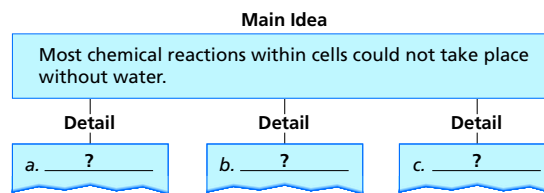


Target Reading Skill

Identifying Main Ideas To review part of Section 3, reread the text following the heading The Compound Called Water. Copy the graphic organizer at right. Complete the graphic organizer by supplying details that support the main idea.



Reviewing Key Terms

Choose the letter of the best answer.

- All living things are composed of
 - blood.
 - chloroplasts.
 - vacuoles.
 - cells.
- In plant and animal cells, the control center of the cell is the
 - chloroplast.
 - cytoplasm.
 - nucleus.
 - Golgi body.
- A storage compartment of the cell is the
 - cell wall.
 - lysosome.
 - endoplasmic reticulum.
 - vacuole.
- Starch is an example of a
 - nucleic acid.
 - protein.
 - lipid.
 - carbohydrate.
- The process by which water moves across a cell membrane is called
 - osmosis.
 - active transport.
 - organelle.
 - resolution.

Complete the following sentences so that your answers clearly explain the Key Terms.

- The **nucleus** can direct the cell's activities because it contains _____.
- Mitochondria** are "powerhouses" of the cell because _____.
- Water is an example of a **compound**, which is _____.
- Saliva in your mouth is an example of an **enzyme** because _____.
- Oxygen molecules enter a cell by **diffusion**, which is _____.

Writing in Science

Dialogue A dialogue is a conversation. Write a dialogue that might have taken place between Schleiden and Schwann. The scientists should discuss their observations and conclusions.

Video Assessment

Discovery Channel School
Cell Structure and Function

Target Reading Skill

Identify Main Ideas Check students' graphic organizers for accuracy.

Reviewing Key Terms

- d
- c
- d
- d
- a
- chromatin
- they convert energy in food molecules to energy the cell can use to carry out its functions
- two or more elements chemically combined
- it speeds up the breakdown of starches
- the process by which molecules move from an area of higher concentration to an area of lower concentration

Writing in Science



E-LA: Writing 7.2.1

Writing Mode Narrative

Scoring Rubric

- Includes a dialogue that goes beyond requirements, for example, describing the structures of animal and plant cells
- Includes criteria but does not go beyond requirements
- Includes factual information that is not written in dialogue form
- Includes inaccurate information

Video Assessment

Cell Structure and Function

Show the Video Assessment to review chapter content and as a prompt for the writing assignment.

Review and Assessment

Checking Concepts

11. The microscope allowed scientists to observe the cells that make up living things. Over the years, they discovered that all living things are made up of cells.
12. The cell wall helps to protect and support the cell in plants and some other organisms.
13. An element is any substance that cannot be broken down into simpler substances. A compound is made up of two or more elements.
14. Enzymes speed up chemical reactions in living things. Without enzymes, many of the chemical reactions that are necessary for life would either take too long or not occur at all.
15. DNA is the genetic material that carries information about an organism and is passed from parent to offspring. The information also directs all of the cell's functions. RNA plays an important role in the production of proteins.
16. Water dissolves substances involved in chemical reactions in living things and takes part in many chemical reactions. It helps cells keep their size and shape, keeps the temperature of cells stable, and carries substances into and out of cells.
17. Diffusion is the process by which molecules move from an area of higher concentration to an area of lower concentration. Diffusion helps the cell take in the substances it needs and get rid of those it does not need.
18. As a cell size increases, more of its cytoplasm is located farther away from the cell membrane. The farther away the cytoplasm is from the cell membrane, the longer it takes substances to reach the cytoplasm. A smaller cell can function better than a larger cell because it can move needed materials and wastes to and from all parts of its cytoplasm more quickly.

Thinking Critically

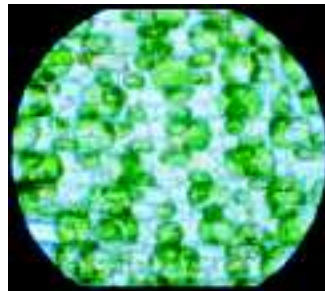
19. From a plant; the cell has chloroplasts and rigid, rectangular cell walls.
20. Ribosomes, endoplasmic reticulum, Golgi apparatus
21. The cell would not be able to make proteins. Proteins make up many parts of the cell, and some proteins act as enzymes, which speed up chemical reactions in the cell. Without proteins, the cell would be missing important structures and would not be able to carry out many of its functions. The cell would likely die.

Checking Concepts

11. What role did the microscope play in the development of the cell theory?
12. Describe the function of the cell wall.
13. Explain the difference between elements and compounds.
14. How are enzymes important to living things?
15. What are the functions of DNA and RNA?
16. Why is water important in the cell?
17. What is diffusion? What function does diffusion have in the cell?
18. Explain the relationship between cell size and the movement of materials into and out of cells.

Thinking Critically

19. **Applying Concepts** Do the cells below come from a plant or an animal? Explain your answer.



20. **Problem Solving** A cell is actively producing a protein to be released outside the cell. Sequence the following organelles in the order that the protein will travel: Golgi bodies, ribosomes, endoplasmic reticulum.
21. **Predicting** Suppose a cell did not have a supply of amino acids and could not produce them. What effect might this have on the cell?
22. **Comparing and Contrasting** Explain how active transport is different from osmosis.

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Math Practice

23. **Ratios** A solution consists of 24 g of table salt dissolved in 2 L of water. Express the concentration of salt in the form of a ratio.
24. **Ratios** What is the concentration of a sugar solution that contains 8 g sugar dissolved in 500 mL of water? Express your answer in the form of a ratio.

Applying Skills

Use the diagrams to answer Questions 25–27.

A scientist watered the plant in Figure A with salt water. After 30 minutes, the plant looked as you see it in Figure B.



25. **Observing** How did the plant cells change after the plant was watered?
26. **Inferring** Describe a process that would lead to the changes in the plant cells.
27. **Developing Hypotheses** Suppose the scientist were to water the plant in B with fresh (unsalted) water. Develop a hypothesis about what would happen to the plant. Explain your hypothesis.



Standards Investigation

Performance Assessment Bring in your egg, graph, and any diagrams you made. As a class, discuss your results and conclusions. Then, as a group, try to answer these questions: What happened to the eggshell? What process took place at each stage of the experiment?

Applying Skills

25. The plant cells got smaller.
26. Osmosis, or movement of water by diffusion, would lead to the changes in the plant cells. In B, water has moved out of the cell by osmosis.
27. Sample answer: If the plant in B were to be watered with fresh water, it would return to its original size because it would gain water by osmosis.

Teachers can monitor student progress and supply remediation when necessary.

Choose the letter of the best answer.

- A reasonable estimate for the size of a cell's nucleus is
A 0.006 mm.
B 6 mm.
C 0.006 m.
D 6 m. **S 7.1.a**
- Which of the following statements is not true according to the cell theory?
A All plants and animals are made of cells.
B Cells are the basic unit of structure in organisms.
C Only some cells come from other cells.
D All cells come from other cells. **S 7.1**

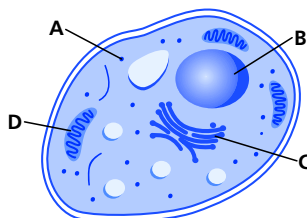
Use the table below and your knowledge of science to answer Question 3.

Comparing the Cells of Three Organisms			
Organism	Cell Wall	Cell Membrane	Chloroplasts
1	No	Yes	Yes
2	Yes	Yes	No
3	No	Yes	No

- Which organism is most likely an animal?
A Organism 1
B Organism 2
C Organism 3
D None of the organisms is an animal. **S 7.1.b**
- Which of the following statements about a cell's membrane is true?
A Only small molecules can pass through the membrane.
B Only water molecules can pass through the membrane.
C Only food molecules can pass through the membrane.
D Some substances can pass through the membrane while others cannot. **S 7.5**

- A tissue in an animal produces and releases chemicals that are used by cells throughout the animal's body. Cells in that tissue probably have a larger than normal number of
A lysosomes.
B mitochondria.
C Golgi bodies.
D nuclei. **S 7.1.b**

Use the diagram below and your knowledge of science to answer Questions 6 and 7.



- Which organelle contains instructions for directing the cell's functions?
A A
B B
C C
D D **S 7.1.c**
- In which organelle is food energy converted to energy that the cell can use?
A A
B B
C C
D D **S 7.1.d**

Apply the BIG Idea

- How are plant and animal cells similar? How are they different? Make a list of the different organelles in each cell. Explain how each organelle is vital to the life and function of a plant or animal. **S 7.5**

Standards Practice

- A; **S 7.1.a**
- C; **S 7.1**
- C; **S 7.1.b**
- D; **S 7.5**
- C; **S 7.1.b**
- B; **S 7.1.c**
- D; **S 7.1.d**

Apply the BIG Idea

- They both have the same types of organelles except that plant cells have cell walls and chloroplasts, and animal cells do not. Nucleus—directs all of the cell's activities; mitochondria—produce energy for plant and animal cells; endoplasmic reticulum—provides an internal transport system for plant and animal cells; ribosomes—produce proteins in plant and animal cells; Golgi bodies—package and distribute protein made in plant and animal cells; chloroplasts—make food in plant cells; vacuoles—provide storage areas in plant and some animal cells; lysosomes—contain chemicals that break down food particles in plant and animal cells. **S 7.5**

Lab zone Standards Investigation

S 7.1.a

Performance Assessment Have students display their eggs and share their graphs and diagrams showing how the size of their egg changed and what it was soaking in each day. Guide the class discussion so that students come to the conclusion that the eggshell dissolved in the vinegar, and that the egg increased and decreased in size because of osmosis.

Encourage students to reflect on what they learned from this “egg-speriment.” The most surprising part may have been how the texture of the egg changed. Most students probably began to understand what was happening to the egg when they read about osmosis. Students may say that if they did the investigation over, they would test a greater variety of liquids.

Teaching Resources

Laboratory Manual TE

- Standards Investigation Scoring Rubric

The Standards Investigation Scoring Rubric will help you evaluate students' work. If you share the rubric in advance, students will know what is expected of them.