About the Consultant

Douglas Fisher, Ph.D., is a Professor in the Department of Teacher Education at San Diego State University. He is the recipient of an International Reading Association Celebrate Literacy Award as well as a Christa McAuliffe award for Excellence in Teacher Education. He has published numerous articles on reading and literacy, differentiated instruction, and curriculum design as well as books, such as Improving Adolescent Literacy: Strategies at Work and Responsive Curriculum Design in Secondary Schools: Meeting the Diverse Needs of Students. He has taught a variety of courses in SDSU’s teacher-credentialing program as well as graduate-level courses on English language development and literacy. He also has taught classes in English, writing, and literacy development to secondary school students.
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Note-Taking Tips

Your notes are a reminder of what you learned in class. Taking good notes can help you succeed in science. These tips will help you take better notes.

- Be an active listener. Listen for important concepts. Pay attention to words, examples, and/or diagrams your teacher emphasizes.

- Write your notes as clearly and concisely as possible. The following symbols and abbreviations may be helpful in your note-taking.

<table>
<thead>
<tr>
<th>Word or Phrase</th>
<th>Symbol or Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>for example</td>
<td>e.g.</td>
</tr>
<tr>
<td>such as</td>
<td>i.e.</td>
</tr>
<tr>
<td>with</td>
<td>w/</td>
</tr>
<tr>
<td>without</td>
<td>w/o</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Word or Phrase</th>
<th>Symbol or Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>and</td>
<td>+</td>
</tr>
<tr>
<td>approximately</td>
<td>≈</td>
</tr>
<tr>
<td>therefore</td>
<td>∴</td>
</tr>
<tr>
<td>versus</td>
<td>vs</td>
</tr>
</tbody>
</table>

- Use a symbol such as a star (★) or an asterisk (*) to emphasize important concepts. Place a question mark (?) next to anything that you do not understand.

- Ask questions and participate in class discussion.

- Draw and label pictures or diagrams to help clarify a concept.

Note-Taking Don’ts

- Don’t write every word. Concentrate on the main ideas and concepts.

- Don’t use someone else’s notes—they may not make sense.

- Don’t doodle. It distracts you from listening actively.

- Don’t lose focus or you will become lost in your note-taking.
New York Science Notebook

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and make connections to

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Cell Reproduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One-celled organisms reproduce through cell division.</td>
<td></td>
</tr>
<tr>
<td>• Every living organism has a life cycle.</td>
<td></td>
</tr>
<tr>
<td>• All organisms reproduce sexually.</td>
<td></td>
</tr>
<tr>
<td>• Most of the cells formed in your body do not contain genetic material.</td>
<td></td>
</tr>
</tbody>
</table>

A strawberry farmer wants to increase her crop without spending large amounts of money for new seeds. How can she take advantage of asexual reproduction to increase her crop?

Strawberry plants can reproduce asexually. They grow horizontal stems called runners, which can produce new plants. The farmer could take advantage of these runners. She could let them grow and produce new plants.

Science Journal

Write about what you know.

Asexual reproduction

1. Write three things that you know about how and why cells reproduce.

Student responses will vary, but may include that cells split into two and that they reproduce so that an organism can grow.

2. Write an if you agree with the statement.

A nuclei with 46 chromosomes that undergo mitosis will produce nuclei, each with 23 chromosomes.

Mitosis produces two new nuclei that are identical both to each other and to the original nucleus. Mitosis is a process by which mature sex cells called gametes are produced. The gametes combine during fertilization to form a new organism.

3. if you disagree with the statement.

The process of cell division is called mitosis.

Mitosis is important for cell growth and repair. Mitosis is a process that is essential for the growth, repair, and replacement of body tissues.

Writing Activities

These activities help you think about what you’re learning and make connections to your life.

CONNECT IT

A strawberry farmer wants to increase her crop without spending large amounts of money for new seeds. How can she take advantage of asexual reproduction to increase her crop?

Strawberry plants can reproduce asexually. They grow horizontal stems called runners, which can produce new plants. The farmer could take advantage of these runners. She could let them grow and produce new plants.

Vocabulary Development

Vocabulary words help you to better understand your science lessons. Learning the Academic Glossary can help you score higher on standardized tests.

Language-Based Activities

Activities cover the content in your science book including vocabulary, writing, note-taking, and problem solving.

Anticipation Guide/KWL Charts

Think about what you already know before beginning a lesson and identify what you would like to learn from reading.

Using Your Science Notebook

This note-taking guide is designed to help you succeed in learning science content. Each chapter includes:

- Main Idea
- Details
- Writing Activities
- Anticipation Guide/KWL Charts
- Science Journal
- Connect It
- Academic Vocabulary
- Vocabulary Development
Chapter Wrap-Up
This brings the information together for you. Revisiting what you thought at the beginning of the chapter provides another opportunity for you to discuss what you have learned.

Review Checklist
This list helps you assess what you have learned and prepare for your chapter tests.

Graphic Organizers
A variety of visual organizers help you to analyze and summarize information and remember content.
The Nature of Science

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>The Nature of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>• An important part of science is testing, or experimenting.</td>
<td></td>
</tr>
<tr>
<td>• Technology is useful only in the situation for which it was designed.</td>
<td></td>
</tr>
<tr>
<td>• People began studying weather in the 1800s.</td>
<td></td>
</tr>
<tr>
<td>• Science can answer all of the questions that can be asked.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

How do you think scientists could learn more about a clump of stone that could be a small dinosaur heart?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The Nature of Science

Section 1 Science All Around

Scan Section 1 of your book, reading all section titles and bold words. Then write three facts that you have learned about the nature of science and scientific investigation.

1. 
2. 
3. 

Define analyze to show its scientific meaning.

Write a sentence that contains both terms from each pair.

hypothesis/control

scientific methods/Earth science

variable/independent variable

constant/dependent variable

science/technology

Use a dictionary to define outcome to show its scientific meaning.

2 The Nature of Science
Mysteries and Problems

I found this information on page __________.

Summarize why it was important for scientists to solve the mystery of the tsunami that struck Japan, on January 27, 1700.

Sequence the scientific methods used to solve a scientific problem by completing the graphic organizer below.

Gather information.

Test the hypothesis.

Distinguish topics that Earth scientists study by listing specific topics identified in this section.

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________
6. ________________
7. ________________
8. ________________
9. ________________
10. ________________
11. ________________
12. ________________
Define the four types of factors in a science experiment. Identify and describe each of them below.

- **Independent Variable**: variables that do not change
- **Dependent Variable**: the standard to which results can be compared

**Summarize** transferable technology by defining the term. Then provide examples by filling out the graphic organizer below.

Transferable technology is ____________________________.

- Radar and Sonar
  - originally developed for ____________________________
  - are now used to study ____________________________

**SYNTHESIZE IT**
Identify three objects in your home or school that have *not* been affected by technology.

___________________________________________

___________________________________________

___________________________________________

*The Nature of Science*
The Nature of Science

Section 2  Scientific Enterprise

New Vocabulary

- observation
- scientific theory
- scientific law
- ethics
- bias

Define observation to show its scientific meaning.

Use your book to define the following terms.

Scientific theory

Scientific law

Ethics

Bias

Academic Vocabulary

Use a dictionary to define objective as an adjective.

Skim through Section 2 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. 
2. 
3. 

AID S3.2d: Formulate and defend explanations and conclusions as they relate to scientific phenomena. S3.2g: Suggest improvements and recommendations for further studying. Also covered: AID S3.1a, S3.2b
Summarize how the manner in which people observe natural phenomena has changed over time.

Organize types of weather information that can be measured. Complete the graphic organizer below.

Distinguish between a scientific theory and a scientific law.
Limits of Science

Science is limited by what it can explain.

For a question or problem to be studied through scientific methods, there must be variables that can be limited, measured, and observed. Questions that deal with ethics or belief systems cannot be answered by science. Ethics is a system of understanding what is observed or limited.

Contrast ethical behavior in science with scientific fraud. Create a table that lists three specific behaviors that are examples of each type of behavior:

<table>
<thead>
<tr>
<th>Ethical Behavior</th>
<th>Scientific Fraud</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SYNTHESIZE IT

Describe how fraud in scientific research could affect other scientists who research in ethical ways.
The Nature of Science Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>The Nature of Science</th>
<th>After You Read</th>
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<tbody>
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<tr>
<td>• Technology is useful only in the situation for which it was designed.</td>
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<td>• People began studying weather in the 1800s.</td>
<td></td>
</tr>
<tr>
<td>• Science can answer all of the questions that can be asked.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about the nature of science.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

8 The Nature of Science
Name ___________________________ Date ______________

Views of Earth

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Views of Earth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• All mountains form in the same way.</td>
</tr>
<tr>
<td></td>
<td>• Lines of longitude run parallel to the equator.</td>
</tr>
<tr>
<td></td>
<td>• All maps of Earth distort the shapes and sizes of landmasses.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Assume that you want to build a home and have a satellite photo to guide you. Describe where you would build your new home and why you would build at your chosen location.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Skim the headings in Section 1. Write three questions that come to mind from reading these headings.

1. 
2. 
3. 

Define landform to show its scientific meaning.

Write the vocabulary term that matches each definition.

large, flat area, often found in the interior regions of continents

flat, raised area of land made up of nearly horizontal rocks that have been uplifted by forces within Earth

mountain in which rock layers are folded

mountain formed when blocks of Earth’s crust are pushed up by forces inside Earth

mountain made of huge, tilted blocks of rock separated from surrounding rock by faults

mountain formed when molten material reaches the surface through a weak area of Earth’s crust

Use a dictionary to define expose.
Section 1 Landforms (continued)

Plains

**Main Idea**

I found this information on page __________.

**Details**

Distinguish two reasons that plains are useful for agriculture.

1. __________________________
   __________________________

2. __________________________
   __________________________

Compare and contrast coastal plains and interior plains.

<table>
<thead>
<tr>
<th>Coastal Plains</th>
<th>Interior Plains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>Characteristics</td>
<td></td>
</tr>
</tbody>
</table>

Summarize key characteristics of the Great Plains.

The Great Plains are an example of a(n) _____________________.

They are located __________________________
   __________________________. The area is __________________________
   __________________________ and covered with __________________________. The Great Plains are made of __________________________.

Compare and contrast plains and plateaus. Complete the Venn diagram with at least three facts.

Plateaus

I found this information on page __________.

Plateaus

Views of Earth 11
Section 1 Landforms (continued)

Main Idea

Mountains

I found this information on page __________.

Details

Model the four types of mountains. Draw a diagram of each type.

Folded Mountain

Upwarped Mountain

Fault-Block Mountain

Volcanic Mountain

Summarize how mountains form. Give an example of each.

Folded Mountain: ________________________________

Upwarped Mountain: ________________________________

Fault-Block Mountain: ________________________________

Volcanic Mountain: ________________________________

Connect It

Use a physical map to identify the landforms in your area.

Name ________________________________ Date ____________

Views of Earth
Views of Earth

Section 2  Viewpoints

PS 1.1f: The latitude/longitude coordinate system and our system of time are based on celestial observations. Also covered: PS 1.1e, 1.1h

Preview the What You’ll Learn statements for Section 2. Predict three topics that will be discussed in this section.

1. 
2. 
3. 

Review Vocabulary

Define pole as it is used when describing Earth.

pole ____________________________

New Vocabulary

Define each vocabulary term.

equator ____________________________

latitude ____________________________

prime meridian ____________________________

longitude ____________________________

Academic Vocabulary

Use a dictionary to define parallel as an adjective. Then find a sentence in Section 2 that contains the term.

parallel ____________________________

____________________________________

____________________________________

____________________________________

Views of Earth 13
Model the system used to measure position on Earth.

- Draw a view of Earth.
- Label important features on the diagram with the following terms.

<table>
<thead>
<tr>
<th>equator</th>
<th>prime meridian</th>
<th>90°S latitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>north pole</td>
<td>0° latitude</td>
<td>90°N latitude</td>
</tr>
<tr>
<td>south pole</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize how latitude and longitude are measured.

Latitude is measured ________________________________

______________________________

Longitude is measured ________________________________

______________________________

Degrees of latitude and longitude are divided into _____________
and _____________.

14 Views of Earth
Look at the map of time zones in your book. Infer why the International Date Line does not follow the 180° meridian exactly.

---

**Main Idea**

**Time Zones**

I found this information on page __________.

---

**Organize** information about time zones. Complete the outline.

**Time Zones**

I. Measuring time
   A. ________________________________________________________________
   B. ________________________________________________________________

II. Characteristics of time zones
   A. ________________________________________________________________
   B. ________________________________________________________________
   C. ________________________________________________________________

---

**Synthesize It**

Summarize what a person should do when crossing the International Date Line. Complete the cause-and-effect diagrams.

<table>
<thead>
<tr>
<th>Travel west across the International Date Line</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel east across the International Date Line</td>
<td></td>
</tr>
</tbody>
</table>

---

**Calendar Dates**

I found this information on page __________.
Views of Earth
Section 3 Maps

**Scan** the section headings, bold words, and illustrations. Write two facts that you discovered as you scanned the section.

1. 
2. 

**Review Vocabulary**

**Define** globe to show its scientific meaning.

**New Vocabulary**

Use your book to define each vocabulary term.

- conic projection
- topographic map
- contour line
- map scale
- map legend

**Academic Vocabulary**

Use a dictionary to define physical. Use physical in a sentence to show its scientific meaning.

**physical**
Define map. Then complete the statements below about map projections.

A map is ________________________________________________.

A map projection is made when ________________________________

__________________________________________________________.

All map projections ____________ the shapes and sizes of land-
masses to some extent.

**Compare and contrast** Mercator, Robinson, and conic projections.

<table>
<thead>
<tr>
<th>How is it made?</th>
<th>Mercator</th>
<th>Robinson</th>
<th>Conic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What does it show accurately?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How is it used?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Summarize the purpose of a topographic map.**

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
If you were going to map your classroom, which map scale would be better: 1 cm:1 m or 1 cm: 10 m? Explain your reasoning.
Create a two-dimension physical map of your state in the space provided below. Include the major landforms found in your state. Use symbols to indicate these landforms on the map. Be sure to explain the symbols you use in a map legend. Your map should be proportional to the actual size of your state. Include a map scale to help others determine distances.
Views of Earth  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

<table>
<thead>
<tr>
<th>Views of Earth</th>
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Review

*Use this checklist to help you study.*

- [ ] Review the information you included in your Foldable.
- [ ] Study your *Science Notebook* on this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Re-read the chapter and review the charts, graphs, and illustrations.
- [ ] Review the Self Check at the end of each section.
- [ ] Look over the Chapter Review at the end of the chapter.

**SUMMARIZE IT**

Identify three important ideas in this chapter.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

20  Views of Earth
Rocks and Minerals

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Rocks and Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Minerals are made by people.</td>
<td></td>
</tr>
<tr>
<td>• Most rocks consist of one or more minerals.</td>
<td></td>
</tr>
<tr>
<td>• Rocks are classified in three major groups.</td>
<td></td>
</tr>
<tr>
<td>• Rocks have stopped forming on Earth.</td>
<td></td>
</tr>
<tr>
<td>• Rocks and minerals have many uses in society.</td>
<td></td>
</tr>
</tbody>
</table>

FOLDABLES

Construct the Foldable as directed at the beginning of this chapter.

SCIENCE JOURNAL

Observe a rock or mineral sample. Write three characteristics about it.

---

Name ___________________________ Date __________

Rocks and Minerals

Rocks and Minerals

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
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</tr>
<tr>
<td>• Rocks and minerals have many uses in society.</td>
<td></td>
</tr>
</tbody>
</table>

FOLDABLES

Construct the Foldable as directed at the beginning of this chapter.

SCIENCE JOURNAL

Observe a rock or mineral sample. Write three characteristics about it.

---

Name ___________________________ Date __________
Name _______________________________ Date _______________

Rocks and Minerals
Section 1 Minerals—Earth’s Jewels

Scan Section 1 of your book. Then, write three questions that you have about minerals. Try to answer your questions as you read.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define physical property with the help of your book or a dictionary.

physical property

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

New Vocabulary

Write the correct vocabulary word from your book next to each definition.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Academic Vocabulary

refine

Use a dictionary to find the definition of refine as it applies to metals. Write the definition below in your own words.

________________________________________________________________________
________________________________________________________________________
Complete the chart below about minerals.

<table>
<thead>
<tr>
<th>Minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition:</td>
</tr>
<tr>
<td>Examples:</td>
</tr>
<tr>
<td>Ways minerals form:</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Contrast cleavage and fracture by writing three different characteristics of each in the following chart.

<table>
<thead>
<tr>
<th>Cleavage</th>
<th>Fracture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contrast the qualities of mineral color and luster.

Color

Luster
Section 1 Minerals—Earth’s Jewels (continued)

**Main Idea**

**Common Minerals**

*Sequence* four steps that describe how copper ore is turned into useful products. The first step has been completed for you.

1. Copper ore is mined and crushed.

2. 

3. 

4. 

**Details**

List characteristics of a gem and an ore in the chart below.

<table>
<thead>
<tr>
<th>Gem</th>
<th>Ore</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT IT**

Write the names of six objects in your classroom that are made using minerals. Then explain how minerals are important in your everyday life.

1. 

2. 

3. 

4. 

5. 

6. 


---

24  *Rocks and Minerals*
Rocks and Minerals

Section 2 Igneous and Sedimentary Rocks

PS 2.2g: Rocks are classified according to their method of formation. The three classes of rocks are sedimentary, metamorphic, and igneous. Most rocks show characteristics that give clues to their formation conditions. Also covered: PS 2.2f, 2.2h

Skim the headings in Section 2. Then make three predictions about what you will learn.

1. 
2. 
3. 

Define the following terms using your book or a dictionary.

lava

igneous rock

extrusive

intrusive

sedimentary rock

process

New Vocabulary

Review Vocabulary

Academic Vocabulary

Name ____________________________ Date ________________

Name ____________________________ Date ________________

Name ____________________________ Date ________________
Section 2  Igneous and Sedimentary Rocks (continued)

Main Idea

Igneous Rocks

Contrast extrusive and intrusive igneous rocks in the chart.

<table>
<thead>
<tr>
<th>Type</th>
<th>Form from molten rock called</th>
<th>Have cooling rate that is</th>
<th>Have crystal size that is</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrusive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrusive</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Organize a concept map about igneous rocks using these words and phrases.

- high silica content
- granitic
- low silica content
- dark colored

I found this information on page ____________.
Choose a sedimentary or igneous rock. You might pick basalt, granite, shale, or sandstone. Write a story from the rock’s perspective about how the rock formed. When writing your story, you should pretend that you are the rock.

<table>
<thead>
<tr>
<th>Form from</th>
<th>Detrital</th>
<th>Chemical</th>
<th>Organic</th>
</tr>
</thead>
<tbody>
<tr>
<td>How form</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where form</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Rocks and Minerals

Section 3 Metamorphic Rocks and the Rock Cycle

Scan the headings in Section 3. Write three predictions about what you will learn in this section.
1. 
2. 
3. 

Review Vocabulary

Define each vocabulary word. Then, write a sentence reflecting the scientific meaning of each of the words.

pressure 
______________________________

New Vocabulary

metamorphic rock 
______________________________

foliated 
______________________________

nonfoliated 
______________________________

rock cycle 
______________________________

Academic Vocabulary

layer 
______________________________

PS 2.2g: Rocks are classified according to their method of formation. The three classes of rocks are sedimentary, metamorphic, and igneous. Most rocks show characteristics that give clues to their formation conditions. Also covered: PS 2.2f, 2.2h
Summarize the conditions under which rocks experience metamorphism as you complete the chart below.

<table>
<thead>
<tr>
<th>Conditions of Metamorphic Rock Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>temperature</td>
</tr>
<tr>
<td>pressure</td>
</tr>
<tr>
<td>time</td>
</tr>
</tbody>
</table>

Draw a metamorphic rock with a foliated texture and a metamorphic rock with a nonfoliated texture below. Show and label two characteristics of each type of rock in the top boxes, and list an example of each type in the bottom boxes.

<table>
<thead>
<tr>
<th>Foliated texture</th>
<th>Nonfoliated texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples:</td>
<td>Examples:</td>
</tr>
</tbody>
</table>
Section 3 Metamorphic Rocks and the Rock Cycle (continued)

Main Idea

**Rock Cycle**

I found this information on page ___________.

Details

Create a diagram of the rock cycle below.

- Label each type of rock in your diagram.
- Label the processes in your diagram. Use the words melting, cooling, weathering and erosion, compaction and cementation, and heat and pressure.

Identify two other cycles that occur in nature.

1. ___________________________________________
2. ___________________________________________

CONNECT IT

While on a leisurely hike, a geologist from the nearby university noticed that the gravel in a sedimentary rock consists of pieces of both igneous and metamorphic rock. As the geologist, write a brief report explaining how this is possible.
Tie It Together

Design

Some artists specialize in making art from rock and mineral pieces. The different colors, textures, and other properties of the rocks and minerals can produce spectacular displays. In the space below, design your own rock and mineral art. It might be mounted on a wall, make up the courtyard of a building, or be a large monument. You may use any rock or mineral shown in your book in your art.
Rocks and Minerals  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Rocks and Minerals</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Minerals are made by people.</td>
<td></td>
</tr>
<tr>
<td>• Most rocks consist of one or more minerals.</td>
<td></td>
</tr>
<tr>
<td>• Rocks are classified in three major groups.</td>
<td></td>
</tr>
<tr>
<td>• Rocks have stopped forming on Earth.</td>
<td></td>
</tr>
<tr>
<td>• Rocks and minerals have many uses in society.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about rocks and minerals.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

32  Rocks and Minerals
Weathering and Erosion

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Weathering and Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Weathering is the conditions of the atmosphere at a given time.</td>
<td></td>
</tr>
<tr>
<td>• Soil forms from pieces of broken rock and other kinds of matter.</td>
<td></td>
</tr>
<tr>
<td>• Erosion moves rock and soil from one place to another.</td>
<td></td>
</tr>
<tr>
<td>• Water can cause erosion, but ice cannot.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe a place—a home, a park, a river, or a mountain. What might that place look like in a year, a hundred years, even 5,000 years?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Weathering and Erosion
Section 1 Weathering and Soil Formation

PS 2.1g: The dynamic processes that wear away Earth’s surface include weathering and erosion. 2.1h: The process of weathering breaks down rocks to form sediment. Soil consists of sediment, organic material, water, and air.

Skim through Section 1 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.

1. 
2. 
3. 

Review Vocabulary
Define the key terms using your book or a dictionary.

acid rain

New Vocabulary
weathering
mechanical weathering
chemical weathering
soil
topography

Academic Vocabulary
Define chemical as an adjective. Use a dictionary to help you.

chemical
Organize information by listing three things that cause rocks to weather.

<table>
<thead>
<tr>
<th>Causes of Weathering</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Identify major causes of mechanical weathering. Complete the concept map below.

**Mechanical Weathering**

Create three drawings to show the process of ice wedging.

- Water seeps into cracks.
- Water freezes and expands, making cracks wider.
- Ice melts and the process repeats.
Section 1 Weathering and Soil Formation (continued)

**Chemical Weathering**

*I found this information on page _________.

**Organize the information from your book in the outline below.**

**Chemical weathering**

A. Definition: ___________________________________________

B. Causes:

1. __________________________________________
2. __________________________________________
3. __________________________________________

**Soil**

*I found this information on page _________.

**Complete the graphic organizers about soil and soil formation.**

The temperature on some mountains is below freezing all year. Predict what soil on these mountains is like.

[Diagram showing soil formation with steps and details]

---

**CONNECT IT**

The temperature on some mountains is below freezing all year. Predict what soil on these mountains is like.
Weathering and Erosion

Section 2  Erosion of Earth’s Surface

Scan Use the checklist below to preview Section 2 of your book. Then write three facts that you discovered about how erosion affects Earth’s surface.

- Read all headings.
- Read all boldface words.
- Look at all of the pictures.
- Think about what you already know about features of Earth’s surface.

1. 
2. 
3. 

Review Vocabulary
Write the correct vocabulary word next to each definition.

the dropping of sediment that occurs when an agent of erosion can no longer carry its load

New Vocabulary

the movement of rock or soil by gravity, ice, wind, or water

erosion that occurs when gravity alone causes rock or sediment to move down a slope

the process in which sediment moves slowly downhill

the movement of rock or sediment downhill along a curved surface

the erosion of the land by wind

erosion that occurs when wind blows sediment into rocks, makes pits in the rocks, and produces a smooth, polished surface

water that flows over the ground

Academic Vocabulary

Define occur using a dictionary.

occur
Section 2 Erosion of Earth’s Surface (continued)

Main Idea

Agents of Erosion

I found this information on page __________.

Gravity

I found this information on page __________.

Ice

I found this information on page __________.

Details

Organize information from your book by filling in the concept map with the four agents, or causes, of erosion.

all cause erosion

Compare and contrast the four types of mass movements. Write ways they are all the same and some ways they are different.

Mass Movements

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
</table>

Sequence four steps explaining how glaciers form and change Earth’s surface.

Glaciers Form and Change Earth’s Surface

1. 

2. 

3. 

4.
Section 2  Erosion of Earth’s Surface (continued)

Main Idea

Wind

I found this information on page _____________.

Model how a sand dune moves by making a diagram in the box. Label the following features:

- sand blows up this side
- sand falls down this side
- dune movement (arrow)
- wind (arrow)

Details

Water

I found this information on page _____________.

Complete the concept map by listing several ways that water can flow over Earth’s surface.

Effects of Erosion

I found this information on page _____________.

Analyze the effects of erosion. List three examples of landforms caused by erosion and three examples caused by deposition.

<table>
<thead>
<tr>
<th>Effects of Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where Sediment is Removed (erosion)</td>
</tr>
</tbody>
</table>
Weathering and Erosion

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Weathering and Erosion</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Weathering is the conditions of the atmosphere at a given time.</td>
<td></td>
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<tr>
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☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT After reading this chapter, identify three things that you have learned about weathering and erosion.

__________________________________________
__________________________________________
__________________________________________

40 Weathering and Erosion
Clues to Earth’s Past

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Clues to Earth’s Past</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The footprint of a dinosaur is considered a fossil.</td>
<td></td>
</tr>
<tr>
<td>• Scientists use fossils to learn what an environment was like long ago.</td>
<td></td>
</tr>
<tr>
<td>• The oldest rock layer is always the one found on top.</td>
<td></td>
</tr>
<tr>
<td>• Scientists can determine the age of some rocks.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List three fossils that you would expect to find a million years from now in the place you live today.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Clues to Earth’s Past

Section 1 Fossils

LE 3.2b: Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to permit its survival. PS 2.1f: Fossils are usually found in sedimentary rocks. Fossils can be used to study past climates and environments. Also covered: LE 3.2c

Skim Section 1 of your book. Read the headings and examine the illustrations. Write three questions that come to mind.

1. 
2. 
3. 

Define paleontologist to show its scientific meaning.

paleontologist

Define the following terms to show their scientific meaning.

permineralized remains

carbon film

cast

index fossils

Define emerge to show its scientific meaning.

emerge
**Main Idea**

**Formation of Fossils**

I found this information on page __________.

**Details**

**Complete** the chart to describe the two conditions that improve the chances of fossil formation. Give an example of each.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Types of Preservation**

I found this information on page __________.

**Sequence** the steps involved in the making of the cast of a shell.

- Sediment buries shell.
- Mold results.
- Cast results.
Section 1 Fossils (continued)

Index Fossils

Summarize the three characteristics of index fossils.

1. ________________________________
2. ________________________________
3. ________________________________

Analyze why index fossils are more useful to paleontologists than many other fossils.

Fossils and Ancient Environments

Organize the kinds of information about ancient environments that scientists can learn from fossils. Complete the graphic organizer.

CONNECT IT

You find a fossil shell in a layer of rock. It appears to be a clam. What type of rock must the rock layer be? What type of environment would the animal have lived in?  

________________________
Name ____________________________ Date ______________

Clues to Earth’s Past
Section 2 Relative Ages of Rocks

LE 3.2c: Many thousands of layers of sedimentary rock provide evidence for the long history of Earth and for the long history of changing lifeforms whose remains are found in the rocks. Recently deposited rock layers are more likely to contain fossils resembling existing species. Also covered: PS 2.2c

Scan the list below to preview Section 2 of your book.
• Read all section headings.
• Read all bold words.
• Look at all of the pictures.
• Think about what you already know about rock.

Write three facts you discovered about the relative ages of rocks as you scanned the section.
1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Define sedimentary rock to show its scientific meaning.
________________________________________________________

Read each definition below. Write the correct vocabulary term in the blank to the left.

states that in undisturbed rock layers, the oldest rocks are on the bottom and the rocks are progressively younger toward the top age of something compared with the ages of other things

gap in a sequence of rock layers that is due to erosion or periods without any deposition

Define sequence to show its scientific meaning.
________________________________________________________
Section 2 Relative Ages of Rocks (continued)

Superposition
Model the principle of superposition by sketching a cross-section of layers of undisturbed sedimentary rock. Number the layers, starting with 1 for the oldest layer.

Model how a folded rock formation containing limestone, coal, and sandstone would form. Draw and label the layers as they would form originally. Then draw what they would look like after being folded.

Describe how the relative age of a rock layer is different from the actual age of the rock layer.

I found this information on page ____________.
As you pass through a highway cut, you notice distinct layers of rock. Can you be sure that the top layer is the youngest one? Explain.
Clues to Earth’s Past

Section 3 Absolute Ages of Rocks

LE 3.2c: Many thousands of layers of sedimentary rock provide evidence for the long history of Earth and for the long history of changing lifeforms whose remains are found in the rocks. Recently deposited rock layers are more likely to contain fossils resembling existing species. Also covered: PS 3.3a

Predict three things that might be discussed in Section 3 as you read the headings.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define isotopes to show its scientific meaning.

isotopes

Define these key terms to show their scientific meaning.

radioactive decay

radiometric dating

uniformitarianism

Define ratio to show its scientific meaning.

ratio
Organize information about radioactive decay as a tool to find a rock’s absolute age. Complete the Venn diagram below with at least six points of information.

Create a bar chart to show four half-lives. Then draw a curve connecting the tops of the bars. Label each axis.
Analyze carbon-14 dating by completing the statements.

The half-life of carbon-14 is _________________.
When carbon-14 decays, it becomes _________________.
Carbon-14 radiometric dating is used for ________________,
________________, and ________________ samples up
to ________________ old. Scientists compare amounts of
carbon-14 in the ________________ to the amount in a fossil
of an organism that lived long ago. While the organism was alive,
it took in and processed carbon-14 and _________________.
The ________________ of carbon-14 to carbon-12 tells the
approximate ________________ of the fossil.

Summarize Hutton’s view of uniformitarianism and the modern
view of changes that affect Earth.

Hutton’s view: _________________________________
______________________________
______________________________

Modern view: _________________________________
______________________________
______________________________

Explain why the principle of uniformitarianism is critical to
what you have learned about determining the absolute age of rocks.

______________________________
______________________________
______________________________
______________________________
A paleontologist found the following composition of rock layers at a site. The paleontologist concludes that no folding or other disruption has happened to the layers. What can you conclude about the area’s history? Write a summary of your conclusions.

**Top layer:** coal layer made up of altered plant material

**Middle layer:** mix of sandstone and shale, with some tracks made by dinosaurs

**Bottom layer:** limestone with fossils of clams, snails, and sea lilies
Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Clues to Earth’s Past</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT
Identify three facts about fossils and rock layers that you found interesting.
Plate Tectonics

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Plate Tectonics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Fossil evidence provides support for the idea that continents have moved over time.</td>
</tr>
<tr>
<td></td>
<td>• New seafloor is continuously forming while old seafloor is being destroyed.</td>
</tr>
<tr>
<td></td>
<td>• Earth’s crust is broken into sections called plates.</td>
</tr>
<tr>
<td></td>
<td>• Rock flows deep inside Earth.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Pretend you’re a journalist with an audience that assumes the continents have never moved. Write about the kinds of evidence you’ll need to convince people otherwise.
Plate Tectonics
Section 1 Continental Drift

A PS 2.2d: Continents fitting together like puzzle parts and fossil correlations provided initial evidence that continents were once together. Also covered: PS 2.2c

**Skim** through Section 1 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.

1. __________________________________________
2. __________________________________________
3. __________________________________________

**Review Vocabulary**

**Define** continent to show its scientific meaning.

*continent*

__________________________________________

**New Vocabulary**

*continental drift*

__________________________________________

*Pangaea*

__________________________________________

**Academic Vocabulary**

*controversy*

__________________________________________

*Use a dictionary to define controversy.*
Summarize Alfred Wegener's hypothesis about Earth's continents.

Create a graphic organizer to identify the three types of clues that are evidence for continental drift.

Analyze the clue in the left column below. Then describe how Alfred Wegener would have explained it in the right column.

<table>
<thead>
<tr>
<th>Clue</th>
<th>Wegener's Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fossils of Mesosaurus found in South America and Africa</td>
<td></td>
</tr>
<tr>
<td>Fossil plant found in five continents, including Antarctica</td>
<td></td>
</tr>
<tr>
<td>Fossils of warm weather plants found on Arctic island</td>
<td></td>
</tr>
<tr>
<td>Glacial deposits found in Africa, India, and Australia</td>
<td></td>
</tr>
</tbody>
</table>
Model what the continents may have looked like 250 million years ago.

Summarize Wegener’s explanations of how and why continental drift occurs.

Wegener’s explanation for continental drift

How: __________________________

Why: _________________________

EVALUATE IT

Do you think it was reasonable for scientists initially to reject the hypothesis of continental drift? Explain your response.

Name __________________________ Date ______________

Section 1 Continental Drift (continued)

I found this information on page ____________.

How could continents drift?

I found this information on page ____________.
Plate Tectonics
Section 2  Seafloor Spreading

Predict three things that might be discussed in Section 2 after reading its headings.
1. 
2. 
3. 

Define seafloor. Then use the word in a sentence.

Use your book to define seafloor spreading. Then use the term in a sentence.

Use a dictionary to define interval. Then use the word in a sentence about magnetic clues to seafloor spreading.

PS 2.2a: The interior of Earth is hot. Heat flow and movement of material within Earth cause sections of Earth's crust to move. This may result in earthquakes, volcanic eruption, and the creation of mountains and ocean basins.
Section 2 Seafloor Spreading (continued)

Main Idea

Mapping the Ocean Floor

I found this information on page _________.

Details

Summarize how sound waves are used to map the seafloor.

Model the process of seafloor spreading by drawing a cross section of a mid-ocean ridge and the magma below it. Use arrows to indicate the directions of motion.

Sequence steps describing seafloor spreading.

Hot, less dense material below Earth’s crust rises toward the surface at a mid-ocean ridge.

The less dense material flows _____________________________.

As the seafloor spreads apart, magma is _________________________.

58 Plate Tectonics
Evidence for Spreading

Label the diagram below to identify evidence for seafloor spreading. Add arrows to show the direction of spreading, and indicate where older rock and newer rock occur.

Model the polarity of Earth’s magnetic field today.

- Draw a sphere to represent Earth.
- Label the north pole and south pole.
- Draw arrows indicating the direction in which magnetic lines of force enter and leave Earth.

Summarize how reversals in the direction of Earth’s magnetic field have provided evidence of seafloor spreading.

At times, the ____________________________ that pass through Earth have _______________. __________ of Earth’s magnetic field are recorded in __________ that forms along __________________________. Scientists can detect __________________ that are __________ to mid-ocean ridges. This occurs on __________________________.
Plate Tectonics

Section 3 Theory of Plate Tectonics

Scan the headings and illustrations in Section 3. List four features caused by plate tectonics.

1. ________________  
2. ________________  
3. ________________  
4. ________________

Review Vocabulary

Define the review terms to show their scientific meanings.

- converge
- diverge
- transform

New Vocabulary

Use your book to define the following terms.

- plate
- plate tectonics
- lithosphere
- asthenosphere
- convection current

Academic Vocabulary

Use a dictionary to define rigid.

rigid

PS 2.2e: The Theory of Plate Tectonics explains how the "solid" lithosphere consists of a series of plates that "float" on the partially molten section of the mantle. Convection cells within the mantle may be the driving force for the movement of the plates. Also covered: PS 2.1c, 2.2b, 2.2c, 2.2f

Join the headings and illustrations in Section 3. List four features caused by plate tectonics.

1. ________________  
2. ________________  
3. ________________  
4. ________________

Define the review terms to show their scientific meanings.

- converge
- diverge
- transform

Use your book to define the following terms.

- plate
- plate tectonics
- lithosphere
- asthenosphere
- convection current

Use a dictionary to define rigid.
Section 3  Theory of Plate Tectonics (continued)

Main Idea

Plate Tectonics
I found this information on page __________.

Details

Complete the following outline on the theory of plate tectonics.

I. A new theory
   A. In the 1960s, a new theory called ______________ was developed.
   B. Earth’s ______________ and part of the ______________ are broken into sections called ______________, that move slowly.

II. Details about the theory
   A. The layer of Earth that is broken into sections is called the ______________.
   B. The ______________ is the plasticlike layer below the ______________.
   C. The rigid plates move over the ______________.

Plate Boundaries
I found this information on page __________.

Compare and contrast the different plate boundaries by defining them side by side. Draw the plates of the world. Identify plate motion by using arrows.

<table>
<thead>
<tr>
<th>Divergent</th>
<th>Convergent</th>
<th>Transform</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Plate Tectonics  61
Causes of Plate Tectonics

Features Caused by Plate Tectonics

Label the convection currents depicted below with heating, rising, cooling, and sinking.

Organize information to describe features caused by plate tectonics. Fill in the chart below.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rift valley</td>
<td></td>
</tr>
<tr>
<td>Folded and faulted mountains</td>
<td></td>
</tr>
<tr>
<td>Strike-slip faults</td>
<td></td>
</tr>
</tbody>
</table>

Summarize how the Satellite Laser Ranging System measures plate movement.

Name ____________________________ Date ______________

Section 3  Theory of Plate Tectonics (continued)
Tie It Together

Synthesize It

Your book has a picture showing how continents may have drifted. It shows their positions 250 million years ago, 125 million years ago, and at the present. Work with a partner to trace the paths that the continents have taken. Then extend their paths forward in time to project where they may be 125 million years from now. Draw a map in the space below, showing your prediction.
Name ____________________________ Date ________________

**Plate Tectonics** Chapter Wrap-Up

*Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.*

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

<table>
<thead>
<tr>
<th>Plate Tectonics</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fossil evidence provides support for the idea that continents have moved over time.</td>
<td></td>
</tr>
<tr>
<td>• New seafloor is continuously forming while old seafloor is being destroyed.</td>
<td></td>
</tr>
<tr>
<td>• Earth’s crust is broken into sections called plates.</td>
<td></td>
</tr>
<tr>
<td>• Rock flows deep inside Earth.</td>
<td></td>
</tr>
</tbody>
</table>

**Review**

*Use this checklist to help you study.*

☐ Review the information you included in your Foldable.

☐ Study your *Science Notebook* on this chapter.

☐ Study the definitions of vocabulary words.

☐ Review daily homework assignments.

☐ Re-read the chapter and review the charts, graphs, and illustrations.

☐ Review the Self Check at the end of each section.

☐ Look over the Chapter Review at the end of the chapter.

**SUMMARIZE IT**

After reading this chapter, identify three things that you have learned about plate tectonics.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Earthquakes and Volcanoes

Before You Read

*Preview the chapter title, the section titles, and the section headings. Complete the first two columns of the chart by listing at least two ideas for each section in each column.*

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What I know</strong></td>
<td><strong>What I want to learn</strong></td>
</tr>
</tbody>
</table>

**Foldables Study Organizer**

*Construct the Foldable as directed at the beginning of this chapter.*

**Science Journal**

*Are earthquakes and volcanoes completely unrelated, or could there be a possible connection? Propose several ideas that might explain what causes these events.*

---

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Earthquakes and Volcanoes

Section 1 Earthquakes

PS 2.2a: The interior of Earth is hot. Heat flow and movement of material within Earth cause sections of Earth’s crust to move. This may result in earthquakes, volcanic eruption, and the creation of mountains and ocean basins. Also covered: PS 2.2b, 2.2f

Scan the headings in Section 1 and write three questions you have about earthquakes.

1. 
2. 
3. 

Write six original sentences with at least two vocabulary terms in each. Include the review, new, and academic vocabulary items. Underline the vocabulary terms that you use. Words may be used more than once. Use all of the words.

- energy
- earthquake
- fault
- seismic wave
- focus
- epicenter
- seismograph
- magnitude
- tsunami
- seismic safe
- collapse
- PS 2.2b
- PS 2.2f

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Model the direction of motion in the three types of faults below. Use arrows to indicate direction of force and direction of movement. Label the arrows.

Normal Fault

Reverse Fault

Strike-slip Fault

Compare primary, secondary, and surface seismic waves by completing the chart below. Put an X in the column of the type of wave that causes the most damage.

<table>
<thead>
<tr>
<th>Seismic Waves</th>
<th>Primary</th>
<th>Secondary</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most damage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative speed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where they travel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Learning from Earthquakes

I found this information on page ____________.

How strong are earthquakes?

I found this information on page ____________.

Earthquake Safety

I found this information on page ____________.

Model how an earthquake’s epicenter is located. The stars in the diagram indicate seismograph stations. The circles show their distance from the epicenter. Mark the epicenter with an X, and use arrows to show the directions in which seismic waves travel.

Compare the Richter scale and the Mercalli scale in the chart.

<table>
<thead>
<tr>
<th>Comparing Earthquake Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richter</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Organize information by listing two things that individuals can do and two things that cities can do to prepare for earthquakes.

Individuals

1. ____________________________
2. ____________________________

Cities

1. ____________________________
2. ____________________________
Earthquakes and Volcanoes

Section 2 Volcanoes

**Predict** what you’ll learn in this section by reading the What You’ll Learn statements. Rewrite each statement as a question. Use these questions as a guide to the content of Section 2.

1. 
2. 
3. 

**Define** plate to show its scientific meaning.

plate

**Write the correct vocabulary term from your book next to each definition.**

- cone-shaped hill or mountain formed when hot magma, solids, and gases erupt onto Earth’s surface
- molten rock flowing onto Earth’s surface
- large, broad volcano with gently sloping sides that is formed by the build up of basaltic layers
- relatively small volcano formed by moderate to explosive eruptions of tephra
- steep-sided volcano formed from alternating layers of tephra and lava

**Read the sentence below. Use a dictionary to determine how the term factor is being used.**

Different factors affect volcanic eruptions.

*In this sentence, the word factor means:*

---

*Earthquakes and Volcanoes*  69
Sequence the events that result in volcanic eruptions where plates collide by filling in the blanks below.

1. An older, denser plate ______________________ a less dense plate.
2. Rock in and above the sinking plate ____________.
3. ______________________ form.
4. The magma ____________ to form ____________.

Analyze the way silica content helps determine how a volcano erupts to complete the following chart.

<table>
<thead>
<tr>
<th>How the composition of magma affects eruptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High silica</td>
</tr>
<tr>
<td>Consistency and flow</td>
</tr>
<tr>
<td>Eruption</td>
</tr>
</tbody>
</table>

Model the 3 types of volcanoes by drawing a cross-section of each in the boxes on this page and the next. To the right of each drawing, write a caption that includes:
- how this type of volcano forms
- what this type of volcano is made of

Shield volcano

I found this information on page __________.

Main Idea

How do volcanoes form?

I found this information on page __________.

Details

Forms of Volcanoes

I found this information on page __________.
Describe a fissure eruption, and give an example.

I found this information on page _________.

CONNECT IT

What type of volcano do you think appears most in the news?
Why? Identify any real-life volcanoes you have heard about.

Earthquakes and Volcanoes  71
Earthquakes and Volcanoes

Section 3 Earthquakes, Volcanoes, and Plate Tectonics

**Skim** Section 3. Predict three things that you will learn.

1. 
2. 
3. 

**Review Vocabulary**

*Define* asthenosphere, *then use a dictionary to break down the word into its two parts and give the meaning of each part.*

**New Vocabulary**

Find the definitions of rift and hot spot in your book. *Then locate another sentence in the section that uses these terms and write it in the space below.*

**Academic Vocabulary**

*Use a dictionary to define occur.*

---

PS 2.2a: The interior of Earth is hot. Heat flow and movement of material within Earth cause sections of Earth’s crust to move. This may result in earthquakes, volcanic eruption, and the creation of mountains and ocean basins. *Also covered:* PS 2.2e, 2.2f
Section 3 Earthquakes, Volcanoes, and Plate Tectonics (continued)

Main Idea

Earth’s Moving Plates

Model the plates of Earth’s lithosphere that contribute to earthquake and volcanic activity in North America. Draw a simple map of North America and its plate and the boundaries with the plates that surround it. Label the plates.

Details

Where Volcanoes Form

I found this information on page _________.

Organize information about where volcanoes form by completing the concept map.

Volcanoes

form at

form at

form at
Section 3 Earthquakes, Volcanoes, and Plate Tectonics (continued)

Main Idea

Moving Plates Cause Earthquakes

I found this information on page ________.

Details

Identify three places where earthquakes frequently occur.
1. __________________________________________
2. __________________________________________
3. __________________________________________

Model what drives Earth’s plates.
• In the diagram below, label Earth’s core and mantle.
• Draw three convection currents. Use arrows to show the direction of flow.
• Show a convergent boundary between two currents and a divergent boundary between two currents.

SYNTHESIZE IT

In your own words, explain how seismic waves help scientists learn about Earth’s layers.

__________________________________________

__________________________________________

__________________________________________

__________________________________________
Tie It Together

Summarize

Create a concept map or other diagram to connect concepts you have learned about volcanoes and earthquakes. Include information about

• why they occur
• how they affect humans
• how scientists measure and observe them
• what scientists know about them.
Earthquakes and Volcanoes
Chapter Wrap-Up

Review the ideas that you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What I know</strong></td>
<td><strong>What I want to learn</strong></td>
<td><strong>What I learned</strong></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

- [ ] Review the information you included in your Foldable.
- [ ] Study your *Science Notebook* on this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Re-read the chapter and review the charts, graphs, and illustrations.
- [ ] Review the Self Check at the end of each section.
- [ ] Look over the Chapter Review at the end of the chapter.

**SUMMARIZE IT**

After reading this chapter, identify three things that you have learned about earthquakes and volcanoes.

1. 
2. 
3.

76  Earthquakes and Volcanoes
Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Waves, Sound, and Light</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Waves carry both matter and energy.</td>
<td></td>
</tr>
<tr>
<td>• Waves occur only in water.</td>
<td></td>
</tr>
<tr>
<td>• Sound travels at the same speed through all materials.</td>
<td></td>
</tr>
<tr>
<td>• Light does not require matter to move through.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Write a short paragraph describing water waves you have seen.
Waves, Sound, and Light

Section 1 Waves

**Skim** Section 1 in your book. Write three questions that come to mind from what you have skimmed.

1. 
2. 
3. 

**Review Vocabulary**

**Define** density using your book or a dictionary.

**New Vocabulary**

Write the correct vocabulary term next to its definition.

- **density**
  - distance between one point on a wave and the nearest point moving with the same speed and direction

- wave that causes particles in matter to move at right angles to the direction the wave travels

- angle an incoming wave makes with the normal equals angle the reflected wave makes with the normal

- disturbance that moves through matter or space and carries energy

- change in direction of a wave when it changes speed as it travels from one material to another

- number of wavelengths that pass a given point in one second, measured in hertz

- wave that causes particles in matter to move back and forth along the direction the wave travels

- bending of waves around an object

**Academic Vocabulary**

Use a dictionary to define adjacent.
Contrast mechanical and electromagnetic waves. Fill in the missing words.

Mechanical waves travel through _________. They may be ___________ waves or ___________ waves.
Electromagnetic waves travel through ___________ or ___________. They are always ___________ waves.

Create drawings of a transverse wave and a compressional wave. Label a trough, a crest, a compression, and a rarefaction.

| Transverse wave |
| Compressional wave |

Compare and contrast the properties of transverse and compressional waves by defining the wave characteristics for each.

<table>
<thead>
<tr>
<th>Property</th>
<th>Wave Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>Amplitude</td>
<td></td>
</tr>
</tbody>
</table>
Section 1 Waves (continued)

**Main Idea**

**Properties of Waves**
I found this information on page ______.

**Waves Can Change Directions**
I found this information on page ______.

**Details**

**Complete** the equation for wave speed. Then rewrite the equation using the correct symbols.

wave speed (m/s) = ___________ (m) × ___________ (Hz)

Wave Speed Equation ___________

**Model** the ways waves change direction by drawing examples using light waves in the boxes below.

<table>
<thead>
<tr>
<th>Light Waves Change Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflection</td>
</tr>
</tbody>
</table>

**SUMMARIZE IT**

Create, label, and describe a water wave. Identify its wavelength, frequency, and amplitude. Draw what would happen if the wave is reflected, refracted, and diffracted.

<table>
<thead>
<tr>
<th>Water Wave</th>
<th>Refracted Wave</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reflected Wave</th>
<th>Diffracted Wave</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Scan Section 2 of your book using the checklist below.

☐ Read all section titles.
☐ Read all bold words.
☐ Read all charts and graphs.
☐ Look at the pictures.
☐ Think about what you already know about sound waves.

Write three facts you discovered about sound waves as you scanned the section.

1. 
2. 
3. 

Define perception using a dictionary or your book.

perception

Write a sentence using the scientific meaning of each of the vocabulary words.

intensity

pitch

reverberation

Use a dictionary to define perceive.

perceive
Section 2 Sound Waves (continued)

Main Idea

Making Sound Waves
I found this information on page ___________.

Organize the features of sound waves in the chart below.

<table>
<thead>
<tr>
<th>Properties of Sound Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produced by</td>
</tr>
<tr>
<td>Type of wave</td>
</tr>
<tr>
<td>How they transfer energy</td>
</tr>
</tbody>
</table>

Identify 2 factors that affect the speed of sound.

1. ___________________________
2. ___________________________

Model Draw and label arrows to show whether intensity, loudness, and energy increase or decrease as the amplitude of a sound wave increases.

- Amplitude increases
  - Intensity __________
  - Loudness __________
  - Energy __________

Describe the relationship between frequency and pitch.

...
Section 2  Sound Waves (continued)

**Main Idea**

Hearing and the Ear

I found this information on page _________.

**Details**

Sequence the path of sound through the ear by completing the flowchart with the function and main structures of each part of the ear.

1. **Outer Ear**
   - Function: ________________________________
   - Main Structures: __________________________

2. **Middle Ear**
   - Function: ________________________________
   - Main Structures: __________________________

3. **Inner Ear**
   - Function: ________________________________
   - Main Structures: __________________________

**The Reflection of Sound**

I found this information on page _________.

Distinguish two uses of reflected sound.

1. ________________________________
2. ________________________________

**CONNECT IT**

Sound in an empty room can be very loud, with many echoes. Describe three ways to make the room quieter.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________
Predict three things that might be discussed in Section 3. Read the section headings and subheadings to help make your predictions.

1. 
2. 
3. 

Define spectrum and use it in a sentence.

Use your book to define each of the new vocabulary terms.

electromagnetic waves

electromagnetic spectrum

infrared waves

ultraviolet waves

Use a dictionary to define interact.

Section 3 Light (continued)

Waves in Empty Space

I found this information on page __________.

Properties of Light Waves

I found this information on page __________.

The Electromagnetic Spectrum

I found this information on page __________.

**Main Idea**

**Analyze** why light travels faster in empty space than when it travels through matter.

**Model** an electromagnetic wave. Draw and label both the electric and the magnetic fields, and indicate the wavelength and the direction of travel.

**Organize** information about the uses of electromagnetic waves.

<table>
<thead>
<tr>
<th>Wave Type</th>
<th>Used For</th>
</tr>
</thead>
<tbody>
<tr>
<td>radio waves</td>
<td></td>
</tr>
<tr>
<td>microwaves</td>
<td></td>
</tr>
<tr>
<td>infrared waves</td>
<td></td>
</tr>
<tr>
<td>visible light</td>
<td></td>
</tr>
<tr>
<td>ultraviolet waves</td>
<td></td>
</tr>
<tr>
<td>X rays</td>
<td></td>
</tr>
<tr>
<td>gamma rays</td>
<td></td>
</tr>
</tbody>
</table>
Sequence the path of light through the eye and organize the structures involved at each step.

<table>
<thead>
<tr>
<th>Light enters eye</th>
<th>Light waves are focused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Structures:</td>
<td>Main Structures:</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Image formed

<table>
<thead>
<tr>
<th>Main Structures:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Carries messages to brain

<table>
<thead>
<tr>
<th>Main Structures:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Summarize what determines the color of objects that emit light and what determines the color of objects that do not.

Contrast the roles of rods and cones. Complete the chart.

<table>
<thead>
<tr>
<th>Cell</th>
<th>Sensitive to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rod</td>
</tr>
<tr>
<td></td>
<td>cone</td>
</tr>
</tbody>
</table>

Synthesize It

Think of a source of electromagnetic waves, such as a radio station or a microwave oven. Describe the waves given off by the source, including their wavelength and frequency.
Tie It Together

Identify ways that sound waves, visible light waves, and other types of electromagnetic waves play a role in your daily life. For each type of wave, give an example of when the waves are useful. Identify any problems the waves can cause.

Sound Waves

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

Visible Light

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

Other Types of Electromagnetic Waves

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________
Waves, Sound, and Light
Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the chart below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Waves, Sound, and Light</th>
<th>After You Read</th>
</tr>
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<tbody>
<tr>
<td>• Waves carry both matter and energy.</td>
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<tr>
<td>• Light does not require matter to move through.</td>
<td></td>
</tr>
</tbody>
</table>

Review
Use this checklist to help you study.

☐ Review the information you included in your Foldable.
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☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It
After reading this chapter, identify three things that you have learned about waves, sound, and light.
Matter and Its Changes

Before You Read

Preview the chapter title, section titles, and section headings. Complete the chart by listing at least two ideas for each section in each column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Wendy Craig Duncan carried the Olympic flame underwater on the way to the 2000 Summer Olympics in Sydney, Australia. How many different states of matter do you think would be involved in this task? List as many as you can.

________________________
________________________
________________________
________________________
________________________
________________________
________________________
________________________
Matter and Its Changes

Section 1 Physical Properties and Changes

Scan Section 1 of your book. Write a sentence about physical properties of matter.

Review Vocabulary

Define mass to show its scientific meaning.

mass

New Vocabulary

Use your book to write a definition for each word listed below.

matter

physical change

density

states of matter

melting point

boiling point

Academic Vocabulary

Use your book or a dictionary to define identify.

identify

PS 3.1c: The motion of particles helps to explain the phases (states) of matter as well as changes from one phase to another. 3.1g: Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components. Also covered: PS 3.1a, 3.1d, 3.1e, 3.1f, 3.2a
Using Your Senses

Create a drawing below to represent the senses you use for making observations. Label each drawing with the sense it represents. Identify those senses that should not be used in the lab.

Physical Properties

Complete the statement below about physical properties.

Physical Properties of a material can be ________ ________ ________ ________

Physical Properties you observe include

1. ________ 3. ________
2. ________

Physical Properties you can measure include

1. ________ 3. ________
2. ________ 4. ________

States of Matter

Sequence the four states of matter of any substance according to its temperature by completing the blanks.

High 

Boiling point

Melting point

Low

1. ________
2. ________
3. ________
4. ________
Organize the information on metallic properties below. Each circle should include a metallic property and a description of the property. The first one has been done for you.

1. Luster—shine, or how a material reflects light
2. Ductility—
   ____________
3. ____________
4. ____________

Using Physical Properties
I found this information on page _________.

Summarize three ways that you can use the physical properties of substances by completing the blanks in the sentences below.

1. Physical properties can be used to ____________ substances.
2. Physical properties can be used to ____________ substances.
3. Physical properties can be used to ____________ substances.

Choose an object in your classroom. Write a creative description of the object, using only physical properties. Have a classmate read your description and try to identify the object you have described.
Matter and Its Changes

Section 2 Chemical Properties and Changes

Scan the title and headings in Section 2. Predict three things that might be discussed in this section.

1. ______________________________
2. ______________________________
3. ______________________________

Define the word heat as it relates to the states of matter. Use your book or a dictionary for help.

heat

Use each of the words below in an original sentence that reflects the word’s scientific meaning.

chemical property

chemical change

law of conservation of mass

React chemical property as it relates to the states of matter. Use your book or a dictionary for help.

react

Ability to Change

I found this information on page ___________.

Contrast physical properties and chemical properties. Write a summary of the differences between these properties.

Contrast physical properties and chemical properties. Write a summary of the differences between these properties.
Complete the chart as you read the section. The left column lists common chemical properties. The right column gives an example of that property. The first row of the chart has been done for you.

<table>
<thead>
<tr>
<th>Type of Chemical Property</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>Wood will burn.</td>
</tr>
<tr>
<td>Reacts with oxygen</td>
<td></td>
</tr>
<tr>
<td>Silver can tarnish.</td>
<td></td>
</tr>
<tr>
<td>A vitamin can change to another substance.</td>
<td></td>
</tr>
<tr>
<td>Reacts when heated or cooled</td>
<td>Water breaks down, or decomposes.</td>
</tr>
</tbody>
</table>

Identify six signs that a chemical change has occurred.

1. 
2. 
3. 
4. 
5. 
6. 

Something New

I found this information on page ___________.
Section 2 Chemical Properties and Changes (continued)

Main Idea

**Something New**

I found this information on page __________.

**Details**

Compare and contrast chemical changes and physical changes by completing the Venn diagram with at least five facts.

<table>
<thead>
<tr>
<th>Chemical Changes</th>
<th>Physical Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both</td>
<td></td>
</tr>
</tbody>
</table>

Create a diagram of a campfire below. Label your drawing to show the chemical change that is occurring and how mass is conserved.

**The Law of Conservation of Mass**

I found this information on page __________.

**CONNECT IT**

Give two examples of how understanding chemical properties can be useful in your daily life.

1. ____________________________________________________________

2. ____________________________________________________________

Matter and Its Changes 95
Matter and Its Changes  Chapter Wrap-Up

Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What I know</strong></td>
<td><strong>What I want to find out</strong></td>
<td><strong>What I learned</strong></td>
</tr>
</tbody>
</table>

Review

*Use this checklist to help you study.*

- Review the information you included in your Foldable.
- Study your *Science Notebook* on this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Re-read the chapter and review the charts, graphs, and illustrations.
- Review the Self Check at the end of each section.
- Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things that you have learned about matter and how it changes.
Atoms, Elements, and the Periodic Table

Before You Read

Preview the chapter title, section titles, and the section headings. List at least two ideas for each section in each column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Make a list of three questions that you think of when you see hot air balloons.

__________________________

__________________________

__________________________

__________________________

__________________________

__________________________
Name ___________________________ Date ______________

Atoms, Elements, and the Periodic Table

Section 1 Structure of Matter

Read the What You’ll Learn statements for Section 1. Write three questions that come to mind. Look for answers to each question as you read the section.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Define density to show its scientific meaning.

Write the correct vocabulary word next to each definition.

small particle that makes up most kinds of matter
uncharged particle in the nucleus of an atom
invisible, negatively charged particle
anything that has mass and takes up space
statement that matter is not created or destroyed, but only changes its form
positively charged central part of an atom
positively charged particle in the nucleus of an atom

Use a dictionary to define theory.
Section 1 Structure of Matter (continued)

**Main Idea**

**What is matter?**
What isn’t matter?

I found this information on page _________.

**What makes up matter?**

I found this information on page _________.

**Details**

State the two characteristics common to all matter.

1. ____________________________
2. ____________________________

Label each example as matter or not matter.

air __________________________ light __________________________
heat __________________________ water __________________________

Organize Democritus’s ideas about atoms. Complete the concept map.

Identify the two main ideas in Dalton’s atomic theory of matter.

1. ____________________________
2. ____________________________

Summarize Lavoisier’s experiment and the conclusion he drew from it.

Experiment: ____________________________ Conclusion: ____________________________
Compare and contrast the Thomson and Rutherford atomic models.

Create a drawing of the Bohr atom. Label the positively charged, negatively charged, and neutral parts.

Identify how the modern model of the atom differs from the Bohr model.

ANALYZE IT

Make a relative time line of atomic models. List the models from oldest to youngest. State the new discovery that was made with the development of each new model.
**Atoms, Elements, and the Periodic Table**

**Section 2 The Simplest Matter**

**Skim** the headings and subheadings in Section 2. Write three predictions about what you will learn in this section.

1. 
2. 
3. 

**Write a scientific sentence using the word mass.**

**Write the correct vocabulary term next to each definition.**

- matter made of only one kind of atom
- number of protons in the nucleus of each atom of an element
- atom of an element with a different number of neutrons
- the number of protons plus the number of neutrons in an atom
- weighted average mass of the isotopes of an element
- element that generally has a shiny luster and is a good conductor of heat and electricity
- element that is usually dull in appearance and is a poor conductor of heat and electricity
- element that has characteristics of metals and nonmetals

**Define** unique *using a dictionary.*

---

**Academic Vocabulary**

- unique
Summarize three key facts about elements.

1. 
2. 
3. 

Complete the graphic organizer to show how the periodic table is organized.

Identifying Characteristics
Label the square below with information you would find about chlorine on the periodic table. Identify each piece of information and explain what you can learn from it.
Section 2 The Simplest Matter  (continued)

Contrast the three isotopes of hydrogen. Complete the chart.

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Protium</th>
<th>Deuterium</th>
<th>Tritium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of protons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of neutrons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass number</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize the four characteristics of each type of element in the chart below.

<table>
<thead>
<tr>
<th>Metals</th>
<th>Nonmetals</th>
<th>Metalloids</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Synthesize it

Metals, nonmetals, and metalloids are located in specific areas of the periodic table. Use what you know about elements and the periodic table to explain why this is.

Name ___________________________ Date _______________

Atoms, Elements, and the Periodic Table  103
Atoms, Elements, and the Periodic Table

Section 3 Compounds and Mixtures

Scan Section 3 using the checklist below.

☐ Read all section headings.
☐ Read all bold words.
☐ Read all charts and graphs.
☐ Look at the pictures.
☐ Think about what you already know about compounds and mixtures.

Write two facts you learned about compounds and mixtures as you scanned the section.

1. ____________________________________________________________

2. ____________________________________________________________

Define formula. Then use the term in an original sentence to show its scientific meaning.

formula

Use each vocabulary term in a scientific sentence.

substance

compound

mixture

Use a dictionary to define symbol. Give an example of a symbol you have used in science.

symbol

PS 3.2b: Mixtures are physical combinations of materials and can be separated by physical means. 3.3f: There are more than 100 elements. Elements combine in a multitude of ways to produce compounds that account for all living and nonliving substances.

Also covered: PS 3.1g, 3.3g

New Vocabulary

Academic Vocabulary

104 Atoms, Elements, and the Periodic Table
Section 3 Compounds and Mixtures (continued)

**Main Idea**

**Substances**

I found this information on page __________.

**Details**

Classify the types of substances. Complete the graphic organizer by describing each type and giving two examples.

<table>
<thead>
<tr>
<th>Type: _______________</th>
<th>Type: _______________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: __________</td>
<td>Description: __________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
</tr>
<tr>
<td>Examples: ______________</td>
<td>Examples: ______________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
</tr>
</tbody>
</table>

I found this information on page __________.

Summarize what information is contained in the formula of a compound.

________________________________________________________________________

________________________________________________________________________

Analyze the formula of each compound. Identify which elements are in each compound and how many atoms of each element make up one unit of the compound.

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Hydrogen peroxide</th>
<th>Carbon dioxide</th>
<th>Carbon monoxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>H₂O</td>
<td>H₂O₂</td>
<td>CO₂</td>
<td>CO</td>
</tr>
<tr>
<td>Atoms and elements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 3 Compounds and Mixtures (continued)

**Main Idea**

**Mixtures**

I found this information on page __________.

**Details**

**Contrast** compounds and mixtures. Complete the Venn diagram with at least five facts.

![Venn diagram]

**Summarize** characteristics of homogeneous and heterogeneous mixtures.

A homogeneous mixture ____________________________.

You __________ see the individual parts. A heterogeneous mixture ____________________________.

You __________ see the individual parts.

Examples of a homogeneous mixture: ____________________________

______________________________

Examples of a heterogeneous mixture: ____________________________

______________________________

**Connect It**

Give examples of two mixtures and two compounds that are important to your everyday life.

______________________________

______________________________

______________________________

______________________________

106 Atoms, Elements, and the Periodic Table
The formulas for three substances are listed below.

- Describe the properties of each substance as thoroughly as you can.
- Identify each as an element or a compound.
- Write the number of protons in the nuclei of the element or elements in each substance.
- State whether those elements are metals, nonmetals, or metalloids, and any properties you can infer for those elements.
- Use a periodic table.

1. Water (H₂O):

2. Table salt (NaCl):

3. Gold (Au):
Atoms, Elements, and the Periodic Table

Chapter Wrap-Up

Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column. How do your ideas now compare with those you provided at the beginning of the chapter?

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
<th>L</th>
<th>What I learned</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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**SUMMARIZE IT**

After reading this chapter, identify three things that you have learned about atoms and elements.

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

108  *Atoms, Elements, and the Periodic Table*
Substances, Mixtures, and Solubility

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Substances, Mixtures, and Solubility</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Burning a substance changes it into other substances.</td>
<td></td>
</tr>
<tr>
<td>• All mixtures are solutions.</td>
<td></td>
</tr>
<tr>
<td>• Stirring can speed up the rate at which a substance dissolves.</td>
<td></td>
</tr>
<tr>
<td>• Acidic foods are sour.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Find and name four items around you that are mixtures.

--------------------------------------------------------

--------------------------------------------------------
Substances, Mixtures, and Solubility

Section 1 What is a solution?

Read the What You’ll Learn statements for Section 1. Write four questions you have after reading the statements.

1. 
2. 
3. 
4. 

Define proton to show its scientific meaning.

Proton

Write the correct vocabulary word in the left column next to each definition.

solid that comes out of its solution due to a chemical reaction

matter with the same composition and properties throughout

substance that dissolves a solute

mixture in which substances are not evenly mixed

mixture with two or more substances that are evenly mixed

substance that dissolves and seems to disappear into another substance

another name for a homogeneous mixture

Use a dictionary to define proportion to show its scientific meaning.

Proportion
Section 1 What is a solution? (continued)

**Main Idea**

**Substances**

Compare elements and compounds by completing the chart.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Element</td>
<td></td>
</tr>
<tr>
<td>Compound</td>
<td></td>
</tr>
</tbody>
</table>

Contrast physical and chemical processes. Complete the sentences.

Physical processes _______ change substances.
Chemical processes _______ change substances.

Distinguish heterogeneous and homogeneous mixtures. Place the phrases in the Venn diagram.

- not bonded chemically
- not evenly mixed
- evenly mixed

- can be physically separated
- also known as solutions

Summarize how solutions form. Define solute and solvent in your answer.

__________________________________________________________

__________________________________________________________

Substances, Mixtures, and Solubility 111
Section 1 What is a solution? (continued)

Main Idea

Contrast crystallization and precipitate formation.

Crystallization: 

Precipitate formation: 

Details

Organize examples of each type of solution.

Gaseous Solutions

Identify the solvent and solute(s) for each solution.

The air you breathe: 

Brass: 

Liquid Solutions

A jar of ocean water sits on a shelf uncovered for some time. Once the water is gone, a white, salty substance is left in the jar. Hypothesize what kind of change occurred. What does this tell you about the water?
Substances, Mixtures, and Solubility

Section 2 Solubility

Scan the headings, bold words, and illustrations in Section 2. Write two facts you learned as you scanned the section.
1. 
2. 

Define polar bond.

polar bond

Write a scientific definition for each vocabulary term.

aqueous

solubility

saturated

concentration

Use a dictionary to define chemical as an adjective.

chemical

PS 3.1b: Solubility can be affected by the nature of the solute and solvent, temperature, and pressure. The rate of solution can be affected by the size of the particles, stirring, temperature, and the amount of solute already dissolved. Also covered: PS 4.2e
Section 2  Solubility (continued)

Main Idea

Model and label a water molecule, including:
- the shared electrons in the bonds
- the partial positive and partial negative charge areas
- the hydrogen and oxygen atoms

Contrast the ways in which ionic and polar molecular compounds dissolve in water. Complete the chart.

<table>
<thead>
<tr>
<th>Type of Compound</th>
<th>How It Dissolves in Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionic</td>
<td></td>
</tr>
<tr>
<td>Polar molecular</td>
<td></td>
</tr>
</tbody>
</table>

What will dissolve?

Contrast the ways in which ionic and polar molecular compounds dissolve in water. Complete the chart.

Analyze the phrase “like dissolves like.” Summarize what this phrase means in your own words.

I found this information on page ____________.

Contrast the ways in which ionic and polar molecular compounds dissolve in water. Complete the chart.

Analyze the phrase “like dissolves like.” Summarize what this phrase means in your own words.

I found this information on page ____________.

I found this information on page ____________.

Water—The Universal Solvent

I found this information on page ____________.

What will dissolve?

I found this information on page ____________.

Analyze the phrase “like dissolves like.” Summarize what this phrase means in your own words.

Name ___________________________ Date ___________________

Substances, Mixtures, and Solubility
Section 2 Solubility (continued)

**Main Idea**

How much will dissolve?

I found this information on page __________.

Summarize how temperature affects solubility.

As temperature increases, the solubility of liquid-solid solutions usually __________ and the solubility of liquid-gas solutions usually __________.

Describe a saturated solution and tell how a solution can become supersaturated.

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

Identify three ways the rate of dissolving can be increased.

1. ____________________________________

2. ____________________________________

3. ____________________________________

Concentration

I found this information on page __________.

Summarize how adding solute changes the properties of a solvent.

________________________________________

________________________________________

**SUMMARIZE IT**

A chef slowly stirs sugar into a pot of water. Describe what happens to the solution as the water heats. What can you conclude about how long it will take the solution to boil?

________________________________________

________________________________________
Substances, Mixtures, and Solubility

Section 3 Acidic and Basic Solutions

PS 3.1a: Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points.

Predict three topics you expect to be discussed in Section 3. Read the headings and bold words to help make your prediction.

1. 
2. 
3. 

Review Vocabulary

Define physical property using your book or a dictionary.

physical property

Write an original sentence using each vocabulary term.

neutralization

pH

hydronium ion

base

indicator

Academic Vocabulary

Use a dictionary to define conduct as a verb in its scientific sense.

conduct
Section 3 Acidic and Basic Solutions (continued)

**Main Idea**

**Acids**

I found this information on page __________.

**Details**

Model and label the formation of a hydronium ion from a hydrogen ion in water.

Write a sentence explaining how hydronium forms from an acid.

I found this information on page __________.

**Organize** information about the properties of acids and some examples of acids. Complete the diagram.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
</tr>
</tbody>
</table>

**Bases**

I found this information on page __________.

**Organize** properties and examples of bases. Complete the diagram.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
<td>6.</td>
</tr>
</tbody>
</table>
Heartburn is caused by excess acid in the digestive system. Antacid tablets treat heartburn by neutralizing the acid. Explain what you can conclude about the tablets, and why.

 CONNECT IT

What is pH?
Label the diagram of the pH scale. Label the areas of the scale for acids, bases, and neutral solutions. Draw arrows showing how the strength of acids and bases increases.

Indicators
Summarize what determines the strength of acidic and basic solutions.

Neutralization
Describe the response of the indicator litmus paper in each case.

Complete the cause-and-effect chart about neutralization.

- The pH of the solution becomes more neutral.
Tie It Together

Can You Guess?

Write clues that a classmate could use to guess three substances or mixtures from everyday life. Include information about the properties and uses of the substance or mixture.

For example, if you chose vinegar, you might write:

“This is a liquid-liquid solution. It is a weak acid. It is used on salads and in other foods.”

Trade clues with a classmate and try to guess each other’s items.

1. 

2. 

3. 

Name ____________________________ Date ___________
Substances, Mixtures, and Solubility

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Substances, Mixtures, and Solubility</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Burning a substance changes it into other substances.</td>
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</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three things that you have learned that surprised you.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

120 Substances, Mixtures, and Solubility
Chemical Reactions

Before You Read

Preview the chapter title, section titles, and section headings. List at least two ideas for each section in each column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

What types of products do you think are manufactured in a chemical plant?

---

Name ___________________________ Date ________________
Chemical Reactions

Section 1 Chemical Formulas and Equations

PS 3.2c: During a chemical change, substances react in characteristic ways to form new substances with different physical and chemical properties. Also covered: PS 3.2d, 3.2e, 3.3d, 4.3a

**Skim** Section 1 of your text. Read the headings and look at the illustrations. Write three questions that come to mind.

1. 
2. 
3. 

**Review Vocabulary**

Define *atom* to show its scientific meaning.

*atom* 

**New Vocabulary**

Write the correct vocabulary term next to its definition.

- substance that exists before a chemical reaction begins
- chemical reaction that releases heat energy
- process that produces a chemical change
- chemical reaction that absorbs heat energy
- substance that forms as a result of a chemical reaction
- tells the reactants, products, physical state, and proportions of each substance in a chemical reaction

**Academic Vocabulary**

Use a dictionary to define *undergo.*

*undergo* 

Name ___________________________ Date ______________
Section 1 Chemical Formulas and Equations (continued)

**Main Idea**

**Physical or Chemical Change?**
I found this information on page ____________.

**Details**

**Compare and contrast** the two types of changes in matter by completing the chart.

<table>
<thead>
<tr>
<th>Physical Change</th>
<th>Chemical Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Examples</td>
<td></td>
</tr>
</tbody>
</table>

**Chemical Equations**
I found this information on page ____________.

**Label** the products, reactants, and subscripts in the chemical equation.

\[ \text{CH}_3\text{COOH} + \text{NaHCO}_3 \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2 \]

**Conservation of Mass**
I found this information on page ____________.

**Complete** the chart below about the chemical reaction above. Then summarize the law of conservation of mass.

<table>
<thead>
<tr>
<th>Element</th>
<th>C</th>
<th>H</th>
<th>O</th>
<th>Na</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of atoms in reactants</td>
<td>3</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Number of atoms in products</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The law of conservation of mass states that __________________________.

__________________________

__________________________

__________________________

__________________________
Complete the process of balancing the chemical equation below. First, count the number of atoms of each element in the products and the reactants to complete the chart.

\[ \text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} \]

<table>
<thead>
<tr>
<th></th>
<th>Carbon</th>
<th>Hydrogen</th>
<th>Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Products</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Balance the number of hydrogen atoms in the equation by writing the correct coefficient in front of the correct molecule. Then count and record the atoms in the new equation.

\[ \text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \_\_\_\text{H}_2\text{O} \]

<table>
<thead>
<tr>
<th></th>
<th>Carbon</th>
<th>Hydrogen</th>
<th>Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Products</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Finish balancing the equation by balancing the number of oxygen atoms in the equation.

\[ \text{CH}_4 + \_\_\_\text{O}_2 \rightarrow \text{CO}_2 + \_\_\_\text{H}_2\text{O} \]

Predict whether the reaction above is endothermic or exothermic and explain why. The energy term would appear on the right side of the equation.

**COMPARE IT** Compare the terms endothermic and exothermic.
Chemical Reactions

Section 2 Rates of Chemical Reactions

Scan the headings, bold words, and illustrations in Section 2. Write two facts that you learned as you scanned the section.

1. 
2. 

Define state of matter in a scientific sentence.

Review Vocabulary

state of matter

New Vocabulary

Write the correct vocabulary term next to its definition.

substance that slows down a chemical reaction

large protein molecule that speeds up a chemical reaction

substance that speeds up a chemical reaction without changing permanently or being used up

energy needed to start a chemical reaction

amount of a substance present in a certain volume

how fast a chemical reaction happens after it is started

Use a dictionary to define volume.

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Section 2 Rates of Chemical Reactions (continued)

**Main Idea**

**How fast? and Activation Energy—Starting a Reaction**

*Evaluate the events that occur during a chemical reaction by completing the paragraph.*

Activation energy is the ________ needed to start a(n) __________. Molecules of the reactants can then __________ with enough energy to ________ the __________ of the reactants. New bonds ________ to create the products of the reaction.

**Details**

**How fast? and Activation Energy—Starting a Reaction**

*Describe two ways that the rate of a reaction can be measured.*

Reaction rate can be found by measuring __________

**Reaction Rate**

*I found this information on page ________.*

**Complete the concept map by identifying factors that affect reaction rate.**

**Factors that Affect Reaction Rate**

- Changing the speed and energy with which molecules collide affects the reaction rate.
- The number of reactant molecules in a given volume affects the chance that molecules will collide and react.
- Only atoms in the outer layer of the reactant material can react—the number of molecules out in the open affects reaction rate.

*I found this information on page ________.*
Section 2 Rates of Chemical Reactions (continued)

**Main Idea**

**Slowing Down Reactions**
I found this information on page _______.

**Speeding Up Reactions**
I found this information on page _______.

**Details**

Summarize the information about inhibitors. Include an example.

Complete the graphic organizer about ways catalysts can work.

Catalysts can speed up reactions by

- providing _____________________.
- holding _____________________.
- reducing _____________________.

Identify four other functions that enzymes carry out in the body.

1. _____________________________.
2. _____________________________.
3. _____________________________.
4. _____________________________.

**Synthesize It**
A scientist adds 1 mg of a catalyst to a solution to speed reaction rate. How much of the catalyst will be left after the reaction occurs? Explain.
Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column. Compare your previous responses with these.

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
<th>L</th>
<th>What I learned</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

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☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about chemical reactions.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

128 Chemical Reactions
Cells—The Units of Life

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Cells—the Units of Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bacteria are the smallest organisms on Earth.</td>
<td></td>
</tr>
<tr>
<td>• All living things are made up of one or more cells.</td>
<td></td>
</tr>
<tr>
<td>• A cell’s shape and size can be related to its function.</td>
<td></td>
</tr>
<tr>
<td>• Cells are organized into systems to perform functions that keep an organism alive.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe how building blocks fit together to build a larger structure.

__________________________

__________________________

__________________________
Cells—The Units of Life

Section 1 The World of Cells

1. Living things are composed of cells. Most cells have cell membranes, genetic material, and cytoplasm. Some cells have a cell wall and/or chloroplasts. Many cells have a nucleus. Also covered: LE 1.1b

Skim through Section 1 of your text. Write three questions that come to mind.

1. 
2. 
3. 

Review Vocabulary

Use the term theory in a sentence to illustrate its scientific meaning.

theory

New Vocabulary

Use the following key terms in a sentence to reflect their scientific meanings.

bacteria

cell wall

organelle

photosynthesis

Academic Vocabulary

Define convert using a dictionary. Then use the word in a sentence to illustrate its scientific meaning.

convert

LE 1.1a: Living things are composed of cells. 1.1c Most cells have cell membranes, genetic material, and cytoplasm. Some cells have a cell wall and/or chloroplasts. Many cells have a nucleus. Also covered: LE 1.1b
Section 1 The World of Cells (continued)

**Main Idea**

Importance of Cells

I found this information on page ________.

**Details**

Summarize the three main ideas of cell theory.

<table>
<thead>
<tr>
<th>Cell Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All living things are made up of one or more cells.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

Organize information you have learned about parts of a cell.

Parts of a cell

I. The outside of the cell

A. _________________ (plants only)

   supports and ____________________________

B. cell membrane

   1. ____________________________

   2. ____________________________

II. The inside of the cell

A. ____________________________

   1. gelatin-like substance

   2. ____________________________

B. ____________________________

   1. ____________________________

   a. stores ____________________________ in chromosomes

   b. ____________________________

   2. Vacuoles store ________________, ________________, ________________, and ________________

   3. ____________________________ converts food energy into

                             ____________________________
Model an animal cell. Use your book to help you sketch an animal cell and label its parts.

- cell membrane
- cytoplasm
- nucleus
- chromosomes
- mitochondrion
- vacuole

Compare cellular respiration and photosynthesis. Label each input and output flow chart with these same five labels.

**Cellular Respiration**

**Photosynthesis**

I found this information on page ____________.
Cells—The Units of Life
Section 2 The Different Jobs of Cells

LE 1.1e: Cells are organized for more effective functioning in multicellular organisms. Levels of organization for structure and function of a multicellular organism include cells, tissues, organs, and organ systems. Also covered: LE 1.1c, 1.1d, 1.1f, 1.1g

Skim the section. Read the headings and the figure captions. Predict three topics that might be discussed in this section.

1. 
2. 
3. 

Review Vocabulary

Define organism using a dictionary.

organisms

Read the definitions below. Write the key term on the blank in the left column.

groups of similar cells that do the same type of work

different types of tissues working together

a group of organs that works together to do a certain job

New Vocabulary

Academic Vocabulary

Use a dictionary to define function. Then use the term in a scientific sentence.

functions

Name _______________________________ Date __________________

Cells—The Units of Life  133
Section 2 The Different Jobs of Cells (continued)

**Main Idea**

**Special Cells for Special Jobs**

I found this information on page ________.

**Details**

**Summarize** information from your book about human cells.

<table>
<thead>
<tr>
<th>Type of Cell</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone</td>
<td>long and have many branches to send and receive messages quickly</td>
</tr>
<tr>
<td></td>
<td>usually long and have many fibers that can contract and relax</td>
</tr>
<tr>
<td>Skin</td>
<td></td>
</tr>
<tr>
<td>Fat</td>
<td></td>
</tr>
</tbody>
</table>

**Identify 3 functions of plant cells.**

1. ________________
2. ________________
3. ________________

**Compare and Contrast** human skin cells and the cells on the outside of a plant stem. Put the statements into the Venn diagram.

- cells are flat and close together
- part of the outer layer of the organism
- cells are short and thick
- provide protection against sun and disease
- cells provide structure

<table>
<thead>
<tr>
<th>Human Skin</th>
<th>Both</th>
<th>Outer Plant Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 2 The Different Jobs of Cells (continued)

**Main Idea**

**Cell Organization**

*I found this information on page ________.*

**Organize information about cell organization by completing the outline.**

Cell organization of many-celled organisms

I. Tissues
   A. Definition: ________________________________
   B. Example: ________________________________

II. Organs
   A. Definition: ________________________________
   B. Example: ________________________________
      Specific examples of tissue system
      1. ________________________________
      2. ________________________________
      3. ________________________________

III. Organ systems
   A. Definition: ________________________________
   B. Example: ________________________________
      Specific examples of organs in system
      1. ________________________________
      2. ________________________________
      3. ________________________________

**CONNECT IT**

Create an analogy between the jobs of nerve cells and fat cells to real-life careers. For example, skin cells help protect the body, and police officers help protect people.
Cells—The Units of Life  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Cells—The Units of Life</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
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- Re-read the chapter and review the charts, graphs, and illustrations.
- Review the Self Check at the end of each section.
- Look over the Chapter Review at the end of the chapter.

Summarize it

After reading this chapter, identify three things that you have learned about cells.

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

136  Cells—The Units of Life
Support, Movement, and Responses

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Support, Movement, and Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Your skin is the largest organ of your body.</td>
<td></td>
</tr>
<tr>
<td>• No matter how still you might be, some muscles in your body are always moving.</td>
<td></td>
</tr>
<tr>
<td>• Living bone is an organ made of several different tissues.</td>
<td></td>
</tr>
<tr>
<td>• The basic working units of the nervous system are nerve cells.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Imagine for a moment that your body does not have a support system. How will you perform your daily activities? Explain your reasoning.
Support, Movement, and Responses

Section 1 The Skin

LE 1.2a: Each system is composed of organs and tissues that perform specific functions and interact with each other.
LE 1.2b: Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal.
Also covered: LE 1.2g, 1.2h, 5.1a, 5.2f

Scan the section by following the checklist below.

- Read all of the section headings.
- Read all of the bold words.
- Read all charts and graphs.
- Look at all of the pictures.
- Think about what you already know about the skin.

Write three facts that you discovered about the skin as you scanned this section.

1. 
2. 
3. 

Define organ as it relates to the body, and use it in an original sentence.

organ

Review Vocabulary

New Vocabulary

Use your book to define the following terms.

epidermis

melanin

Academic Vocabulary

Use a dictionary to define regulate.

regulate

LE 1.2a: Each system is composed of organs and tissues that perform specific functions and interact with each other.
LE 1.2b: Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal.
Also covered: LE 1.2g, 1.2h, 5.1a, 5.2f
Section 1 The Skin (continued)

**Main Idea**

**Skin Structures**

I found this information on page __________.

**Details**

Model the skin by drawing and labeling its parts.

**Skin Functions**

I found this information on page __________.

Create a graphic organizer to identify the five major functions of the skin.
Section 1 The Skin (continued)

**Main Idea**

**Skin Injuries and Repair**

*I found this information on page __________.*

**Details**

Complete the graphic organizer to identify types of skin injuries.

**Types of Skin Injuries**

- [ ]
- [ ]
- [ ]
- [ ]

- damage from exposure to harsh conditions

**Sequence** the steps involved in the formation of a bruise and its healing.

1. Red blood cells leak into tissue and release hemoglobin.
2. 
3. 
4. 
5. 
6. 

*I found this information on page __________.*
Scan the headings in Section 2. Read the headings and examine the illustrations. Write three questions that come to mind.

1. 
2. 
3. 

Define muscle using your book or a dictionary.

muscle

Use your book to define the following terms. Then write a sentence for each term.

voluntary muscle

 involuntary muscle

tendon

Use a dictionary to define voluntary.
Section 2 The Muscular System (continued)

Main Idea

Movement of the Human Body

I found this information on page _________.

Details

Compare and contrast movements of voluntary and involuntary muscles by using the terms provided to complete the Venn diagram.

- able to relax
- controlled consciously
- able to contract
- cannot control consciously

Voluntary Muscle

Both

Involuntary Muscle

Classify the types of muscle tissues in the graphic organizer.

Classification of Muscle Tissue

I found this information on page _________.

Types of Muscle Tissues

Striated

Nonstriated
Section 2  The Muscular System (continued)

Main Idea

Your Body's Simple Machines–Levers

I found this information on page __________.

Details

Model the three types of levers found in the body by providing simple drawings to illustrate the positions of the fulcrum, effort force, and load in each type.

Working Muscles

I found this information on page __________.

Complete the following paragraph about how muscles work by filling in the missing words or phrases.

Muscles work together in ______________ so that your body can move. As one muscle ______________, the other ______________.

Muscles ______________ push; they always ______________.

When the muscles on the back of your upper leg contract, they ______________ and pull your lower leg back and up. When you straighten your leg, the muscles on the back of your upper leg ______________ and lengthen, and the muscles on the front of your upper leg ______________.

Synthesize It

Explain why a runner may have difficulty walking steadily after a long race.

____________________

____________________

____________________

Support, Movement, and Responses  143
Support, Movement, and Responses
Section 3 The Skeletal System

Predict three things that will be discussed in Section 3. Read the section’s headings to help you make your predictions.

1. 
2. 
3. 

Review Vocabulary

Define skeleton.

skeleton

New Vocabulary

Find a sentence in Section 3 that includes each vocabulary term.

periosteum

cartilage

joint

ligament

Academic Vocabulary

Use a dictionary to define internal.

internal

LE 1.2a: Each system is composed of organs and tissues which perform specific functions and interact with each other. 1.2g: Locomotion, necessary to escape danger, obtain food and shelter, and reproduce, is accomplished by the interaction of the skeletal and muscular systems, and coordinated by the nervous system.
Section 3 The Skeletal System (continued)

**Main Idea**

**Functions of Your Skeletal System**

I found this information on page ________.  

**Bone Structure**

I found this information on page ________.  

---

**Details**

**Summarize** the functions of the skeletal system on the lines below.

1. ________________________________  
2. ________________________________  
3. ________________________________  
4. ________________________________  
5. ________________________________  

**Distinguish** compact bone from spongy bone by identifying a characteristic and the importance of each type of bone.

<table>
<thead>
<tr>
<th>Type of Bone</th>
<th>Characteristic</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Create** a graphic organizer to identify five characteristics of cartilage that make it important in joints.

---

Name ____________________________  Date ____________
**Main Idea**

**Bone Formation**

I found this information on page ________.

**Details**

**Compare** the roles of osteoblasts and osteoclasts in the formation and breakdown of bone tissue.

Osteoblasts


Osteoclasts


**Joints**

I found this information on page ________.

**Organize** the different types of joints in a graphic organizer:

![Joints Diagram]

**Summarize** the purpose of cartilage at joints in the human body on the lines below.


Support, Movement, and Responses

Section 4 The Nervous System

LE 1.2b: The nervous and endocrine systems interact to control and coordinate the body’s responses to changes in the environment, and to regulate growth, development, and reproduction. Hormones are chemicals produced by the endocrine system; hormones regulate many body functions. Also covered: LE 1.2a, 5.1a, 5.2f

Scan the headings in Section 3 to identify the body’s senses.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________
5. ____________________________

Define homeostasis.

homeostasis

______________________________

______________________________

Scan within the section for bold words and their meanings. Then write the correct term next to its definition.

brain and spinal cord

all of the nerves that connect the brain and spinal cord to other body parts

nerve cell

small space in which an impulse crosses from one neuron to another

Use a dictionary to define adjust.

adjust

______________________________

______________________________

Name ____________________________ Date ____________________________
Section 4 The Nervous System (continued)

How the Nervous System Works
I found this information on page __________.

Complete the graphic organizer below to illustrate how the nervous system acts as a control system for the body.

Sequence the structures of a neuron in the order in which an impulse travels.
1. __________ 2. __________ 3. __________

Organize the parts of the nervous system in this graphic organizer.

Nerve Cells
I found this information on page __________.

The Divisions of the Nervous System
I found this information on page __________.
Section 4 The Nervous System (continued)

Main Idea

Safety and the Nervous System
I found this information on page _________.

Sequence the reflex arc by tracing the path of an impulse, for example after a person touches a hot object.

The Senses
I found this information on page _________.

Drugs Affect the Nervous System
I found this information on page _________.

Identify the sensory organs and their receptors for each sense.

<table>
<thead>
<tr>
<th>Sense</th>
<th>Sensory Organ</th>
<th>Sensory Receptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize the effects of depressants and stimulants on the body.
1. Depressants ________________________________
   ________________________________
2. Stimulants ________________________________
   ________________________________

CONNECT IT
Evaluate how alcohol use could affect the ability of a person riding a bicycle.

Support, Movement, and Responses 149
Support, Movement, and Responses

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

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<tbody>
<tr>
<td>• Your skin is the largest organ of your body.</td>
<td></td>
</tr>
<tr>
<td>• No matter how still you might be, some muscles in your body are always moving.</td>
<td></td>
</tr>
<tr>
<td>• Living bone is an organ made of several different tissues.</td>
<td></td>
</tr>
<tr>
<td>• The basic working units of the nervous system are nerve cells.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three main ideas that you have learned about body systems.
Circulation

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Circulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The human heart has four chambers.</td>
<td></td>
</tr>
<tr>
<td>• Arteries are blood vessels that carry blood to the heart.</td>
<td></td>
</tr>
<tr>
<td>• Platelets are cell fragments that help fight bacteria and viruses.</td>
<td></td>
</tr>
<tr>
<td>• Lymphatic vessels are like veins in that they have valves.</td>
<td></td>
</tr>
</tbody>
</table>

Conduct the Foldable as directed at the beginning of this chapter.

Science Journal

Infer how the circulatory system provides your body with the nutrients it needs to stay healthy.

---

Circulation

151
Circulation
Section 1 The Circulatory System

Scan Section 1 of your book. Read the headings and look at the illustrations. Predict three things that will be discussed.

1. 
2. 
3. 

Define heart using your book or a dictionary.

New Vocabulary
Read the definitions below. Write the correct vocabulary terms on the blanks in the left column.

two upper chambers of the heart that contract at the same time

two lower chambers of the heart that contract at the same time

flow of blood to and from the tissues of the heart

flow of blood through the heart to the lungs and back to the heart

flow of blood from the heart to all of the organs and body tissues, except the heart and lungs, with oxygen-poor blood returning to the heart

blood vessel that carries blood away from the heart

blood vessel that carries blood back to the heart

microscopic blood vessel that connects arteries and veins

Use a dictionary to define transport as it would be used in science.
Section 1 The Circulatory System (continued)

Main Idea

**How Materials Move Through the Body**

I found this information on page _________.

Details

**Compare and contrast** diffusion and active transport by completing the Venn diagram with at least five facts.

Diffusion

Active Transport

Both

Sequence the stages in pulmonary circulation by completing the flow diagram. Include aorta, pulmonary veins, pulmonary arteries, right atrium, left atrium, and right ventricle.

I found this information on page _________.

Summarize the exchange that occurs between a systemic capillary and the tissue cells it serves.

I found this information on page _________.

Name ___________________________ Date ____________

Circulation 153
Section 1  The Circulatory System (continued)

**Main Idea**

**Blood Vessels**

I found this information on page ___________.

**Details**

**Classify** blood vessels by completing the chart.

<table>
<thead>
<tr>
<th>Blood Vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Arteries</td>
</tr>
<tr>
<td>Capillaries</td>
</tr>
<tr>
<td>Veins</td>
</tr>
</tbody>
</table>

**Blood Pressure**

I found this information on page ___________.

**Define** blood pressure and the two numbers used to measure it.

Blood pressure is _____________________________.

First number measures  
Second number measures

**CONNECT IT**

A doctor may advise a patient to make lifestyle changes to help prevent cardiovascular disease. Identify several healthful habits the doctor might suggest.

---

154  Circulation
Name _________________________   Date __________

Circulation
Section 2  Blood

LE 1.2f: The circulatory system moves substances to and from cells, where they are needed or produced, responding to changing demands. Also covered: LE 1.2a, 1.2b, 1.2j

Skim Section 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.
1. ____________________________
2. ____________________________
3. ____________________________

Define blood vessels using your book or a dictionary.

blood vessels

Use your book or a dictionary to define the following terms.

platelet

plasma

hemoglobin

Use a dictionary to define series as it would be used in science.

series
Section 2  Blood (continued)

**Functions of Blood**

I found this information on page __________.

**Parts of Blood**

I found this information on page __________.

**Blood Clotting**

I found this information on page __________.

---

Create a graphic organizer with facts about the functions of blood.

---

Summarize information about the parts of blood in the chart below.

<table>
<thead>
<tr>
<th>Parts of Blood</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma</td>
<td></td>
</tr>
<tr>
<td>Red blood cells</td>
<td></td>
</tr>
<tr>
<td>White blood cells</td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td></td>
</tr>
</tbody>
</table>

Sequence the steps in wound healing by completing the blanks.

______________ stick to the wound and release ______________
______________ . Next, ______________ forms a sticky net. The net
traps ______________ and ______________ to form a clot. The
______________ forms a ______________. Then, ______________
form under the ______________. Finally, the ______________ falls off.
Section 2 Blood (continued)

Blood Types

I found this information on page ________.

Compare and contrast the 2 sets of chemical identification tags in blood by completing the Venn diagram with at least five facts.

ABO Identification System

Both

Rh Factor

Diseases of Blood

I found this information on page ________.

Identify causes and effects of two diseases of the blood.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemia</td>
<td>lack of certain vitamins or iron in diet</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Leukemia</td>
<td></td>
</tr>
</tbody>
</table>

Almost immediately after being born, a baby received a blood transfusion of Rh⁺ blood. Predict the mother’s Rh factor. Why did the baby need a blood transfusion?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Circulation
Section 3 The Lymphatic System

LE 1.2f: The circulatory system moves substances to and from cells, where they are needed or produced, responding to changing demands. Also covered: LE 1.2a, 1.2j

**Scan the What You’ll Learn statements for Section 3 of your book. Identify three topics that will be discussed.**

1. 
2. 
3. 

**Review Vocabulary**

**Define** smooth muscles *using your book or a dictionary.*

- smooth muscles

**New Vocabulary**

**Use your book or a dictionary to define each vocabulary term. Then use the term in a sentence that shows its scientific meaning.**

- lymph

- lymphatic system

- lymphocyte

- lymph node

**Academic Vocabulary**

**Use a dictionary to define occur as it would be used in science.**
Section 3  The Lymphatic System (continued)

Main Idea

Functions of the Lymphatic System

I found this information on page __________.

Details

Define tissue fluid and describe its relationship to the lymphatic system.

I found this information on page __________.

Sequence the stages by which lymph travels through the lymphatic system.

I found this information on page __________.

Summarize how the lymphatic system transports lymph.

Discuss the role of smooth muscles and valves.

I found this information on page __________.
Section 3 The Lymphatic System (continued)

Main Idea

Lymphatic Organs
I found this information on page 

Details

Model the lymphatic system by drawing it within an outline of the human body. Indicate and label lymph nodes, lymph vessels, lymphatic duct, thoracic duct, tonsils, thymus, and spleen.

A Disease of the Lymphatic System
I found this information on page 

Summarize how HIV affects the lymphatic system.

CONNECT IT
Analyze why people who have HIV are at higher risk from the flu or pneumonia than people who are HIV-negative.

Name _____________________________ Date _________________

160 Circulation
Tie It Together

A Checklist for Health

You know that a healthy lifestyle is important for the health of your cardiovascular system.

- Work with a partner to develop a checklist of daily actions to protect your cardiovascular health.
- List actions that are beneficial and actions that should be avoided.
- Provide concrete examples.
- Then make a poster using your checklist.
Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Circulation</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>The human heart has four chambers.</td>
<td></td>
</tr>
<tr>
<td>Arteries are blood vessels that carry blood to the heart.</td>
<td></td>
</tr>
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</tr>
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<td></td>
</tr>
</tbody>
</table>

Review

*Use this checklist to help you study.*

- Review the information you included in your Foldable.
- Study your Science Notebook on this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Re-read the chapter and review the charts, graphs, and illustrations.
- Review the Self Check at the end of each section.
- Look over the Chapter Review at the end of the chapter.

**SUMMARIZE IT**

After reading this chapter, identify three main concepts that you have learned about circulation.

---

162 Circulation
Digestion, Respiration, and Excretion

Before You Read

Preview the chapter title, the section titles, and the section headings. List at least one idea for each section in each column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I know</td>
<td>What I want to find out</td>
</tr>
</tbody>
</table>

**Foldables**

Construct the Foldable as directed at the beginning of this chapter.

**Science Journal**

Write a paragraph describing what you do to help your body recover after an active game.

---

Digestion, Respiration, and Excretion 163
Digestion, Respiration, and Excretion

Section 1 The Digestive System

LE 1.2c: The digestive system consists of organs that are responsible for the mechanical and chemical breakdown of food. The breakdown process results in molecules that can be absorbed and transported to cells. Also covered: LE 1.2a, 1.2b

Scan the title and headings in Section 1. Predict three topics that might be discussed in this section.

1. 
2. 
3. 

Review Vocabulary

Write an original sentence to show the scientific meaning of the word bacteria.

bacteria

New Vocabulary

Find a sentence in Section 1 that uses each vocabulary term or a form of the term.

nutrient

enzyme

peristalsis

chyme

villi

Academic Vocabulary

Define contract as a verb using a dictionary.

contract
Section 1 The Digestive System (continued)

Main Idea

Functions of the Digestive System

I found this information on page ________.

Sequence the steps of the digestive process. Identify what occurs during each step.

Step: _________________
What happens: _________________

Step: Digestion
What happens: _________________
Chemical: _________________
Mechanical: _________________

Step: _________________
What happens: _________________

Step: _________________
What happens: _________________

Enzymes

I found this information on page ________.

Summarize how enzymes are important by completing the statements below.

Enzymes _________________ and help you digest _________________.
They are produced in _________________
__________________________.
Enzymes also are important because they _________________
__________________________ and
__________________________.
Section 1 The Digestive System (continued)

Main Idea

Organs of the Digestive System

I found this information on page __________.

Model and label the organs involved in digestion. Circle the labels of organs that are part of the digestive tract.

Details

Bacteria Are Important

I found this information on page __________.

Identify two ways bacteria in the digestive system help the body.

1. __________________________________________

2. __________________________________________

Summarize It

Suppose you eat a sandwich that provides protein, carbohydrates, and fat. Describe what happens to the sandwich as it moves through your digestive system.

_________________________________________________

_________________________________________________

_________________________________________________

_________________________________________________

166 Digestion, Respiration, and Excretion
Review Vocabulary

Define molecule to show its scientific meaning.

molecule

New Vocabulary

Use your book to define the following terms.

amino acid

carbohydrate

vitamin

mineral

Academic Vocabulary

Use a dictionary to define source. Then write an original sentence using the term.

source

Scan the illustrations in Section 2. Write three questions that come to mind. As you read, look for answers to your questions.

1. ____________________________
2. ____________________________
3. ____________________________

LE 5.2b: Foods contain a variety of substances. Each substance is vital to the survival of the organism. 5.2e: In order to maintain a balanced state, all organisms have a minimum daily intake of each type of nutrient. An imbalance in any of the nutrients might result in weight gain, weight loss, or a diseased state. Also covered: LE 5.2a, 5.2d

Digestion, Respiration, and Excretion

Section 2 Nutrition

Name ____________________________ Date ____________________________

Digestion, Respiration, and Excretion

LE 5.2b: Foods contain a variety of substances. Each substance is vital to the survival of the organism. 5.2e: In order to maintain a balanced state, all organisms have a minimum daily intake of each type of nutrient. An imbalance in any of the nutrients might result in weight gain, weight loss, or a diseased state. Also covered: LE 5.2a, 5.2d

Scan the illustrations in Section 2. Write three questions that come to mind. As you read, look for answers to your questions.

1. ____________________________
2. ____________________________
3. ____________________________

Review Vocabulary

Define molecule to show its scientific meaning.

molecule

New Vocabulary

Use your book to define the following terms.

amino acid

carbohydrate

vitamin

mineral

Academic Vocabulary

Use a dictionary to define source. Then write an original sentence using the term.

source

Digestion, Respiration, and Excretion  167
Complete the paragraph to summarize the importance of food.

Food provides __________________________. The __________________________ of food is its most important quality, but many people choose food based on __________________________ and __________________________.

Identify the 6 major classes of nutrients.
1. __________ 3. __________ 5. __________
2. __________ 4. __________ 6. __________

Summarize why proteins are important nutrients.

Organize information about the three types of carbohydrates.

<table>
<thead>
<tr>
<th>Type</th>
<th>Food Sources</th>
<th>Use in Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize four functions that fat has in the body.
1. __________________________
2. __________________________
3. __________________________
4. __________________________
Section 2 Nutrition (continued)

Main Idea

I found this information on page __________.

Distinguish **between water-soluble and fat-soluble vitamins.**

<table>
<thead>
<tr>
<th>Water-Soluble Vitamins</th>
<th>Fat-Soluble Vitamins</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Label each description with the mineral it describes.**

___________ helps clot blood and maintain strong teeth and bones.

___________ helps muscle contraction.

___________ allows oxygen to be transported by red blood cells.

Food Groups

I found this information on page __________.

**Model serving size for different food categories.**

<table>
<thead>
<tr>
<th>Group</th>
<th>Recommended Servings per Day</th>
<th>Examples of 1 Serving Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread and cereal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk, yogurt, or cheese</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat, beans, and eggs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT IT**

Plan a daily menu that provides the recommended servings from each food group. Identify some nutrients that each food in your menu provides.
Scan Section 3 using the checklist below.

☐ Read all headings.
☐ Read all bold words.
☐ Look at each illustration.
☐ Think about what you already know about breathing.

Write two predictions you have for subjects that will be covered in this section.
1. 
2. 

Define diaphragm as it relates to the respiratory system.

Define:

- diaphragm

New Vocabulary

Write the vocabulary term that matches each definition.

- tiny, thin-walled sacs at the end of bronchioles
- air-conducting tube that connects the larynx with the bronchi
- airway to which the vocal cords are attached
- two short tubes that carry air into the lungs

Read the sentence below. Analyze what coordinate means in this sentence.

Your brain coordinates the movement of the muscles in your throat, tongue, cheeks, and lips when you talk.
 Functions of the Respiratory System

I found this information on page __________.

Sequence the process of breathing and cellular respiration.

Breathing in brings oxygen into the body.

Blood ____________________________

Cells ____________________________

Cells produce carbon dioxide and water as waste.

Blood ____________________________

Breathing out ______________________

Create a drawing of the respiratory system. Label the nasal cavity, larynx, pharynx, trachea, lungs, bronchi, and alveoli.

Write a caption explaining the function of each part of the system.
Section 3 The Respiratory System (continued)

Main Idea

Why do you breathe?
I found this information on page _________.

Analyze how carbon dioxide in the blood affects breathing rate.

Model the role of the diaphragm in breathing. Make one diagram of the lungs and diaphragm for when a person inhales and one for exhaling. Use arrows to show how the lungs and diaphragm move.

Classify respiratory diseases and disorders. Complete the chart.

<table>
<thead>
<tr>
<th>Disease or Disorder</th>
<th>Cause or Contributing Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory infections</td>
<td></td>
</tr>
<tr>
<td>Chronic bronchitis</td>
<td></td>
</tr>
<tr>
<td>Lung cancer</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
</tr>
</tbody>
</table>

SYNTHESIZE IT

Describe how emphysema affects cellular respiration and cell function.

Name ___________________________ Date ____________

Digestion, Respiration, and Excretion
Digestion, Respiration, and Excretion

Section 4 The Excretory System

LE 1.2e: The excretory system functions in the disposal of dissolved waste molecules, the elimination of liquid and gaseous wastes, and the removal of excess heat energy. Also covered: 1.2a

Read the What You’ll Learn statements for Section 4. Rewrite each statement as a question. As you read, look for the answers to your questions.

1. 

2. 

3. 

Define capillary to show its scientific meaning.

capillary

Define the following terms.

nephron

ureter

bladder

Use a dictionary to define eliminate. Then rewrite the following sentence, substituting the meaning you found for the word eliminate.

You eliminate some salts when you sweat.

eliminate
Summarize the ways in which the body excretes, or removes, waste. Complete the chart to show what each body system excretes.

<table>
<thead>
<tr>
<th>Excretion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive System</td>
</tr>
<tr>
<td>Respiratory System</td>
</tr>
<tr>
<td>Skin</td>
</tr>
<tr>
<td>Urinary System</td>
</tr>
</tbody>
</table>

Analyze the importance of excretion by completing the sentence.
If the body did not excrete wastes, ________________

Summarize the function of each part of the urinary system.

- Kidneys: ____________________________
- Renal arteries: ____________________
- Renal veins: _______________________
- Ureters: __________________________
- Bladder: __________________________
- Urethra: __________________________
Section 4 The Excretory System (continued)

Main Idea

I found this information on page __________.

Sequence the steps of filtration in the kidneys.

1. Blood enters the kidneys through the renal artery.

2. 

3. 

4. 

5. 

6. The liquid left behind flows into collecting tubules and then into ureters.

Urinary Diseases and Disorders

I found this information on page __________.

Identify the effects of kidney failure.

_________________________

_________________________

_________________________

SYNTHESIZE IT

Identify effects of excretory system malfunction.

_________________________

_________________________

_________________________

_________________________
**Digestion, Respiration, and Excretion**

**Chapter Wrap-Up**

*Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column. How do your ideas compare with those you provided at the beginning of the chapter?*

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What I know</strong></td>
<td><strong>What I want to find out</strong></td>
<td><strong>What I learned</strong></td>
</tr>
</tbody>
</table>

**Review**

*Use this checklist to help you study.*

- [ ] Review the information you included in your Foldable.
- [ ] Study your *Science Notebook* on this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Re-read the chapter and review the charts, graphs, and illustrations.
- [ ] Review the Self Check at the end of each section.
- [ ] Look over the Chapter Review at the end of the chapter.

**SUMMARIZE IT**

Identify the three most important ideas from this chapter.
Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Invertebrate Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Most animals have a backbone.</td>
<td></td>
</tr>
<tr>
<td>• Animals are made up of many cells and have many different types of cells.</td>
<td></td>
</tr>
<tr>
<td>• Animals can make their own food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can digest their food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can move from place to place.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Describe similarities and differences between you and an aquatic invertebrate animal such as a nudibranch, which is a type of sea slug.

Science Journal
Invertebrate Animals

Section 1 What is an animal?

LE 1.1h: Living things are classified by shared characteristics on the cellular and organism level. In classifying organisms, biologists consider details of internal and external structures. Biological classification systems are arranged from general (kingdom) to specific (species).

Also covered: LE 1.1e, 1.1g, 1.2c, 1.2g, 5.1a, 5.1c, 5.1d, 5.1e, 5.1f, 5.1g

Preview Section 1 by reading the headings. Write three questions you have about the content of the section.

1. 
2. 
3. 

Define organelle using your book or a dictionary.

- 
- 
- 

Define the following key terms. Below each definition, copy one sentence from Section 1 of your book that uses the word. Do not copy the sentence that gives the definition.

symmetry

- 
- 
- 

invertebrate

- 
- 
- 

Use a dictionary to define indicate.

- 

Invertebrate Animals
Section 1 What is an animal? (continued)

**Main Idea**

**Animal Characteristics**
I found this information on page ________.

**Details**

**Complete** the following chart by writing a statement about each characteristic of animals.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cells</td>
<td></td>
</tr>
<tr>
<td>Nucleus and organelles</td>
<td></td>
</tr>
<tr>
<td>Obtaining energy</td>
<td></td>
</tr>
<tr>
<td>Digesting food</td>
<td></td>
</tr>
<tr>
<td>Movement</td>
<td></td>
</tr>
</tbody>
</table>

**Symmetry**
I found this information on page ________.

**Compare** forms of animal symmetry by drawing an example for each of the three types of symmetry below.

<table>
<thead>
<tr>
<th>Asymmetry</th>
<th>Bilateral Symmetry</th>
<th>Radial Symmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Invertebrate Animals 179
Section 1  What is an animal? (continued)

Classify the types of invertebrates in the chart below.

<table>
<thead>
<tr>
<th>Animal Kingdom</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Invertebrates</td>
<td></td>
</tr>
</tbody>
</table>

CONNECT IT
Design an imaginary animal species. Keep in mind the five common characteristics of animals. Give your animal species a name. Draw it and label its parts.

My animal species: ________________________________
**Invertebrate Animals**

**Section 2 Sponges, Cnidarians, Flatworms, and Roundworms**

Scan the figures in Section 2 of your book. Write three questions that come to your mind.

1. 

2. 

3. 

Define species to show its scientific meaning.

species 

New Vocabulary

Use your book to define the following key terms.

cnidarian 

polyp 

medusa 

Academic Vocabulary

Use your book or a dictionary to find two meanings for the term segment. Write both definitions below.

segment 

LE 5.1b: An organism's overall body plan and its environment determine the way that the organism carries out the life processes. Also covered: LE 1.1h, 4.a, 5.1a, 5.1d, 5.1e
Section 2  Sponges, Cnidarians, Flatworms, and Roundworms (continued)

**Main Idea**

**Sponges**

I found this information on page ________.

**Cnidarians**

I found this information on page ________.

**Details**

**Organize** the information about sponges by filling in the key information.

A. Filter feeders

B. Body support and defense

C. Sponge reproduction

**Compare** the two body forms of cnidarians by describing them in words and by drawing them in the chart below.

### Cnidarian Body Forms

<table>
<thead>
<tr>
<th>Form</th>
<th>Description</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medusa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

182  Invertebrate Animals
Sequence the main stages of reproduction in medusa forms of cnidarian, starting and ending with larva. Refer to the life cycle diagram in your book if you need help.

1. 
2. 
3. 
4. 
5. 

Compare and contrast characteristics of flatworms and roundworms by completing the chart below.

<table>
<thead>
<tr>
<th></th>
<th>Flatworms</th>
<th>Roundworms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body shape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body openings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digestive system</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Evaluate how the ability to move from place to place would give an invertebrate an advantage in getting food and reproducing.
New Vocabulary

**organ**

**mollusk**

**mantle**

**radula**

**open circulatory system**

**closed circulatory system**

**Academic Vocabulary**

**rigid**

Scan Section 3 of your textbook. Then write two facts that you learned about mollusks and segmented worms.

1. 

2. 

Define organ using your book as it applies to living organisms.

Define the following key terms.

1. 

2. 

LE 5.1a: Animals and plants have a great variety of body plans and internal structures that contribute to their ability to maintain a balanced condition. Also covered: LE 5.1b, 5.1d, 5.1g

Use a dictionary to define the word rigid.

1. 

2. 

Invertebrate Animals

Invertebrate Animals
Main Idea

Mollusks

Organize the information in your book by writing the six important characteristics of mollusks.

1. 
2. 
3. 
4. 
5. 
6. 

Types of Mollusks

Classify the three types of mollusks by completing the chart below.

<table>
<thead>
<tr>
<th>Mollusks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Where do they live?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>How many shells?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Examples</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Cephalopods

Describe the movement of a squid in water. Refer to the drawing of a balloon in your book if you need help.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Summarize the four characteristics of segmented worms below.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________

Classify types of segmented worms by completing the chart.

<table>
<thead>
<tr>
<th>Types of Segmented Worms</th>
<th>Types of Segmented Worms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Where Found</td>
</tr>
<tr>
<td>Earthworm</td>
<td></td>
</tr>
<tr>
<td>Leech</td>
<td></td>
</tr>
<tr>
<td>Marine worm</td>
<td></td>
</tr>
</tbody>
</table>

Write an account of an hour in the life of an earthworm. Include information about how the worm moves and eats.
**Invertebrate Animals**

Section 4 Arthropods and Echinoderms

Scan the illustrations in this section. Write four things you learned about arthropods and echinoderms from the illustrations.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________
4. ____________________________________________

Define regeneration using your book or a dictionary.

regeneration

---

Define the following vocabulary terms.

arthropod

appendage

exoskeleton

metamorphosis

---

Use your book or a dictionary to define inject. Use the word in a sentence about how spiders capture prey.

inject

---
Organize information from your book by filling in the web diagram with the five characteristics shared by all arthropods.

Analyze the information in your book to complete the following chart about the four types of arthropods.

<table>
<thead>
<tr>
<th>Types of Arthropods</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insects</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Arachnids</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Centipedes</strong> and <strong>millipedes</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Crustaceans</strong></td>
<td></td>
</tr>
</tbody>
</table>
Section 4 Arthropods and Echinoderms (continued)

Main Idea

I found this information on page __________.

Details

Sequence the stages of complete and incomplete metamorphosis by labeling the charts.

<table>
<thead>
<tr>
<th>Complete Metamorphosis</th>
<th>Incomplete Metamorphosis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Molt</td>
</tr>
<tr>
<td></td>
<td>Molt</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Echinoderms

I found this information on page __________.

Summarize characteristics common to echinoderms by making a list of characteristics below.

1. ______________________________________________________________________
2. ______________________________________________________________________
3. ______________________________________________________________________
4. ______________________________________________________________________

Connect It

Compare the circulatory systems of an insect and an earthworm.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
Invertebrate Animals

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Invertebrate Animals</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Most animals have a backbone.</td>
<td></td>
</tr>
<tr>
<td>• Animals are made up of many cells and have many different types of cells.</td>
<td></td>
</tr>
<tr>
<td>• Animals can make their own food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can digest their food.</td>
<td></td>
</tr>
<tr>
<td>• All animals can move from place to place.</td>
<td></td>
</tr>
</tbody>
</table>

Review

Use this checklist to help you study.

☐ Review the information you included in your Foldable.
☐ Study your Science Notebook on this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about invertebrate animals.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
Vertebrate Animals

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about animals with backbones in the first column. Then list three things that you would like to learn about them in the second column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>W</th>
<th>What I want to find out</th>
</tr>
</thead>
</table>

**Science Journal**

An eagle, a salmon, a snake, and a grizzly bear all have a backbone. List other traits these animals and humans share.

- 
- 
- 
- 
- 
- 
- 
- 
- 
-
Vertebrate Animals
Section 1 Chordate Animals

LE 5.1a: Animals and plants have a great variety of body plans and internal structures that contribute to their ability to maintain a balanced condition. Also covered: LE 1.1h, 5.1b, 5.1d, 5.1e, 5.1f, 5.1g

Skim the headings in Section 3. Then make three predictions about what you will learn.

1. 
2. 
3. 

Define Write the correct word next to each definition.

an animal without a backbone

an animal with a notochord, a nerve cord, and pharyngeal pouches sometime during development

an animal whose body temperature changes as the surrounding temperature changes

an animal whose body temperature does not change with changes in the surrounding temperature

a tough flexible tissue that is similar to bone but not as hard or brittle

Use a dictionary to define maintain.
Section 1 Chordate Animals (continued)

Main Idea

What is a chordate?

Identify and describe three characteristics of all chordates that appear at some time during their development.

<table>
<thead>
<tr>
<th>Chordates</th>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model a simple chordate by copying the sketch of the lancelet. Sketch a human next to it.

Name each human structure with the same function as the following lancelet structures.

- notochord: ___________________________
- nerve cord: _______________________
- gill slit: _______________________

Compare the characteristics that all chordates share to the characteristics that only vertebrates share.

<table>
<thead>
<tr>
<th>All Chordates</th>
<th>Only Vertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I found this information on page ____________.
Section 1 Chordate Animals (continued)

**Main Idea**

**Fish and Types of Fish**

Contrast the characteristics of bony fish, jawless fish, and cartilaginous fish by completing the diagram. Write 3–4 characteristics for each type.

<table>
<thead>
<tr>
<th>Characteristics of All Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bony Fish</th>
<th>Jawless Fish</th>
<th>Cartilaginous Fish</th>
</tr>
</thead>
</table>

**Details**

Analyze the adaptations of a typical bony fish. Use the figure in your book to help you sketch and label the fish.

**CONNECT IT**

Compare ectotherms and endotherms. Hypothesize about the advantages and disadvantages of each.
LE 4.3d: Patterns of development vary among animals. In some species the young resemble the adult, while in others they do not. Some insects and amphibians undergo metamorphosis as they mature. Also covered: LE 4.3f, 5.1a, 5.1b

**Scan** Section 1 of your book. Then write three questions that you have about amphibians and reptiles. Try to answer your questions as you read.

1. ________________________________
2. ________________________________
3. ________________________________

**Define** metamorphosis to show its scientific meaning.

**metamorphosis**

**New Vocabulary**

**Use a dictionary or your book to define each key term.**

**hibernation**

**estivation**

**amniotic egg**

**Academic Vocabulary**

**Use a dictionary to define internal.**

**internal**
Complete the prompts about amphibians.

Definition: ________________________________  ________________________________

Origin of the word amphibian: ________________________________  ________________________________

Examples: ________________________________  ________________________________

Contrast hibernation and estivation in amphibians by completing the Venn diagram with at least five facts.

Organize amphibian characteristics by listing them below.

1. ________________________________
2. ________________________________
3. ________________________________
4. ________________________________
5. ________________________________
Reptiles

Organize information about reptiles by completing the diagram.

<table>
<thead>
<tr>
<th>Turtles</th>
<th>Crocodiles and Alligators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lizards</td>
<td>Snakes</td>
</tr>
</tbody>
</table>

Summarize adaptations that are typical of reptiles by completing the chart.

<table>
<thead>
<tr>
<th>Reptile Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
</tr>
<tr>
<td>Skin</td>
</tr>
<tr>
<td>Neck</td>
</tr>
<tr>
<td>Lungs</td>
</tr>
<tr>
<td>Internal fertilization</td>
</tr>
<tr>
<td>Amniotic eggs</td>
</tr>
</tbody>
</table>

CONNECT IT

Compare and contrast amphibians and reptiles.
Vertebrate Animals
Section 3  Birds

LE 5.1b: An organism’s overall body plan and its environment determine the way that the organism carries out the life processes. Also covered: LE 5.1a, 5.1d, 5.1e

Skim the headings in Section 3. Then make 3 predictions about what you will learn.

1. ________________________________
2. ________________________________
3. ________________________________

Review Vocabulary

Define appendage to show its scientific meaning. Think of two examples of appendages.

appendage

New Vocabulary

Use your book to define and sketch each type of feather.

contour feather

down feather

Academic Vocabulary

Use a dictionary to define constant.

constant
List six characteristics of birds.

1. 
2. 
3. 
4. 
5. 
6. 

Analyze how birds are adapted for flight. Make a concept web that includes five adaptations.
### Functions of Feathers

I found this information on page ________.

### Compare and contrast contour feathers and down feathers.

List characteristics of each type of feather.

<table>
<thead>
<tr>
<th>Down Feathers</th>
<th>Contour Feathers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
</tr>
</tbody>
</table>

### Analyze at least three reasons why birds preen.

1. 
2. 
3. 

### COMPARE IT

Analyze which would be warmer: a winter coat stuffed with down feathers, or one made of woven cloth. Provide reasons to support your answer.
Vertebrate Animals
Section 4 Mammals

LE 5.1b: An organism's overall body plan and its environment determine the way that the organism carries out the life processes. Also covered: LE 4.1d, 5.1a, 5.1d, 5.1f

Skim Section 4, then write four topics about mammals that you would like to know about.

1. 
2. 
3. 
4. 

Write the correct key word next to each definition.

the arrangement of the individual parts of an object that can be divided into similar parts

plant-eating mammal with incisors specialized to cut vegetation and large, flat molars to grind it

meat-eating animal with sharp canine teeth specialized to rip and tear flesh

plant- and meat-eating animal with incisors that cut vegetables, sharp premolars that chew meat, and molars that grind food

mammal whose offspring develops inside the female's uterus; has a placenta that supplies the embryo with food and oxygen and removes waste

mammal that gives birth to incompletely developed young that finish developing in their mother's pouch

mammal that lays eggs with tough, leathery shells instead of giving birth to live young

Use a dictionary to define complex.
Organize 7 characteristics common to mammals.

1. 

2. 

3. 

4. 

5. 

6. 

7. 

Model and describe the different kinds of teeth carnivores, omnivores, and herbivores have. Use the figure in your book to help you.
### Main Idea

**Mammal Types**

*I found this information on page ______.*

---

### Details

**Classify mammals by completing the following chart.**

<table>
<thead>
<tr>
<th>Types of Mammals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Mammal</strong></td>
</tr>
<tr>
<td>Monotreme</td>
</tr>
<tr>
<td>Marsupial</td>
</tr>
<tr>
<td>Placental</td>
</tr>
</tbody>
</table>

---

### CONNECT IT

Choose a wild mammal that is native to your area. Classify it using the information you have learned. Provide two unique characteristics. Tell how it is adapted to its environment.

---

*Vertebrate Animals* 203
Vertebrate Animals  Chapter Wrap-Up

Review the ideas you listed in the K-W-L chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What I know</strong></td>
<td><strong>What I want to find out</strong></td>
<td><strong>What I learned</strong></td>
</tr>
</tbody>
</table>

After reading this chapter, identify three facts that you have learned about vertebrate animals.

---

Review
Use this checklist to help you study.

- Review the information you included in your Foldable.
- Study your Science Notebook on this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Re-read the chapter and review the charts, graphs, and illustrations.
- Review the Self Check at the end of each section.
- Look over the Chapter Review at the end of the chapter.

Summarize It
After reading this chapter, identify three facts that you have learned about vertebrate animals.

---

204  Vertebrate Animals
Plants

Before You Read

*Before you read the chapter, respond to these statements.*

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In tropical rain forests, there are more than 260,000 known plant species and probably more to be identified.</td>
<td></td>
</tr>
<tr>
<td>• Land plants’ ancestors may have been green algae that lived in the sea.</td>
<td></td>
</tr>
<tr>
<td>• Ferns and mosses produce spores rather than seeds.</td>
<td></td>
</tr>
<tr>
<td>• Paper and clothing are made from seed plants.</td>
<td></td>
</tr>
</tbody>
</table>

*Construct the Foldable as directed at the beginning of this chapter.*

**Science Journal**

Write three characteristics that you think all plants have in common.

[Blank lines for writing]
Plants
Section 1 An Overview of Plants

Skim the headings in Section 1. Then predict three facts you will learn from reading the section.
1. 
2. 
3. 

Review Vocabulary
Define the word species. Use your book or a dictionary for help.

New Vocabulary
Use your book to define the following key terms.

species 

cuticle 

cellulose 

vascular plant 

nonvascular plant 

Academic Vocabulary
Use a dictionary to define adapt to reflect its scientific meaning.

adapt 

LE 1.1h: Living things are classified by shared characteristics on the cellular and organism level. 5.1b: An organism’s overall body plan and its environment determine the way that the organism carries out the life processes. Also covered: LE 1.1c, 1.1f, 3.1a, 4.1a, 4.1b, 4.3e, 5.1a, 5.1d, 5.1g, 5.2e, 6.2c

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Section 1 An Overview of Plants (continued)

Main Idea

What is a plant?
I found this information on page _________.

Details

Summarize how plants make food by completing the concept map below. Use these terms: photosynthesis, chlorophyll, chloroplasts.

Green plant cells

contain

that make food through the process of

Origin and Evolution of Plants
I found this information on page _________.

Sequence the events in the table below. Write the oldest event at the bottom of the table and the youngest event at the top of the table.

Events

• First cone-bearing plants
• First flowering plants
• First green algae
• First land plants

(Youngest)

(Oldest)
Section 1  An Overview of Plants (continued)

Main Idea

Life on Land

I found this information on page _________.

Adaptations to Land

I found this information on page _________.

Classification of Plants

I found this information on page _________.

Details

Summarize how land plants made life possible for land animals.

Identify the four adaptations that make it possible for plants to live on land.

Complete the concept map below about plant classification.

Connect It

Suppose that you are working at a greenhouse. While at work, a child asks you, “What’s a plant?” Write a short answer to this question.
LE 5.1b: An organism’s overall body plan and its environment determine the way that the organism carries out the life processes. Also covered: 1.1c, 4.1b, 5.1d

**Skim** Section 2 of your book. Then write three questions that you have about plants. Try to answer your questions as you read.

1. 
2. 
3. 

**Define** *spore*. Use your book or a dictionary for help. Write a sentence that reflects its scientific meaning.

*spore*

**New Vocabulary**

Use your book to define the following key terms. Then use each word in a sentence that reflects its scientific meaning.

*rhizoid*

*pioneer species*

**Academic Vocabulary**

Use a dictionary to define *soil*. Write a sentence that reflects its scientific meaning.

*soil*
Section 2 Seedless Plants (continued)

**Main Idea**

Seedless Nonvascular Plants

*I found this information on page _________.*

**Details**

Organize the characteristics of seedless nonvascular plants by completing the chart below.

<table>
<thead>
<tr>
<th>Characteristics of Seedless Nonvascular Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
</tr>
<tr>
<td>8.</td>
</tr>
</tbody>
</table>

*Complete the concept map to identify examples and characteristics of seedless nonvascular plants. One example has been listed for you.*

- **Mosses**
  - spores in caps on stalks

- **Liverworts**
  - less than 2.5 cm in diameter
Section 2 Seedless Plants (continued)

Main Idea

Seedless Vascular Plants

I found this information on page _________.

Details

Compare and contrast seedless vascular plants with seedless nonvascular plants in the Venn diagram below.

Seedless vascular plants
Seedless nonvascular plants
Both

Importance of Seedless Plants

I found this information on page _________.

Summarize the importance of seedless plants in the table below.

<table>
<thead>
<tr>
<th>Importance of Seedless Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
</tr>
</tbody>
</table>

CONNECT IT

Suppose you are a naturalist working in a forest area that has recently burned in a forest fire. Summarize what you would tell visitors about seedless plants and how important they are to the forest's recovery.

Plants 211
Plants
Section 3 Seed Plants

Scan Section 3 of your book. Write three questions that come to mind as you read the headings and examine the illustrations.

1. 
2. 
3. 

Review Vocabulary

Define seed. Use your book or a dictionary for help. Then use this word in a sentence that reflects its scientific meaning.

seed

New Vocabulary

Read the definitions below. Write the correct key term on the blank in the left column. Use your book for help.

- a vascular plant that produces seeds that are not protected by fruit
- a vascular plant that flowers and produces fruit with one or more seeds
- a plant with one cotyledon inside its seeds
- a plant with two cotyledons inside its seeds

Academic Vocabulary

Use a dictionary to define annual as it applies to the length of a plant’s life.

annual
Section 3  Seed Plants (continued)

Main Idea

Characteristics of Seed Plants

I found this information on page __________.

Details

Create a cross-section of a leaf in the space below. Label and describe the purpose of six important features.

Organize the characteristics of seed plants by completing the chart below.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td></td>
</tr>
<tr>
<td>Stems</td>
<td></td>
</tr>
<tr>
<td>Roots</td>
<td></td>
</tr>
<tr>
<td>Vascular tissue</td>
<td></td>
</tr>
</tbody>
</table>
### Gymnosperms

*Complete the chart below about gymnosperms by writing about the characteristic listed in that cell.*

<table>
<thead>
<tr>
<th></th>
<th>Gymnosperms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divisions</td>
<td>Seeds</td>
</tr>
<tr>
<td>Flowers</td>
<td>Leaves</td>
</tr>
</tbody>
</table>

### Angiosperms

*Complete the chart below about angiosperms by writing about the characteristic listed in that cell.*

<table>
<thead>
<tr>
<th></th>
<th>Angiosperms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division</td>
<td>Seeds</td>
</tr>
<tr>
<td>Flowers</td>
<td>Fruits</td>
</tr>
</tbody>
</table>

### Importance of Seed Plants

*Skim your book for two uses each of gymnosperms and angiosperms.*

**Gymnosperms:**
1. 
2. 

**Angiosperms:**
1. 
2. 

---

Section 3 Seed Plants (continued)
Tie It Together

Synthesize

In the space below, draw a sketch of a tree. Label the tree’s roots, trunk, and leaves. Next to each label, write the important functions that each of these structures performs. Beneath your sketch, explain why trees are an important part of the environment.
Plants Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Plants</th>
<th>After You Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In tropical rain forests, there are more than 260,000 known plant species and probably more to be identified.</td>
<td></td>
</tr>
<tr>
<td>• Land plants’ ancestors may have been green algae that lived in the sea.</td>
<td></td>
</tr>
<tr>
<td>• Ferns and mosses produce spores rather than seeds.</td>
<td></td>
</tr>
<tr>
<td>• Paper and clothing are made from seed plants.</td>
<td></td>
</tr>
</tbody>
</table>

Review

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☐ Study the definitions of vocabulary words.
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☐ Re-read the chapter and review the charts, graphs, and illustrations.
☐ Review the Self Check at the end of each section.
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SUMMARIZE IT

After reading this chapter, identify three things that you have learned about plants.
Plant Processes

Before You Read

Before you read the chapter, respond to these statements.

1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Plant Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Plants make their own food.</td>
<td></td>
</tr>
<tr>
<td>• Plants break down food to release energy.</td>
<td></td>
</tr>
<tr>
<td>• Plant stems grow away from light.</td>
<td></td>
</tr>
<tr>
<td>• Plants have hormones that control changes in their growth.</td>
<td></td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe what would happen to life on Earth if all the green plants disappeared.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
Plant Processes

Section 1 Photosynthesis and Respiration

Scan the illustrations in Section 1. Write three questions that you have about plants. Try to answer your questions as you read.

1. 
2. 
3. 

Review Vocabulary

Define cellulose using your book. Then write a sentence to illustrate its scientific meaning.

cellulose

New Vocabulary

Use your book to define the following terms.

stomata

chlorophyll

photosynthesis

respiration

Academic Vocabulary

Use a dictionary to define release.

release

LE 5.1c: All organisms require energy to survive. Some cells use oxygen to release the energy stored in food. 6.2a: Photosynthesis is carried on by green plants and other organisms containing chlorophyll.

Also covered: LE 5.1b, 6.2b, 6.2c
**Main Idea**

**Taking In Raw Materials**

I found this information on page ________.

**Details**

**Organize** what you know about the different layers of a plant’s leaves by completing the table below.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidermis</td>
<td></td>
</tr>
<tr>
<td>Palisade layer</td>
<td></td>
</tr>
<tr>
<td>Spongy layer</td>
<td></td>
</tr>
</tbody>
</table>

**Summarize** why stomata are important structures in a plant leaf.

I found this information on page ________.

**The Food-Making Process**

I found this information on page ________.

**Complete** the equation for photosynthesis. **Identify:**

- the product that is stored as a food source
- the product made during light-dependent reactions
- the product that is released mostly as waste
- the product made during light-independent reactions

\[
6\text{CO}_2 + 6\text{H}_2\text{O} \quad \text{light energy} \quad \rightarrow \quad \text{Food source: made during} \quad \text{Waste product: made during}
\]

\[
\text{carbon dioxide} \quad \text{water}
\]
Define aerobic respiration.

Complete the equation for aerobic respiration.

\[ C_6H_{12}O_6 + 6O_2 \rightarrow \text{carbon dioxide} + \text{water} + \text{energy} \]

Compare the processes of photosynthesis and aerobic respiration by completing the table.

<table>
<thead>
<tr>
<th></th>
<th>Photosynthesis</th>
<th>Aerobic Respiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>End products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell structure in which process occurs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Create a concept map or other diagram to summarize what you learned in this section about plant structure and function.
Name __________________________ Date ____________

**Plant Processes**

**Section 2  Plant Responses**

LE 5.1a: Animals and plants have a great variety of body plans and internal structures that contribute to their ability to maintain a balanced condition. Also covered: LE 5.1b, 5.1g

**Scan Section 2. Predict three things that you will learn.**

1. ___________________________________________
2. ___________________________________________
3. ___________________________________________

**Review Vocabulary**

**Define** behavior *using your book.*

behavior

**New Vocabulary**

*Write the correct vocabulary term next to each definition. Use your book to help you.*

1. response of a plant to external stimuli, movement caused by change in growth
2. type of plant hormone that causes plant stems and leaves to exhibit positive responses to light
3. plant's response to the number of hours of daylight and darkness it receives
4. plant that generally requires short nights—less than 12 hours of darkness—to begin the flowering process
5. plant that generally requires long nights—12 or more hours of darkness—to begin the flowering process
6. plant that does not require a specific photoperiod and can begin the flowering process over a range of night lengths

**Academic Vocabulary**

*Use a dictionary to define involve.*

involve

---

*Plant Processes* 221
Section 2 Plant Responses (continued)

Main Idea

What are plant responses?

I found this information on page ____________.

Distinguish the types of stimuli as internal or external.

1. a stimulus that comes from outside the body
2. a stimulus that comes from inside the body

Tropisms

I found this information on page ____________.

Complete the table below. Identify the stimulus for each described response.

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plant stem grows faster on one side. Stem bends and twists around object.</td>
</tr>
<tr>
<td></td>
<td>Plant bends toward light. Leaves turn and absorb more light.</td>
</tr>
<tr>
<td></td>
<td>Roots grow downward. Stems grow upward.</td>
</tr>
</tbody>
</table>

Plant Hormones

I found this information on page ____________.

Compare the effects of different hormones that affect plants.

<table>
<thead>
<tr>
<th>Plant hormones</th>
</tr>
</thead>
</table>
| Ethylene  
  helps stems to grow toward light |
| Gibberellins  
  causes |
| Cytokinins  
  stimulate |
|              
  prevents seeds sprouting and buds from developing in winter, and tomatoes opening on hot days |

Plant Processes
**Main Idea**

**Plant Hormones**
* I found this information on page ________.

**Details**

Create a diagram to illustrate how auxin causes a stem to grow in response to sunlight. Write a short caption to describe where auxin is concentrated in the stem.

**Photoperiods**
* I found this information on page ________.

**Complete** the table below to show your understanding of the effects of photoperiodism on different types of plants.

<table>
<thead>
<tr>
<th>Type of Plant</th>
<th>Hours of Darkness Needed to Flower</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>need less than 12 hours</td>
<td>spinach, lettuce, and beets</td>
</tr>
<tr>
<td></td>
<td>need 12 or more hours</td>
<td>poinsettias, strawberries, and ragweed</td>
</tr>
<tr>
<td></td>
<td>do not need a specific amount of light</td>
<td>dandelions and roses</td>
</tr>
</tbody>
</table>

**CONNECT IT**

Explain plant responses you might see in plants that are growing indoors on a windowsill.

<table>
<thead>
<tr>
<th>__________</th>
<th>__________</th>
<th>__________</th>
</tr>
</thead>
</table>
Plant Processes  Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an A if you agree with the statement.
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<tr>
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<th>After You Read</th>
</tr>
</thead>
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<tr>
<td>• Plants break down food to release energy.</td>
<td></td>
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SUMMARIZE IT
After reading this chapter, identify three things that you have learned about plant processes.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Bacteria, Protists, and Fungi

Before You Read

Before you read the chapter, respond to these statements.
1. Write an A if you agree with the statement.
2. Write a D if you disagree with the statement.

<table>
<thead>
<tr>
<th>Before You Read</th>
<th>Bacteria, Protists, and Fungi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Bacteria are one-celled organisms.</td>
</tr>
<tr>
<td></td>
<td>• A healthy person should not have any bacteria living in or on their body.</td>
</tr>
<tr>
<td></td>
<td>• Algae or their products are ingredients in toothpaste and ice cream.</td>
</tr>
<tr>
<td></td>
<td>• Fungi break down organic materials, including food scraps and dead plants.</td>
</tr>
</tbody>
</table>

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Scientists have discovered some organisms are only one-celled and others are made up of many cells. List possible functions of these organisms in a pond environment.
Bacteria, Protists, and Fungi

Scan the headings in Section 1 of your book. Identify 5 topics that will be discussed.

1. 
2. 
3. 
4. 
5. 

Use disease in a sentence that shows its scientific meaning.

Read the definitions below. Write each key term on the blank in the left column.

- any organism that uses dead material as a food and energy source
- any organism that causes disease
- a chemical that limits the growth of or kills other bacteria
- a dormant form of a bacterium
- a preparation that can help prevent disease that is made from particles taken from killed bacteria
- a process that is used to kill most harmful bacteria in a food product

Use a dictionary to define internal.
Section 1 Bacteria (continued)

**Main Idea**

**Characteristics of Bacteria**

Compare and contrast the ways that bacteria obtain food.

- **Bacteria** can be
  - make food using
  - get food from

**Model** Draw the three shapes of bacteria. Identify the shape and the special name of each one. Use the figure in your book to help you.

- __________
- __________
- __________

**Types of Bacteria**

Compare how the two main groups of bacteria are classified.

<table>
<thead>
<tr>
<th>How Bacteria Are Classified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eubacteria</td>
</tr>
</tbody>
</table>

I found this information on page __________.

I found this information on page __________.
### Section 1  Bacteria (continued)

#### Bacteria and Your Health

I found this information on page __________.

#### Bacteria and the Environment

I found this information on page __________.

**Main Idea**

**Details**

**Summarize** how bacteria can affect your health.

1. ___________
2. ___________
3. ___________

**Sequence** events to describe the role of nitrogen-fixing bacteria in a food chain.

<table>
<thead>
<tr>
<th>Nitrogen Fixation in the Food Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

**SYNTHESIZE IT**

Write a short paragraph about how your view of bacteria has changed as a result of reading this section.

__________

__________

__________

__________

__________

__________

__________

__________
Bacteria, Protists, and Fungi

Section 2 Protists

LE 5.1b: An organism’s overall body plan and its environment determine the way that the organism carries out the life processes. Also covered: LE 1.1d, 4.1a, 5.1d, 5.1e

Scan the section headings. Then predict what you will learn in this section.

1. 
2. 
3. 

Review Vocabulary

Use your book or a dictionary to define parasites.

parasites


New Vocabulary

Use your book or a dictionary to define the key terms.

protist

protozoan

pseudopod

algae


Academic Vocabulary

Use a dictionary to define sphere.

sphere
Section 2  Protists (continued)

**Main Idea**

**What is a protist?**

I found this information on page _________.

**Details**

**Compare and Contrast** protists with bacteria. Write yes if the type of organism has the characteristics described below. Write no if it does not.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Protists</th>
<th>Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contain a nucleus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have a cell membrane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some are made up of many cells</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Compare and contrast** the three protist groups by inserting each characteristic listed below within the Venn diagram.

- are algae
- consumers
- contain chlorophyll
- eukaryotic
- grouped by how they move
- include water molds
- live in wet surroundings
- producers
- saprophytes or parasites
- some have pseudopods

---

**Protists**
Organize information about ways humans use protists such as algae. List three products in which algae are used.

1. 
2. 
3. 

Summarize malaria and the Irish potato famine on the lines below.

Malaria: 

Irish potato famine: 

CONNECT IT
Summarize different types and characteristics of protists.
Bacteria, Protists, and Fungi

Section 3 Fungi

LE 5.1b: An organism’s overall body plan and its environment determine the way that the organism carries out the life processes. Also covered: LE 1.1c, 4.1a, 5.1e

Scan Section 3 of your book. Write three facts that you discovered about fungi as you scanned the section.

1. 
2. 
3. 

Review Vocabulary

Use producer in a sentence that shows its scientific meaning.

producer

New Vocabulary

Define the following key terms.

hyphae

sporangia

lichen

mycorrhizae

Academic Vocabulary

Use a dictionary to define accumulate. Then use this term in a sentence that shows its scientific meaning.

accumulate
Organize information about fungi by completing the sentences below.

1. Most fungi are _______ and _______.
2. Like plant cells, fungus cells have _______.
3. Most fungi are _______, but some are _______.
4. Fungi reproduce through the production of _________.
5. Fungi grow best in _________.

Summarize the structure and function of fungi by filling in the blanks.

Hyphae are ________ tubes. The body of a fungus is usually ________. Cells in the hyphae ________ food. Sexual reproduction occurs when ________. ________ results in which ________ are produced.

Classify fungi by completing the graphic organizer below.
Section 3  Fungi (continued)

Main Idea

Fungi in the Environment
I found this information on page _________.

Fungi and Humans
I found this information on page _________.

Details

Create a sketch to show how mycorrhizae interact with plants. Describe the role of these fungi in words under your diagram.

Distinguish ways that fungi can be helpful or harmful to humans. Give a specific example of each.

<table>
<thead>
<tr>
<th>Role</th>
<th>Helpful</th>
<th>Harmful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific example</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONNECT IT

Describe how the methods fungi use to obtain food can help other organisms and the environment.

Name __________________________________________ Date ____________

234  Bacteria, Protists, and Fungi
Tie It Together

Design an Experiment

As you have learned, yeast is used to make bread. Design an experiment that involves the effect that yeast has on the production of bread. (You do not need to perform the experiment.) Your design should include these items:

• the question that you are attempting to answer by doing the experiment
• a hypothesis that you will test
• the procedure or the steps that should be followed
• the type of data you would collect
• how you will analyze the data to draw a conclusion

Question: ____________________________________________________________

Hypothesis: __________________________________________________________

Procedure: ___________________________________________________________

Data: ________________________________________________________________

Analyzing Data: ______________________________________________________

Name ___________________________ Date __________}

Bacteria, Protists, and Fungi 235
Now that you have read the chapter, think about what you have learned. Compare your previous answers to these.

1. Write an A if you agree with the statement.
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### Bacteria, Protists, and Fungi

- Bacteria are one-celled organisms.
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- Fungi break down organic materials, including food scraps and dead plants.

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### SUMMARIZE IT

After reading this chapter, list three things that you have learned about bacteria, protists, and fungi.

---

*236 Bacteria, Protists, and Fungi*