Reading Essentials

Answer Key

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To the Teacher

*Reading Essentials* is designed to help students use recognized reading strategies to improve their reading-for-information skills. Science content is presented by sections within each chapter. Each section is divided into *Before You Read*, *Read to Learn*, and *After You Read*.

In *Before You Read*, students organize their thoughts by drawing from prior knowledge or finding clues in the text about the topics that will be covered.

In *Read to Learn*, the text focuses on key science concepts. Key terms are reinforced and redefined several times after the initial introduction. *Read to Learn* contains margin features (Study Coach, Mark the Text, Foldables, Think It Over, Picture This, and Applying Math) that actively involve students in their own learning by helping them understand, organize, and reinforce new information. In-text references and corresponding margin features about each figure appear throughout the chapter, encouraging students to understand the figure and the science behind it. As students read, a reading check [insert symbol] at the end of the paragraph provides a visual clue for answering the *Reading Check* question in the margin.

*After You Read* presents a Mini Glossary featuring the key terms from the section and an activity using the terms. Additional activities help students organize, summarize, and analyze the content in the *Read to Learn* section.

*Reading Essentials* utilizes reading strategies throughout the interactive textbook. These teaching strategies are integrated into each chapter reinforcing students to actively read and helping them to organize information in a variety of ways, write about what they are learning, and access previous knowledge they may have about the subject matter. To reinforce reading strategies, the *Before You Read* and margin features initiate students into a “walk through” of each chapter, drawing their attention to the headings and paragraphs. The supporting activities help students practice basic writing skills, find main ideas, review vocabulary terms, and much more. Two reading specialists have reviewed and edited the workbook.

Teaching support for *Reading Essentials* can be found in your *Teacher Wraparound Edition*. *Reading Essentials* content follows the order in which material is presented in the *Student Edition*. Features in the *Teacher Wraparound Edition* that you may find helpful are *Science Content Background* found on the E page and F page, *Lab Demonstrations*, *Inquiry Labs*, *Make a Model*, *Use an Analogy* and *Active Reading* strategies. For many students, *Fast File Chapter Resource* pages are an excellent way to reinforce material presented in *Reading Essentials*. 

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Foldables

Foldables™ are easy-to-make, three-dimensional, interactive graphic organizers that students create out of simple sheets of paper. These unique hands-on tools for studying and reviewing were created exclusively for Glencoe by education specialist Dinah Zike.

Organizing Foldables to Make Chapter Projects

For each chapter, students use 11" × 17" paper or 12" × 18" art paper to make projects that act as portfolios for collecting student-made Foldables. These cumulative projects act as study guides and are perfect for continuing to immerse students in concepts and vocabulary as they progress through a chapter.

1. Have students write their names, date, period/class, and a main idea or a title on the front of each chapter project. Some students might choose to illustrate the cover using any of the following: original or traced illustrations or graphics, internet printouts, photocopied pictures, original photographs, newspaper articles pertaining to topic studied, or diagrams, tables, or charts.

2. Quarter sheets and half-sheets of notebook paper are used in place of 3" × 5" and 4" × 7" index cards. These small sheets of paper are inexpensive and perfect for recording terms and definitions, taking class notes and main ideas, outlining key points, making concept maps or webs, sketching diagrams or observations, and writing general information on a science person, place, or thing.

3. Three of the five projects (Bound Book Project, Half-Book Project, and Shutterfold Project) lend themselves to the use of whole sheets of notebook paper or photocopy paper. Single or multiple sheets of paper can be stapled or braided onto these projects. This allows essays and in-depth research projects to be included in chapter study guides. Or, students can glue maps, charts, tables, photocopied activity sheets, internet print-outs, and any other activities using a whole sheet of paper onto these projects.

4. The Accordion Project lends itself to vertical Foldables such as those with two, three, four, or more tabs. Two quarter sheets of notebook paper also fit on each of the four sections of this project.

   **HINT:** If you would like to place a whole sheet of paper into this project, fold it in half or into fourths and then glue the folded paper onto one of the four sections.

5. Pocket Projects are perfect for organizing and storing student work. Fold whole sheets of paper and student-made Foldables so they will fit into the two or three pockets of the chapter project. These act as portfolios for student work and notes.

6. Students can use the ideas presented in these chapters to design their own student aids and project formats. It is much easier to store and display a Foldables project than a poster board project.
Teaching Tips for Foldables

Do not ask middle school and high school students to carry glue and scissors from class to class. Instead, set up a small table or rolling cart in the back of the classroom and provide a few containers of glue, several pairs of scissors, containers of colored pencils, a stapler, and anything else the students might need.

Turn one-gallon freezer bags into student portfolios. Students can carry their portfolios in their notebooks if they place strips of two-inch clear tape along one side and punch three holes through the taped edge. Cut bottom corners off the bag so it won’t hold air and will stack and store easily.

For additional information on Dinah Zike publications (Dinah Zike’s Teaching Science with Foldables) or workshops call 1-800-99DINAH or contact www.dinah.com.

Research shows (Bransford, 1979; Corno, 1994), study strategies help students understand, organize, remember and apply new information presented in science textbooks. Some study strategies include concept mapping, highlighting, outlining, note taking, summarizing, and underlining (Peverly, Probst, Graham & Shaw, 2003).

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Chapter 1 The Nature of Science

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in The Nature of Science, have them combine their section Foldables into the following Foldables chapter project.

Use an 11 × 17 piece of paper to make a shutterfold project as shown below. Tape or glue each section’s Foldable as shown. Title the project The Nature of Science.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 5)
Answers will vary. Students might list tools and resources such as encyclopedias, books, the Internet, a scientist, a professional gardener, a magnifying glass, or a microscope.

Read to Learn
1. a. fossil (p. 6)

2. the Bering Strait (p. 6)
3. radar (p. 7)
4. to sweep away dirt without hurting anything (p. 7)

After You Read (p. 8)
1. Sentences will vary. Sample sentence: Radar is a type of technology that helps archaeologists study buried objects from ancient cultures.

2. An object is found at the site.

A scientist called an archaeologist is contacted to study the object.

Students do research to learn about their area’s history.

The expert determines if the object is an artifact from a past culture, or a piece of trash.

Hand shovels and brushes are used to uncover artifacts.

As artifacts are found, scientists take pictures or make drawings. These are used to make maps showing the exact location of each artifact.

Artifacts are carefully removed from the soil, numbered, and recorded.

All artifacts are taken to the lab, where they are cleaned, studied, and stored.

Section 2

Before You Read (p. 9)
Answers will vary. Sample answers: The sugar in the tea made it take longer to freeze. Maybe the sugar lowers the freezing temperature of water.

Read to Learn
1. Recognize the problem
2. Analyze your data
3. Draw Conclusions
4. Communicate (p. 10)
ANSWER KEY

2. Students’ responses might include books, videos, and experts in the area. (p. 10)
3. sight, smell, and touch (p. 11)
4. a statement that can be tested (p. 11)
5. Answers will vary. Sample answer: to understand what causes the results of an experiment. (p. 11)
6. the number of times he watered the plants (p. 12)
7. Sunlight was a constant factor in Ben’s experiment (p. 12)
8. plant C (p. 12)
9. He repeated the experiment. (p. 13)
10. 15.5 cm − 10.8 cm = 4.7 cm (p. 13)

After You Read (p. 14)

1. Answers will vary. Sample sentence: Some scientists use their sense of smell to make observations.

Chapter 2 Minerals

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested in each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in this chapter, have them place their section Foldables into the following Foldables chapter project.

Have students fold an 11 × 17 piece of paper into a three-fold pocket project. Students can place the Foldable from Section 1 in the first pocket labeled Minerals. Place the layered book Foldable from Section 2 in the middle pocket labeled Mineral Identification. Place the quarter sheet notes from Section 3 in the 3rd pocket labeled Uses of Minerals.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 15)

Students may include descriptive words such as shiny, many flat sides, transparent, or hard.
ANSWER KEY

Read to Learn

1. The dots in student’s boxes should be in a regular pattern, similar to the one below. (p. 16)

2. orderly pattern that repeats over and over (p. 16)

3. clear quartz on left formed in an open space; rose quartz on right formed in a tight space. (p. 17)

4. Magma is melted rock inside Earth. (p. 17)

5. Minerals dissolve in water to make a solution. When the water evaporates, crystals form. Crystals also may form when a solution contains too much of a mineral. (p. 17)

6. 25.7 percent of Earth’s crust is made up of other elements. (p. 18)

7. oxygen and silicon (p. 18)

After You Read (p. 19)

1. Students should indicate that minerals are crystals because their atoms are arranged in an orderly, repeating pattern.

2. magma cools

   atoms move closer together

   compounds form crystals

3. Student responses will vary as to whether or not this strategy was helpful.

Section 2

Before You Read (p. 20)

Students may include the idea that the gold ring is shiny, bright, a circular shape, and very valuable; while rock salt is dull-looking, with a more regular (cubic) shape, and is not as valuable.

Read to Learn

1. hardness of minerals (p. 21)

2. Answer should include three of the following: talc, gypsum, calcite, fluorite, or apatite. (p. 21)

3. It shines like a bright piece of metal. (p. 22)

4. water (p. 22)

5. It has smooth, flat layers. (p. 23)

6. circle quartz broken into jagged pieces (p. 23)

After You Read (p. 24)

1. Student responses should indicate that glass shatters into pieces of different sizes and shapes. It does not have cleavage; it fractures.

2. 1. galena; 2. hematite; 3. silver

3. Student responses will vary as to the strategy they use to remember vocabulary words.

Section 3

Before You Read (p. 25)

Student responses will vary, but may describe the stone as shiny, colorful, and light-catching.

Read to Learn

1. hardness (p. 26)

2. hematite (p. 26)

3. Students should draw another item made from aluminum such as a bicycle. (p. 26)
4. in open spaces in natural fractures or cracks, faults, surfaces between rock layers (p. 27)
5. Student answers may include that a titanium racket is lighter or less likely to break than a wood racket. (p. 27)

**After You Read (p. 28)**
1. Student responses may vary, but should suggest that precious gems are rare and beautiful and are cut to show them off in jewelry.

2. [Diagram showing gems and ores]

3. Student responses will vary, but may include the idea that discussing the text with the partner helped the student get new ideas and understand how gems and ores are used in everyday life.

**Chapter 3 Rocks**

**Dinah Zike’s Foldables™ Teaching Strategies**

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to *Dinah Zike’s Teaching Science with Foldables.*

To help students reinforce the concepts presented in Rocks, have them combine their section Foldables into the following Foldables chapter project.

Use an $11 \times 17$ or $12 \times 18$ piece of paper or cardstock to create a chapter project. Tape or glue each section’s Foldable as shown. Title the project *Rocks.*

**Optional Foldable**

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

**Section 1**

**Before You Read (p. 29)**

Students may include descriptive words such as shiny, rough, pointed, round, smooth, and hard.

**Read to Learn**

1. Student marking of the figure should follow the model of the rock cycle in Figure 2 of the student text. (p. 30)

2. Mineral material in rock is conserved as rocks change. (p. 30)

3. Hutton observed that rocks change. (p. 30)

**After You Read (p. 31)**

1. Students should indicate that rocks in the rock cycle change form as they’re acted on by weathering, heat, pressure, and cooling.
ANSWER KEY

2. Weathering
   erodes rock.
   Sediment settles and compacts forming
   sedimentary rock
   Heat and pressure turn it into
   metamorphic rock
   which is then eroded by

3. Student responses will vary depending on whether or not they found underlining a helpful strategy for learning about rocks.

Section 2

Before You Read (p. 32)
Student may describe the red color, the heat, the fire, the smoke, or other feature of an erupting volcano.

Read to Learn
1. Students should write intrusive rock somewhere under the surface by the magma and extrusive rock by the lava flow. (p. 33)
2. inside Earth’s surface (p. 33)
3. outside Earth’s surface (p. 33)
4. Student answers will vary but may include the idea that magma is hot and fiery and igneous rocks are formed from this material. (p. 34)
5. Basaltic rocks are dense and dark-colored; granitic rocks are less dense and light-colored. (p. 34)

After You Read (p. 35)
1. Student sentences should state that igneous rocks come from magma beneath Earth’s surface or from lava above it.

Section 3

Before You Read (p. 36)
Student responses should indicate that the sandwich was crushed or flattened by the weight of the object on top of it.

Read to Learn
1. Students should highlight the rocks surrounding the magma and the cracks in these rocks that liquid can flow through. (p. 37)
2. heat, pressure, and hot fluids (p. 37)
3. Foliated rock has mineral grains in parallel layers. (p. 38)
4. nonfoliated (p. 38)

After You Read (p. 39)
1. Students should describe the difference in arrangement of mineral grains in foliated and nonfoliated rock.
2. Rocks are changed into
   metamorphic rocks
   with layered mineral grains have a
   foliated texture
   with nonlayered mineral grains have a
   nonfoliated texture
   by
   pressure
   heat
   hot fluids
ANSWER KEY

3. Student responses will vary depending on whether or not they thought writing sentences was a helpful strategy for learning the information in this section.

**Section 4**

**Before You Read (p. 40)**
Student responses should indicate that the slices of bread are stuck together into a kind of solid stack.

**Read to Learn**
1. detrital, chemical, and organic (p. 41)
2. Students should color the spaces in each picture, realizing that these spaces become smaller as the sediments are compacted. (p. 41)
3. Students should trace areas between sediments where cementation is taking place. (p. 42)
4. water (p. 42)
5. conglomerate rocks (p. 42)
6. dissolved minerals (p. 43)
7. the remains of living things (p. 43)

**After You Read (p. 44)**
1. Student sentences should describe how the processes of cementation and compaction form sedimentary rocks.
2. **SEDIMENTARY ROCK** that is made from broken pieces of rock is called detrital, that is made from minerals that come out of solution is called chemical, and that is made from once-living things is called organic.
   
3. Student responses will vary.

**Chapter 4 Atmosphere**

**Dinah Zike’s Foldables™ Teaching Strategies**

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to *Dinah Zike’s Teaching Science with Foldables*.

To help students reinforce the concepts presented in Atmosphere, have them combine their section Foldables into the following Foldables chapter project.

Use 11 × 17 or 12 × 18 inch paper to make the shutterfold project. Tape or glue each section’s Foldable as shown. Title the project *Atmosphere*. The optional Foldable can be glued to the back of the project.

**Optional Foldable**

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

**Section 1**

**Before You Read (p. 45)**
Students may include descriptive words such as clouds, mist, or fog. A few students may use the word atmosphere.
ANSWER KEY

Read to Learn
1. about 1/5 (p. 46)
2. dust, salt, and pollen (p. 46)
3. the troposphere and the stratosphere (p. 47)
4. the troposphere (p. 47)
5. the thermosphere (p. 48)
6. Boise (p. 48)
7. because they are denser (p. 49)
8. Answers may vary between 400 and 450 milliliters. (p. 49)
9. because some layers have gases that easily absorb the Sun’s energy, and other layers do not (p. 50)
10. increases (p. 50)
11. heat from Earth’s surface (p. 50)
12. the Sun’s harmful ultraviolet rays (p. 51)
13. by leaking from appliances or CFCs can escape if they are not properly disposed of (p. 51)
14. in the atmosphere over Antarctica (p. 51)

After You Read (p. 52)
1. Student responses should include the idea that the ozone layer protects us from the Sun’s harmful energy, ultraviolet radiation.
2. Answers in blanks are: exosphere, thermosphere, mesosphere, stratosphere, troposphere

Section 2

Before You Read (p. 53)
Students may include descriptive words such as warm, hot, burning, nice.

Read to Learn
1. Most of the Sun’s energy is absorbed by Earth’s surface. (p. 53)
2. Cooler, denser air sinks. Warmer, less dense air rises. (p. 54)
3. Students should circle precipitation and write the term in the space provided. (p. 55)
4. condensation (p. 55)

After You Read (p. 56)
1. Answers will vary but should include one of the following: Conduction takes place when molecules bump into each other and energy is transferred. Radiation is energy that is transferred from the Sun to Earth in the form of rays or waves. Convection takes place after the atmosphere has already been warmed by radiation or conduction. In convection, energy is transferred by the flow of material.
2. Sun’s energy causes water to change to water vapor. Water vapor turns back into water in process called condensation. Water droplets come together in clouds and form larger drops. Water drops fall to earth as precipitation.
3. Student responses should indicate that highlighting the main points and details will help them remember important words and ideas that will most likely be covered on a test.

Section 3

Before You Read (p. 57)
Students may include such descriptive words as strong, cold, gusty, windy, chilly, warm, north, and so on.
ANSWER KEY

Read to Learn
1. the Coriolis effect (p. 58)
2. Winds turn to their right north of the equator. (p. 58)
3. doldrums (p. 58)
4. trade winds (p. 59)
5. Trade winds move sailing ships along quickly. (p. 59)
6. jet streams (p. 60)
7. Students should trace the arrow showing direction of the jet stream. The jet stream moves west to east. (p. 60)
8. Jets flying from east to west would be flying against the direction of wind in the jet stream and this would slow them down. (p. 60)
9. The warm air is rising. (p. 61)
10. convection currents (p. 61)

After You Read (p. 62)
1. Student responses should include the main ideas of whatever definition they chose to restate.
2. Sea Breeze: warmer air, cooler air, Land Breeze: warmer air, cooler air
3. The equator is closest to the Sun and therefore receives most of Sun’s heat. The Polar regions are farthest away and receive the least amount of Sun’s rays and heat.

Chapter 5 Weather

Dinah Zike’s Foldables™ Teaching Strategies
Have students create the Foldables suggested in each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Weather, have them place their section Foldables into the following Foldables project.
Use one sheet of 11 × 17 or 12 × 18 paper to make a Folded Project. Tape or glue each section’s Foldable as shown. Section 3 Foldable can be attached to the back of the project. Title the project Weather.

Optional Foldable
You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 63)
Kites whip around in the wind and move as the wind moves them.

Read to Learn
1. rapidly (p. 64)
2. Figure on left side—low pressure; on right side—high pressure. (p. 64)
3. Choose one: wind vane points toward the wind; wind sock fills and points toward the wind. (p. 65)
4. Students should circle the figure on the right. (p. 65)
**ANSWER KEY**

5. dew point (p. 66)
6. Students should trace arrows showing moist warm air rising. (p. 66)
7. stratus, cumulus, cirrus (p. 67)
8. cumulonimbus (p. 67)
9. Students should circle raindrops, snowflakes, ice, and hail. (p. 68)

**After You Read (p. 69)**
1. Student responses should demonstrate that they understand the concepts of weather and terms like humidity and precipitation.
2. Warm moist air rises, expands, and cools. Water vapor condenses into tiny droplets. Droplets suspend in the air, forming clouds. Three types of clouds are stratus, cumulus, and cirrus. Four kinds of precipitation come from clouds: rain, snow, sleet, and hail.
3. Student responses will vary as to whether or not working with a partner was helpful.

**Section 2**

**Before You Read (p. 70)**
Basement air is usually cooler. Temperature in an attic is usually hotter.

**Read to Learn**
1. stormy weather (p. 71)
2. Students should color the arrow showing cold air movement in the cold front blue and color the arrow showing warm air movement in the warm front red. (p. 71)
3. Students should color arrows red showing warm air closed off from Earth. (p. 72)
4. Students should circle area in between cold air and warm air. (p. 72)

5. by colliding with other water droplets as they fall (p. 73)
6. air movement (p. 73)
7. tornado (p. 74)
8. Students should trace over the updraft. (p. 74)
9. Students should circle F3. (p. 75)
10. typhoons, cyclones (p. 75)
11. Students should highlight counterclockwise arrows. (p. 76)
12. The weather is not dangerous yet, but may be soon. (p. 76)

**After You Read (p. 77)**
1. Student answers should demonstrate that they understand that hurricanes gain strength from the heat of warm ocean water.
2. cold front
   - Cold air goes under warm air. Warm air is lifted.
   - 3 air masses: cold, cool, warm
   - Warm air closed off from Earth.
stationary front
   - Neither warm nor cold air is moving.
   - Lighter, warmer air moves over cold air.
occulted front
   - 3 air masses: cold, cool, warm
   - Warm air closed off from Earth.
3. Student answers will vary as to whether the study strategy helped them learn the concepts in the section.

**Section 3**

**Before You Read (p. 78)**
clouds, wind, humid feel to weather, what weather was like that day, patterns

**Read to Learn**
1. weather conditions at a specific location (p. 79)
2. Students should circle the low pressure area by Portland in the northwest part of the map. (p. 79)
ANSWER KEY

After You Read (p. 80)

1. An isobar connects two places with same atmospheric pressure; an isotherm connects two places with the same temperature.

2. First
   - gathers data on weather conditions

   Second
   - makes weather maps

   Third
   - forecasts weather

Chapter 6 Climate

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested in each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in this chapter, have them place their section Foldables into the following Foldables three-pocket chapter project.

Use a sheet of 11 × 17 or 12 × 18 paper as the base. Place each section’s Foldable as shown. Title the project Climate.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activity page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 81)

Student answers will vary but may describe their climate as warm, cold, sunny, or rainy.

Read to Learn

1. Large bodies of water absorb and give off heat. (p. 82)

2. Student responses will vary depending on their location. (p. 82)

3. Mountain air contains fewer molecules that absorb heat. (p. 83)

4. the dry side (p. 83)

After You Read (p. 84)

1. Student responses will vary but should demonstrate that they understand the concept that the polar climate zones receive the least amount of solar radiation on Earth and tropical climate zones receive the greatest amount of solar radiation.

2. How Mountains Affect Climate

   First
   - Moist air flows toward a mountain and is forced upward, where it cools.

   Second
   - The cool air releases moisture as rain or snow on the windward side of the mountain.

   Third
   - The dry air passes over the mountain to the leeward side.

   Fourth
   - The dry air flows down the leeward side of the mountain and heats up.

3. Student responses will vary.
ANSWER KEY

Section 2

Before You Read (p. 85)
Student answers will vary but may state that they would wear lightweight clothing, use an air conditioner a lot, or drink a lot of cold drinks.

Read to Learn
1. Students should label their region of the map and correctly correlate it with the climate type as shown in the legend. (p. 86)
2. Student responses will vary but may mention the fur or claws on a dog or cat; beak shape on a bird. (p. 87)
3. Animal body processes slow down during estivation. (p. 87)
4. Students should trace the curled-up lungfish in the mud. (p. 87)

After You Read (p. 88)
1. Student responses will vary but should demonstrate that they understand that hibernation is a behavioral adaptation. They might name rodents or bears as an example of an animal that hibernates.

2. Adaptation

   Behavioral Adaptations
   hibernation, estivation

   Structural Adaptations
   fur, claws, beak

3. Student responses will vary as to whether or not highlighting helped them.

Section 3

Before You Read (p. 89)
Student responses will vary but may state that they could not be as active because it is too hot.

Read to Learn
1. Students should highlight the different tilt of the axis for each season. (p. 90)
2. northern hemisphere (p. 90)
3. east to west (p. 91)
4. Fossils from plants or animals usually found in warm climates are sometimes seen at the poles. (p. 91)
5. $15,000 - 11,500$ years $= 3,500$ years to next ice age. (p. 92)
6. Solid particles and liquid droplets enter the atmosphere and block the Sun. (p. 92)
7. east to west (p. 93)
8. Europe might have been warmer than usual. (p. 93)
9. about $3^\circ$ (p. 94)
10. many factors (p. 94)
11. Students should circle the arrows showing heat being deflected down toward Earth. (p. 95)
12. global warming (p. 95)
13. carbon dioxide (p. 96)
14. Student responses may vary but may state they can recycle paper so fewer trees are cut; plant more trees on deforested areas. (p. 96)
15. Students should circle the smokestack emissions from the factory. (p. 97)
16. carbon dioxide (p. 97)

After You Read (p. 98)
1. Student responses will vary but should demonstrate that they understand that carbon dioxide is a greenhouse gas that traps heat near Earth’s surface. So, as more of it is put in the atmosphere, more heat will be trapped and the warmer the climate will get.
Chapter 7 Earth in Space

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Earth in Space, have them combine their section Foldables into the following Foldables chapter project.

Use an 11 × 17 piece of paper as the base. Tape or glue each Foldable as shown.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 99)

Students’ answers will vary, but look for any misconceptions about Earth and its movement through space. You may wish to address these later.

Read to Learn

1. gravity (p. 100)
2. 12,756 km − 12,714 km = 42 km (p. 100)
3. 365 1/4 days (p. 101)
4. because it is tilted on its axis (p. 102)
5. b (p. 102)
6. winter solstice (p. 103)
7. Students should draw an arrow pointing to Earth at winter solstice for the northern hemisphere. (p. 103)

After You Read (p. 104)

1. Students’ answers will vary. Sample sentence: As Earth orbits the Sun, it rotates on its axis.
2. Earth’s revolution takes 365 1/4 days.
3. Student responses will vary. Allow volunteers to share their outlining processes with the class. You might want to use this opportunity to review outlining procedures with the students.
ANSWER KEY

Section 2

Before You Read (p. 105)

Students’ answers will vary. Look for facts about the Moon’s surface, interior, and place in space.

Read to Learn

1. meteorites striking its surface (p. 106)
2. core, non-rigid mantle, rigid mantle, and crust (p. 106)
3. the mantle and the crust (p. 107)
4. The same side always faces Earth. (p. 107)
5. It reflects sunlight. (p. 108)
6. Students should highlight the right side of each figure of the Moon. (p. 108)
7. less and less of the lighted side can be seen (p. 109)
8. Students should circle the figure marked “Day 29 1/2 New moon again.” (p. 109)
9. Students should circle the darkest area of shadow on Earth. (p. 110)
10. the Earth casts a larger shadow than the Moon (p. 111)
11. c (p. 111)

After You Read (p. 112)

1. Students’ answers will vary but should show an understanding of the chosen term.
2. Students’ answers will vary, but should indicate how the flash cards helped with understanding the section’s concepts. Another possible study strategy might be to highlight the main idea in each section.

Section 3

Before You Read (p. 113)

Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto

Read to Learn

1. Mercury, Venus, Earth, and Mars (p. 114)
2. sulfuric acid (p. 114)
3. They allow water to exist as a solid, liquid, and gas. (p. 115)
4. rocky and rugged (p. 115)
5. the Great Red Spot (p. 116)
6. It has seven major ring divisions around it. (p. 116)
7. methane (p. 117)
8. It is so close to Pluto that it can’t be seen with ground-based telescopes. (p. 117)
9. the asteroid belt (p. 118)
10. Heat from the Sun causes some of the ice in a comet to vaporize. (p. 118)
11. The inner part’s conditions caused small, solid planets to form and the outer part’s conditions caused giant gaseous planets to form. (p. 119)
12. the origin of the solar system (p. 119)

After You Read (p. 120)

1. Answers will vary. Students should show a comparison between the two chosen terms.
ANSWER KEY

2. Student responses will vary. You might want to ask volunteers to share one of their questions with the class.

Chapter 8 Life’s Structure and Classification

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Life’s Structure and Classification, have them combine their section Foldables into the following Foldables chapter project.

Use an 11\(\times\)17 piece of construction paper or cardstock to make an accordion fold. Tape or glue each section’s Foldable as shown. Foldable E should be attached to the back of the project.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 121)

Answers may include: learned to walk, talk, dress myself, and feed myself. Accept any appropriate responses.

Read to Learn

1. changes to organisms as they grow (p. 122)
2. Homeostasis regulates an organism’s internal condition despite changes in its environment. (p. 122)
3. to allow a species to continue by replacing individuals that die (p. 123)
4. through its roots (p. 123)

After You Read (p. 124)

1. Possible answer: A cell is the smallest unit of an organism that carries on the functions of life.
2. 

<table>
<thead>
<tr>
<th>What All Organisms Have in Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. organized into cells</td>
</tr>
<tr>
<td>2. grow and develop</td>
</tr>
<tr>
<td>3. reproduce</td>
</tr>
<tr>
<td>4. use energy</td>
</tr>
<tr>
<td>5. need a place to live, water, and food</td>
</tr>
<tr>
<td>6. maintain homeostasis</td>
</tr>
<tr>
<td>7. respond to stimuli</td>
</tr>
</tbody>
</table>
ANSWER KEY

Section 2

Before You Read (p. 125)
Students’ answers will vary for the make and model of three cars. Two other ways to classify cars are by size and color.

Read to Learn
1. Students circle the stripes on the salamander. (p. 126)
2. scientific names help avoid mistakes; organisms with similar evolutionary histories are classified together; describes a species; allows information about organisms to be organized easily and efficiently (p. 126)
3. family: delphinidae; class: mammalia. (p. 127)
4. Common name: deer mouse; scientific name: Peromyscus maniculatus. (p. 127)

After You Read (p. 128)
1. Possible answer: Genus is a classification group of similar species. Kingdom is the largest classification group.

2.

<table>
<thead>
<tr>
<th>1. Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Phylum</td>
</tr>
<tr>
<td>3. Class</td>
</tr>
<tr>
<td>4. Order</td>
</tr>
<tr>
<td>5. Family</td>
</tr>
<tr>
<td>6. Genus</td>
</tr>
<tr>
<td>7. Species</td>
</tr>
</tbody>
</table>

Read to Learn
1. Answers may include that scientists could now view microscopic organisms and could begin to understand that living things are made of cells. (p. 129)
2. every cell came from a cell that already existed (p. 130)
3. Student should circle cell membranes, hereditary material, and ribosomes. (p. 130)
4. Lignin makes cell walls rigid. (p. 131)
5. the framework in cytoplasm which helps the cell keep or change its shape (p. 131)
6. Students should circle cell wall, central vacuole, and chloroplast. (p. 132)
7. ribosomes (p. 132)
8. to direct all cell activities (p. 133)
9. because muscle cells are more active (p. 133)
10. Students highlight the heart and blood vessels. (p. 134)

After You Read (p. 135)
1. A sample answer could be any of the following: cell membrane, cell wall, chloroplast, cytoplasm, endoplasmic reticulum, Golgi bodies, mitochondria, nucleus, organelle, or ribosome and a sentence that explains its function.
2. 1. cell; 2. tissue; 3. organ; 4. organ system

Section 3

Before You Read (p. 129)
A sample answer would be: door: allow people to go in and out; classroom: place where students learn; gym: place where students play sports; lunch room: where students eat meals.

Section 4

Before You Read (p. 136)
Methods for preventing diseases may include washing their hands, staying away from people with contagious diseases, getting vaccines, eating healthy, keeping a healthy weight, exercising, and taking vitamins.
**ANSWER KEY**

**Read to Learn**

1. New viruses are released as the host cell bursts open and is destroyed. (p. 137)
2. The hereditary material of the virus is copied. (p. 137)
3. A virus can be carried by the wind or be inhaled. (p. 138)
4. Weakened virus particles (p. 138)
5. To find a cure for cancer (p. 139)
6. \(37,100,000 - 18,500,000 = 18,600,000\) (p. 139)

**After You Read (p. 140)**

1. An example would be: “A virus can be carried by the wind to plant cells or inhaled by animals.”
2. For example, students may choose: “What happens when a virus is latent?” The answer would be its hereditary material becomes part of the cell’s hereditary material. As the host cell reproduces, the hereditary material of the virus is copied. At any time, something can make the virus active.
3. Students may state that writing a question for each paragraph helped them learn the material because they had to read the text carefully to find the answers.

**Chapter 9 Cell Processes**

**Dinah Zike’s Foldables™ Teaching Strategies**

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to *Dinah Zike’s Teaching Science with Foldables.*

To help students reinforce the concepts presented in Cell Processes, have them combine their section Foldables into the following Foldables chapter project.

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**Optional Foldable**

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

**Section 1**

**Before You Read (p. 141)**

Students should include items such as desk, chair, wall, and people. One thing they have in common is that they are made up of matter.

**Read to Learn**

1. Students highlight the electrons, and circle the nucleus containing the protons and neutrons. (p. 142)
2. Oxygen and hydrogen (p. 142)
3. 2 hydrogen atoms + 1 oxygen atom = water (p. 143)
4. Neutral compounds formed when ions of opposite charges attract each other (p. 143)
ANSWER KEY

5. Students may include mixtures such as oil and vinegar salad dressing or potting soil and peat moss. (p. 144)

6. carbon and hydrogen (p. 144)

7. a. carbohydrates; b. carbon, hydrogen, oxygen (p. 145)

8. water (p. 146)

9. inside (p. 146)

After You Read (p. 147)

1. Students write a sentence that explains the difference between organic and inorganic compounds. A sample would be: “Organic compounds have carbon and hydrogen atoms and are found in all living things, while inorganic compounds are made of elements other than carbon and are found in both living and nonliving things.”

2. Students choose one of the question heads and write an answer to the question. For example, students may choose: “What makes up matter?” The answer would be that matter is made up of atoms.

3. Students explain how underlining main ideas helped them understand what they read.

Section 2

Before You Read (p. 148)

Students should note that window screens let some substances such as air move in and out of a room, while keeping other substances such as bugs out of the room.

Read to Learn

1. Diffusions keep molecules moving until equilibrium is reached. (p. 149)

2. Students use the figure to explain to a partner how diffusion works. (p. 149)

3. help substances move through the cell membrane (p. 150)

4. because more water leaves the plant’s cells than enters them (p. 150)

5. cellular energy (p. 151)

6. The contents of a vesicle are moved outside a cell. (p. 151)

After You Read (p. 152)

1. Students choose a term that explains how substances move into and out of a cell (diffusion, osmosis, active transport, endocytosis, and exocytosis) and write a sentence explaining how the process works.

2. Active Transport

Passive Transport

Both Active and Passive Transport

Both Active and Passive Transport

Both Active and Passive Transport

Section 3

Before You Read (p. 153)

Students’ ideas may include that food provides energy to the body or that food helps a body grow and stay strong.

Read to Learn

1. The enzyme is not changed. (p. 153)

2. Students circle light energy, carbon dioxide, and water. (p. 154)

3. for growth, for keeping up cells and for reproduction (p. 155)

4. Students should note that nonliving things do not eat food and therefore do not need to break down food to release energy. (p. 155)
5. lactic acid, alcohol, and carbon dioxide (p. 156)
6. carbon dioxide and alcohol (p. 156)
7. (p. 157)

To help students reinforce the concepts presented in Cell Reproduction, have them combine their section Foldables into the following Foldables chapter project.

Use an 11 × 17 piece of construction paper or cardstock to make an accordion fold. Tape or glue each section’s Foldable as shown.

**Optional Foldable**

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

### Section 1

**Before You Read (p. 159)**

Students’ lists should include five living things such as dogs, cats, plants, trees, and people. One thing they have in common is that they are all made up of cells.

**Read to Learn**

1. Students draw an outline around the portion of the circle that shows interphase. Approximately 80 percent of the cell cycle is interphase. (p. 160)
2. Students circle the centromere. (p. 161)
3. The centrioles move to opposite ends of the cell. (p. 161)
ANSWER KEY

4. Students highlight the chromosomes in each phase of mitosis and explain to a partner what is happening to the chromosomes. (p. 162)

5. a cell plate (p. 162)

6. Students use the figure to calculate the following: (p. 163)
\[
\frac{23}{2} \times 2 = \frac{46}{(\text{No. of chromosome pairs})} \times 2 = \frac{46}{(\text{No. of chromosomes})}
\]

7. to allow growth and to replace worn out or damaged cells (p. 163)

8. one organism (p. 164)

9. In budding a new organism grows from the body of its parent until it is large enough to break away and live on its own. (p. 164)

After You Read (p. 165)

1. Students write a sentence using an example to explain mitosis. For example, “Skin cells in the human body use mitosis to create new skin cells.”

Read to Learn

1. two (p. 167)

2. Each chromosome in a cell is copied. (p. 167)

3. In metaphase I, the centromere of each chromatid pair attaches to one spindle fiber. In metaphase II, the centromere of each chromatid pair attaches to two spindle fibers. (p. 168)

4. The organism usually does not grow normally. (p. 168)

After You Read (p. 169)

1. Students choose the terms that explain the process of sexual reproduction (sperm, eggs, fertilization, zygote) and write one or two sentences explaining how it works. A sample would be: “Sexual reproduction occurs when a sperm and an egg come together in fertilization. The cell that forms from fertilization is called a zygote.”

2. Students explain how the journal entries help them understand sexual reproduction and meiosis.

Before You Read (p. 166)

Students should explain that they are different from anyone else in the class because, unless they are an identical twin, they have a different genetic makeup. They may also note that everyone has different experiences that help form unique identities.
ANSWER KEY

Section 3

Before You Read (p. 170)
Students may say that DNA is used to identify people who have committed crimes or to identify bodies of crime victims.

Read to Learn
1. by letters (p. 170)
2. She discovered that DNA is two chains of molecules (p. 171)
3. Students write a quiz question. An example would be: “In which step do new base pairs form?” The answer to this question is Step 2. (p. 171)
4. Genes instruct the cell to make certain proteins. (p. 172)
5. A, U (p. 172)
6. a permanent change in the DNA sequence of a gene or chromosome of a cell (p. 173)

After You Read (p. 174)
1. Students write a short paragraph explaining how DNA and RNA are different. For example, DNA and RNA have different structures, are made up of different sugars, and have one nitrogen base that is different. DNA is built like a ladder with rungs. Each side of the ladder is made up of sugar-phosphate molecules. The sugar in each molecule is called deoxyribose. The four nitrogen bases found in DNA are adenine, guanine, cytosine, and thymine. RNA looks like a ladder with its rungs sawed in half. The sugar in the sugar-phosphate molecules is ribose. RNA has the base uracil instead of thymine.
2. From left to right the missing letters should be: C, C, A, G, T, T, A.

Chapter 11 Heredity

Dinah Zike’s Foldables™ Teaching Strategies
Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Heredity, have them combine their section Foldables into the following Foldables chapter project.

Use an 11 × 17 piece of construction paper or cardstock to create a half book. Tape or glue each section’s Foldable as shown.

Optional Foldable
You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 175)
Students should list four ways in which a child looks like a parent such as same hair color, similar eyes, same nose, or same height.

Read to Learn
1. the study of how traits are inherited through the interactions of alleles (p. 175)
2. Students circle the two egg cells and the two sperm cells. (p. 176)

3. Mendel studied one trait at a time. Other scientists studied many traits at one time. (p. 176)

4. 7 (p. 177)

5. as a capital letter (p. 178)

6. Homozygous: two alleles that are the same for a trait; heterozygous: two different alleles for a trait (p. 178)

7. Students shade the two bb squares. (p. 179)

8. alleles on the chromosomes (p. 179)

After You Read (p. 180)

1. Students write a sentence that explains the difference between a dominant allele and a recessive allele. A sample answer would be: “A dominant allele is a form of a trait that covers up a recessive allele.”

2. 
<table>
<thead>
<tr>
<th></th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Dd</td>
</tr>
<tr>
<td>d</td>
<td>Dd</td>
</tr>
</tbody>
</table>

3. Students may respond that it helps to anticipate the ways that different people word questions.

Section 2

Before You Read (p. 181)

Students may indicate that a pedigree shows the animal’s background and ancestry.

Read to Learn

1. AB, AA, AO, BB, BO, OO (p. 182)

2. temperature, amount of light, amount of rainfall, nutrients in the soil, or pollution (p. 182)

3. Both parents pass the recessive allele to the child. (p. 183)

4. color blindness (p. 183)

5. Both parents must carry an allele for this disorder. The grandmother is not a carrier of this trait. (p. 184)

6. Students’ conclusions will vary. A pedigree will list traits that may be desirable to breed or to avoid breeding. (p. 184)

After You Read (p. 185)

1. Students choose a term that explains one of the ways traits can be inherited. A sample answer would be: “When the offspring of two homozygous parents show an intermediate phenotype, this inheritance is incomplete dominance. Neither allele is dominant.”

2. Students choose one of the question heads and write an answer to the question. For example, students may chose “What are multiple alleles?” The answer would be that a trait controlled by multiple alleles will produce three or more phenotypes of that trait.

3. Students list the words they circled and write a definition of one of them. Make sure students have a clear understanding of these new words.

Section 3

Before You Read (p. 186)

Students’ ideas may include information they have heard or read about advances in medical research.

Read to Learn

1. abnormal alleles (p. 187)

2. Students use the figure to explain gene therapy to a partner. (p. 187)
After You Read (p. 188)

1. Students write a sentence to explain how genetic engineering is being used to improve crop plants. A sample answer would be: “Genetic engineering inserts desired traits in crop plants.”

2.

Chapter 12 Adaptations over Time

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Adaptations over Time, have them combine their section Foldables into the following Foldables chapter project.

Use two 11 × 17 pieces of construction paper or cardstock to make a bound book. Tape or glue each section’s Foldable to a page as shown. Foldables C and D should be placed on other pages of the book.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 189)

Students’ responses will vary, but should note traits that they have in common with their parents or other relatives.

Read to Learn

1. No, scientists know from data collected on traits that the hypothesis is not supported. (p. 189)

2. off the west coast of South America near the equator (p. 190)

3. to break the hard shells of the nuts and seeds (p. 190)

4. those with traits best suited to the environment (p. 191)

5. Camouflage helps an organism to blend into its environment. This makes it difficult for it to be seen and gives it a better chance to survive. (p. 191)

6. environmental conditions and changes in genes (p. 192)

7. Students circle Raccoon. (p. 193)
ANSWER KEY

8. The bacteria that survived had variations. (p. 193)

After You Read (p. 194)
1. Students might write “Adaptation is a variation that helps to make an organism better suited to its environment.”

2.

<table>
<thead>
<tr>
<th>Theory or Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis of acquired characteristics</td>
<td>characteristics developed during a parent’s lifetime are inherited by the offspring.</td>
</tr>
<tr>
<td>Theory of evolution by natural selection</td>
<td>organisms with traits best suited to their environment are more likely to survive and reproduce.</td>
</tr>
<tr>
<td>Gradualism</td>
<td>evolution is a slow and ongoing process by which one species changes to a new species.</td>
</tr>
<tr>
<td>Punctuated equilibrium</td>
<td>rapid evolution happens when the mutation of a few genes results in the appearance of a new species over a short period of time.</td>
</tr>
</tbody>
</table>

Section 2

Before You Read (p. 195)
Answers will vary. Students might indicate finding rocks with imprints of a leaf or having seen fossils in museums.

Read to Learn
1. fossils (p. 195)
2. what organisms ate and their environment (p. 196)
3. Student answers may vary. Porpoise flipper: swimming; frog forelimb: balance; human arm: lifting; bat wing: flight (p. 197)
4. three small muscles around each ear (p. 198)
5. how closely related organisms are (p. 198)

Section 3

Before You Read (p. 200)
Students’ descriptions will vary, but should describe appearance and actions.

Read to Learn
1. Both ate meat and plants and walked on two legs. (p. 200)
2. Answer may include small brain, humanlike jaw and teeth, and walked upright. (p. 201)
3. Neanderthals and Cro-Magnons were both Homo sapiens and both lived in caves. (p. 201)

After You Read (p. 202)
1. Students choose a term and write a sentence that describes how the term is related to modern humans. A sample sentence would be: “Primates have characteristics that suggest they have a common ancestor.”
2. Students explain the benefit they get from underlining main ideas.

Chapter 13 Circulation and Immunity

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Circulation and Immunity, have them combine their section Foldables into the following Foldables chapter project.

Use two sheets of 11 × 17 construction paper or cardstock to make a bound book. Tape or glue each section’s Foldable onto the pages of the book as shown.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 203)

Students’ descriptions will vary. Students might indicate applying pressure to the wound helps to stop the bleeding.

Read to Learn

1. 55% (p. 204)

2. to fight bacteria, viruses, and other invaders of the body (p. 204)

3. Fibrin makes a sticky net that traps escaping blood cells and plasma and forms a clot, which stops more blood from escaping. (p. 205)

4. Students circle white blood cells. (p. 205)

5. The type O blood is most limited because it can only receive type O blood in a transfusion. (p. 206)

6. Answers may include large blood loss, lack of iron or vitamins, or it can be inherited. (p. 206)

After You Read (p. 207)

1. Students write a sentence that explains the role of one of the terms in blood. A sample would be: “Hemoglobin is the part of blood that carries oxygen and carbon dioxide.”

2. Blood

- Functions of
  - a. carries oxygen from the lungs to body cells; carries carbon dioxide from the body cells to the lungs to be exhaled
  - b. carries waste products to kidneys
  - c. moves nutrients to body cells
  - d. fights infections and helps heal wounds

- Parts of
  - plasma
  - red and white blood cells
  - platelets
ANSWER KEY

Section 2

Before You Read (p. 208)
Students’ slogans will vary. A sample would be: “Avoid fatty foods and keep a healthy heart.”

Read to Learn
1. coronary circulation, pulmonary circulation, and systemic circulation (p. 208)
2. Students should use the names of the heart and lungs in the figure to explain pulmonary circulation. (p. 209)
3. oxygen and nutrients (p. 209)
4. the force of the blood pushing against the walls of the blood vessels (p. 210)
5. getting regular checkups, having a healthful diet, and exercising (p. 211)
6. Students’ answers may vary, but might indicate that the lymphatic system is not working properly. (p. 211)

After You Read (p. 212)
1. Students write a sentence explaining the difference between arteries and veins. A sample sentence would be: “Arteries move blood away from the heart, and veins move blood toward the heart.”

<table>
<thead>
<tr>
<th>Type of Circulation</th>
<th>What It Does</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary</td>
<td>blood flows to and from the heart tissues</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>blood flows through the heart to the lungs and back to the heart</td>
</tr>
<tr>
<td>Systemic</td>
<td>oxygen-rich blood flows to organs and body tissues</td>
</tr>
</tbody>
</table>

2. Students write their thoughts about how the K-W-L technique helped them organize their study of circulation.

Section 3

Before You Read (p. 213)
Students’ responses will vary, but they may mention that the skin prevents disease-causing organisms from getting into your body or that coughing or sneezing are ways to get rid of such organisms.

Read to Learn
1. cilia and mucus (p. 213)
2. White blood cells constantly move through the body and digest invading bacteria. (p. 214)
3. Students draw Xs through the pathogens at the disposal stage. They also draw circles around the antibodies on the memory B cells. (p. 214)
4. Vaccinations give you immunity against a disease. (p. 215)

After You Read (p. 216)
1. Students write a sentence that explains the relationship between an antibody and an antigen. A sample would be: “An antibody destroys an antigen that has invaded the body.”

2. Ways the Body Defends Itself
   - First-line defenses
     - skin, respiratory, and digestive systems
   - Second-line defenses
     - specific immunity
     - white blood cells
**ANSWER KEY**

**Section 4**

**Before You Read (p. 217)**
Students’ lists of diseases (cancer, the flu, measles) and causes (infection, allergens) will vary.

**Read to Learn**
1. bacteria (p. 218)
2. gonorrhea, chlamydia, and syphilis (p. 219)
3. by sexual contact with an HIV-infected person, by using infected needles, or by an HIV-infected pregnant woman passing it to her child (p. 219)
4. getting enough rest, eating well-balanced meals, and having regular checkups (p. 220)
5. chemicals, insect stings, certain foods, molds, and dust (p. 220)
6. smoking, exposure to some kinds of chemicals, X rays, and ultraviolet radiation (p. 221)
7. Students’ responses may vary, but should indicate that if you are aware of the warning signs you can see a doctor and possibly eliminate cancer as the cause, or, if the sign turns out to be cancer, then finding it early provides a good chance for survival. (p. 221)

**After You Read (p. 222)**
1. Students write a sentence that explains the difference between infectious and noninfectious diseases. A sample would be: “Infectious diseases can be spread from one organism to another, but noninfectious diseases cannot.”
2. Students choose one of the question heads and write an answer to the question. For example, students may choose: “What are sexually transmitted diseases?” The answer would be that sexually transmitted diseases are infectious diseases, caused by bacteria or viruses, that are passed from person to person during sexual contact.
3. Students explain how writing quiz questions and answers helps you prepare for a test. They may note that they can use the questions to prepare for the types of questions that are likely to appear on tests.

**Chapter 14 Digestion, Respiration, and Excretion**

**Dinah Zike’s Foldables™ Teaching Strategies**
Have students create the Foldables suggested for each section. For additional help making these organizers, refer to *Dinah Zike’s Teaching Science with Foldables*.

To help students reinforce the concepts presented in Digestion, Respiration, and Excretion, have them combine their section Foldables into the following Foldables chapter project.

Use an 11 × 17 piece of construction paper or cardstock to make a four-door book. Place each section title on the four outside tabs of the book. Tape, glue, or staple each section’s Foldable inside.

**Optional Foldable**
You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

**Section 1**

**Before You Read (p. 223)**
Students should say that their mouths water at the thought of food that they like.
ANSWER KEY

Read to Learn
1. Answers may include: speed up chemical reactions, help your muscle and nerve cells release energy, and help your blood clot. (p. 224)
2. Students should underline mouth, esophagus, stomach, small intestine, large intestine, rectum, and anus. They should circle tongue, teeth, salivary glands, liver, gallbladder, and pancreas. (p. 224)
3. Students highlight the salivary glands and add the label Saliva to the drawing. (p. 225)
4. to make food more slippery and to protect the stomach from the strong, digestive solutions (p. 225)
5. Fewer nutrients would be absorbed. (p. 226)
6. vitamin K and two B vitamins, niacin and thiamine (p. 226)

After You Read (p. 227)
1. Students write a sentence that explains the function of peristalsis in the digestive system. A sample answer would be: “Peristalsis are waves of muscle contractions that move food through the digestive system.”

Organ of the digestive system
Mouth
Esophagus
Stomach
Small intestine
Large intestine

What takes place in the organ
chew food, saliva combines with food, food becomes soft
food is moved through by peristalsis
food is mixed by peristalsis, food is mixed with enzymes and strong digestive solutions to help break it down into chyme
bile is added to chyme and breaks up fat; digestive solution from pancreas mixes in; broken down foods are absorbed, nutrients move into blood vessels within villi
absorbs water from undigested materials; rectum and anus release semisolid wastes from body

Section 2

Before You Read (p. 228)
Students should list their five favorite foods and rank them in order of least nutritional to most.

Read to Learn
1. Students name which sources of protein they like to eat. (p. 229)
2. for energy (p. 229)
3. Olive oil would be healthiest because it is an unsaturated fat. Butter is a saturated fat, which can cause high levels of blood cholesterol. (p. 230)
4. Students highlight calcium and phosphorus. (p. 230)
5. A body can survive only a few days without water. The body’s cells need water to carry out their work. Most nutrients that a body needs have to dissolve in water to be used by the body. (p. 231)
6. Students write a meal plan that would provide a well-balanced meal. (p. 231)

After You Read (p. 232)
1. Students write two sentences that explain the difference between a mineral and a vitamin. A sample answer would be: “A mineral is an inorganic nutrient that lacks carbon and regulates many chemical reactions in the body. A vitamin is an organic nutrient needed in small quantities for growth, regulating body functions, and preventing diseases.”
ANSWER KEY

2. Before You Read (p. 233)

Students should write the names of the body parts that they use to take a deep breath, such as mouth, nostrils, throat, and lungs.

Read to Learn

1. Students underline larynx and highlight mouth cavity and nasal cavity. (p. 234)
2. mucous membranes and cilia (p. 234)
3. hemoglobin (p. 235)
4. Students explain to a partner that the diaphragm contracts when you exhale and relaxes when you inhale. (p. 235)
5. Secondhand smoke can harm a nonsmoker’s respiratory system. (p. 236)
6. substances that can cause cancer (p. 236)

After You Read (p. 237)

1. Students choose one term that is part of the respiratory system (alveoli, bronchi, larynx, trachea) and explain its function. A sample answer would be: “Alveoli are clusters of tiny, thin-walled sacs in the lungs that exchange oxygen and carbon dioxide and cellular waste with capillaries.”

2. Section 4

Before You Read (p. 238)

Students should describe what happens to trash from their home. Then they should explain what happens when trash is not removed from a home.

Read to Learn

1. Students circle carbon dioxide and water. (p. 239)
2. Urine: urinary system; lungs: respiratory system (p. 239)
3. Wastes would collect in the kidney. (p. 240)
4. Water, sugar, and salt are reabsorbed and returned to the blood. (p. 240)
5. Students circle kidney, ureter, bladder, and urethra. (p. 241)
6. Dialysis removes wastes from the blood. (p. 241)
ANSWER KEY

After You Read (p. 242)

1. The ureter brings urine to the bladder where the urine is held until it is released from the body.

2. Students choose one of the question heads and write an answer to the question. For example, students may choose, “Why does the body control fluid levels?” The answer would be to stay in good health.

3. Students explain how the summaries they wrote help them understand the excretory system.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 243)

Students describe the last bruise they had and how it changed as it healed. Students should note the changes in color and eventual fading of the bruise.

Read to Learn

1. Students highlight epidermis, dermis, and fatty layer. (p. 243)

2. Students list any two of the following: protection, sensory response, formation of vitamin D, control of body temperature, and ridding the body of wastes. (p. 244)

3. Students add the label at the right end of the thermometer to indicate the highest temperature that results in death in humans. (p. 245)

4. help control the body’s temperature and release wastes (p. 245)

5. The pigments in the hemoglobin cause the coloring in bruises. (p. 246)

6. to replace lost skin (p. 246)

After You Read (p. 247)

1. Students write a sentence describing the skin structure. A sample answer might be: “The outer and thinnest layer of skin is the epidermis.”
ANSWER KEY

2. Functions of Skin
   |   |
   | 1. protection   |
   | 2. sensory response |
   | 3. formation of vitamin D |
   | 4. control of body temperature |
   | 5. ridding the body of wastes |

3. Layers of Skin Tissue
   - dermis
   - epidermis
   - fatty layer

Section 2

Before You Read (p. 248)
Students can describe any movement they make, since muscles make all movements possible.

Read to Learn
1. Involuntary muscles are not consciously controlled. You don’t have to remember to make your heart beat. (p. 249)
2. Students should circle the neck and head and label it first-class lever; circle the arm holding the tennis racket and label it third-class lever; circle the calf and foot on either leg and label it second-class lever. (p. 249)
3. Students use the figure to describe to a classmate how muscles pull, rather than push. (p. 250)
4. to contract and relax (p. 250)

Section 3

Before You Read (p. 252)
Students should describe the body parts they use when playing their favorite sport.

Read to Learn
1. in the red marrow in the center of bones (p. 252)
2. Students underline Periosteum. (p. 253)
3. Cartilage protects the joints and makes movement easier by lessening friction. (p. 254)
4. Students label the marrow cavity in the second and third bones. (p. 254)
5. Ligaments help hold bones in place. (p. 255)
6. a. ball-and-socket joint; b. hinge joint (p. 255)
7. elbows, knees, and fingers (p. 256)
8. pain, stiffness, and swelling of joints (p. 256)
ANSWER KEY

After You Read (p. 257)
1. Students use two terms in the glossary to write a sentence describing the skeletal system. A sample sentence might be: “The surface of bones is covered with periosteum, and the ends of bones are covered with cartilage.”

2.

- 1. It gives shape and support to your body.
- 2. It protects your internal organs.
- 3. Major muscles are attached to bones to help them move.
- 4. Blood cells are formed in red marrow.
- 5. Calcium and phosphorus compounds are stored in the skeleton.

Five Functions of the Skeletal System

10. Students trace the sound coming into the outer ear, going through the eardrum, the through the hammer, anvil, and stirrup. (p. 263)

11. to hear sound and to control the body’s balance. (p. 264)

12. olfactory cells (p. 264)

13. Students draw an arrow to the taste pore. (p. 265)

14. Depressants slow the activities of the central nervous system. Stimulants speed up the activities of the central nervous system. (p. 265)

After You Read (p. 266)
1. Students write a sentence explaining the function of one part of the nervous system. A sample would be: “Neurons send impulses to and from the brain to all parts of the body.”

Section 4

Before You Read (p. 258)
Students should indicate that they quickly pulled away or dropped the hot object.

Read to Learn
1. nervous system (p. 258)

2. Students label two more dendrites and one more axon on the figure. (p. 259)

3. the brain and the spinal cord (p. 260)

4. the autonomic system (p. 260)

5. Students may mention helmets, seat belts, or other specialized safety gear. (p. 261)

6. Students trace the path of the reflex arc. (p. 261)

7. the retina (p. 262)

8. Students circle Retina. (p. 262)

9. Sound waves stimulate nerve cells in the ear, impulses are sent to the hearing area of the brain, and you hear the sound. (p. 263)

10. Students trace the sound coming into the outer ear, going through the eardrum, the through the hammer, anvil, and stirrup. (p. 263)

11. to hear sound and to control the body’s balance. (p. 264)

12. olfactory cells (p. 264)

13. Students draw an arrow to the taste pore. (p. 265)

14. Depressants slow the activities of the central nervous system. Stimulants speed up the activities of the central nervous system. (p. 265)

Chapter 16 Regulation and Reproduction

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Regulation and Reproduction, have them combine their section Foldables into the following Foldables chapter project.
ANSWER KEY

Use an 11 × 17 piece of construction paper to make an accordion fold. Tape or glue each section’s Foldable as shown.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 267)

Students should explain how their body reacted to a sudden fright. Answers might include heart began to race, hair on arms stood up, got goosebumps, or screamed.

Read to Learn

1. Students highlight pineal and pituitary and circle pituitary, testes, and ovaries. The pituitary gland is highlighted and circled. (p. 268)

2. Students circle the pancreas. (p. 268)

After You Read (p. 269)

1. Students write a sentence to explain how their body reacted to a sudden fright. Answers might include heart began to race, hair on arms stood up, got goosebumps, or screamed.

Section 2

Before You Read (p. 270)

Students’ answers will vary, but they should note that males and females have different sexual characteristics or reproductive systems.

Read to Learn

1. Students take turns explaining to each other what the pituitary gland does. (p. 270)

2. Students underline testis. (p. 271)

3. Students underline the oviduct. (p. 272)

4. Students trace the route of the egg after ovulation from the ovary, through the oviduct, to the uterus. (p. 272)

5. Students underline within 24 hours. (p. 273)

6. The menstrual cycle starts over again if an egg is not fertilized. (p. 273)

7. Students underline Phase 3. (p. 273)

After You Read (p. 274)

1. Students write a sentence using at least two of the terms to describe the male or female reproductive system. A sample might be: “The testes make the male hormone testosterone and the male reproductive cells called sperm.”

2. Students underline the menstrual cycle.

3. Students explain how writing and answering quiz questions helped them understand the reproductive system.
ANSWER KEY

Section 3

Before You Read (p. 275)
Students should describe changes that they have seen happen to a young child in the course of a year. Depending on the age of the child, they may note that the child got teeth, learned to crawl, learned to walk, or spoke words.

Read to Learn
1. two (p. 275)
2. 1. Ovulation; 2. Fertilization; and 3. Implantation (p. 276)
3. The embryo gets nutrients from the mother. (p. 276)
4. The amniotic fluid protects the embryo and stores nutrients and wastes. (p. 277)
5. the baby and the placenta (p. 277)
6. during puberty (p. 278)
7. a. between 8 and 9 months; b. between 10 and 15 months (p. 278)
8. between ages nine to 13 (p. 279)
9. Middle-aged adults begin to lose physical strength, their blood circulation and breathing become less efficient, bones break more easily, and skin becomes wrinkled. (p. 279)

After You Read (p. 280)
1. Students write a sentence or two explaining the relationship of a zygote, an embryo, and a fetus. A sample answer would be, “A zygote is a fertilized cell that becomes an embryo after it attaches to the wall of the uterus. The embryo develops into a fetus after two months of pregnancy.

2. 

<table>
<thead>
<tr>
<th>Stage of Development</th>
<th>Period of Time</th>
<th>Development Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infancy</td>
<td>Birth to 18 months</td>
<td>increased physical coordination, mental development, rapid growth</td>
</tr>
<tr>
<td>Childhood</td>
<td>18 months to 12 years</td>
<td>rapid growth, control of bladder and bowel, develop abilities to speak, read, write, and reason</td>
</tr>
<tr>
<td>Adolescence</td>
<td>12 years to 20 years</td>
<td>females develop breasts, pubic and underarm hair, and fatty tissue around the thighs and buttocks; males develop deeper voices, increased muscle size, and facial, pubic, and underarm hair</td>
</tr>
<tr>
<td>Adulthood</td>
<td>20 years to 60 years</td>
<td>after age 45 adults begin to lose physical strength, blood circulation and breathing becomes less efficient, bones break more easily, skin becomes wrinkled</td>
</tr>
<tr>
<td>Older Adulthood</td>
<td>After age 60</td>
<td>overall decline in health, muscle and joints become less flexible; bones become thinner and break more easily, hearing and vision loss, lungs and heart function decline</td>
</tr>
</tbody>
</table>

Chapter 17 Plants

Dinah Zike’s Foldables™ Teaching Strategies
Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Plants, have them combine their section Foldables into the following Foldables chapter project.

Use two pieces of 11 x 17 construction paper to make a bound book. Tape or glue each section’s Foldable to a page as shown. Foldables C and D should be placed on other pages of the project.
Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 281)

Students’ choices will vary, but they should identify their favorite plants and explain why they are their favorites.

Read to Learn

1. cell wall (p. 281)
2. Green algae and plants have cells and use photosynthesis. (p. 282)
3. A drought would kill algae. (p. 282)
4. the cuticle (p. 283)
5. vascular and nonvascular (p. 283)

After You Read (p. 284)

1. Students write a sentence that explains the difference between vascular and nonvascular plants. A sample sentence could be “Vascular plants have tubelike structures that carry water and nutrients throughout the plant, but nonvascular plants do not have these structures.”

2. Plant Adaptations for Life on Land

- developed cuticles to slow the loss of water
- developed support structures such as cellulose
- adopted reproduction to life on land
- developed structures to distribute water and nutrients

Section 2

Before You Read (p. 285)

Students’ answers should include providing water, nutrients, and the proper amount of light.

Read to Learn

1. Rhizoids anchor the plants where they grow. (p. 285)
2. Answers may vary. Moss spores are carried by the wind and can grow on most damp surfaces. (p. 286)
3. Vascular tissue lets plants grow larger and thicker. (p. 287)
4. Students circle the label Fronds. (p. 287)
5. A horsetail has a jointed stem, with a ring of vascular tissue around it, and leaves growing out from around the joints of the stem. (p. 288)
6. Answers may include that they are used for fuel, as houseplants, for food, and for medicines. (p. 288)

After You Read (p. 289)

1. Students write a sentence to explain the importance of pioneer species to the environment. Sample sentences would be “Pioneer species such as mosses are the first organisms to grow in an area that is new or disturbed, such as after a forest fire.”

2. Nonvascular Seedless Plants

- few cells thick; rhizoids instead of roots; absorb water and nutrients through cell membranes and cell walls

Vascular Seedless Plants

- thicker than nonvascular plants; absorb water and nutrients through vascular tissues

Both Nonvascular and Vascular Seedless Plants
3. Students explain how summarizing what they read helped them learn about nonvascular and vascular seed plants.

**Section 3**

**Before You Read (p. 290)**

Students’ favorite fruits will vary. Students might indicate that some fruits grow on trees.

**Read to Learn**

1. Students color blue the palisade layer, color red the epidermis, and underline the stoma. (p. 291)

2. Students include any two of the following:
   - Roots let water and dissolved substances move from the soil to the stems to the leaves. Roots anchor plants and support the plant parts that are aboveground. The roots of some plants store food. Some roots take in oxygen that is used in respiration. (p. 291)

3. Phloem moves food from where it is made to where it is stored and used. (p. 292)

4. Gymnosperms produce seeds that are not protected by fruit, while angiosperms flower and produce fruits with one or more seeds. (p. 292)

5. Wood from conifers is used in building. Resins from conifers are used in soaps, paint, and varnish. (p. 293)

**After You Read (p. 294)**

1. Students write two sentences explaining the role of xylem and phloem. A sample could be “Xylem moves water and dissolved substances from the roots throughout the plant. Phloem moves food from where it is made to parts of the plant where it is used.”

**Chapter 18 Interactions of Living Things**

**Dinah Zike’s Foldables™ Teaching Strategies**

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to *Dinah Zike’s Teaching Science with Foldables*.

To help students reinforce the concepts presented in Interactions of Living Things, have them combine their section Foldables into the following Foldables chapter project.

Use an 11 × 17 piece of construction paper or cardstock to make a three-pocket Foldable. Place each section’s Foldable in the correct pocket.

**Optional Foldable**

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.
ANSWER KEY

Section 1

Before You Read (p. 295)
Students’ responses will vary, but may include air, water, food, and other people.

Read to Learn
1. All living things need water to survive. (p. 295)
2. There probably is greater variety in a place with fairly consistent temperatures, because more species can live where there are no temperature extremes. Accept any supported answer. (p. 296)
3. Answers may include that soil varies in the amounts of sand, soil, silt, and clay or that it contains different amounts of nutrients, minerals, and moisture. (p. 296)
4. Students circle the taiga. (p. 297)

After You Read (p. 298)
1. Students write a sentence describing the difference between an abiotic and a biotic factor. A sample sentence would be “Trees are a biotic factor in the environment, whereas air and water are abiotic factors.”
2. Answers will vary.

Section 2

Before You Read (p. 299)
Answers will vary. Students should indicate whether the community has a large or small population and should describe whether the population is spread out or limited to a particular area.

Read to Learn
1. Students circle 1960 and highlight 2000. (p. 300)
2. The population stops growing. Members of the population will die or move on. (p. 300)
3. habitat (p. 301)

After You Read (p. 302)
1. Students choose a term and write a sentence that explains how it affects population or population size. A sample sentence would be “Predators are a limiting factor of a population.”
2. Students explain how flash cards help them prepare for a test. Students may note the benefits of identifying possible quiz questions.

Section 3

Before You Read (p. 303)
Students’ responses will vary, but students might indicate that recycling is the reusing of materials for the same purpose or a different purpose.
ANSWER KEY

Read to Learn
1. Students circle grasses and highlight grasshoppers, birds, and fox. (p. 304)
2. Condensation, evaporation, and precipitation (p. 305)
3. Students circle the plant. (p. 305)

After You Read (p. 306)
1. Students write a sentence that explains why a food web gives a more complete picture of an ecosystem than a food chain does. A sample sentence might be: “A food web is more complete because it shows how an organism can be a part of several food chains.”
2. Students may choose: “What other cycles exist in nature?” The answer would be the carbon cycle and nitrogen cycle.

Chapter 19 Conserving Resources

Dinah Zike’s Foldables™ Teaching Strategies
Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.
To help students reinforce the concepts presented in Conserving Resources, have them combine their section Foldables into the following Foldables chapter project.
Use two pieces of 11 × 17 construction paper or cardstock to make a bound book. Tape or glue each section’s Foldable as shown. Foldables B, C, D, and E will appear on other pages of the book.

Optional Foldable
You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 307)
Students should identify any two objects and should indicate what parts of the environment, such as trees or minerals, were used to make the objects.

Read to Learn
1. because it takes hundreds of millions of years for it to form (p. 308)
2. Students outline oil, coal, and natural gas; 16 percent. (p. 308)
3. Hydroelectric power is renewable and does not cause pollution. Building dams floods land habitats. (p. 309)
4. Geothermal energy comes from the molten rock beneath Earth’s surface. (p. 309)
5. Students use the figure to explain how heat is produced from uranium. They should point out the neutrons crashing into the uranium atoms, releasing more neutrons which collide with other uranium atoms and generate heat. (p. 310)
6. sunlight (p. 310)

After You Read (p. 311)
1. Students write a sentence that explains the difference between renewable and nonrenewable resources. A sample would be: “A renewable resource is one that can be constantly replaced by nature, whereas a nonrenewable resource is one that is used up more quickly than it can be replaced by nature.”
ANSWER KEY

2.

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>fossil fuels</td>
<td>provide most of energy that humans use</td>
<td>limited supply, cause pollution</td>
</tr>
<tr>
<td>hydroelectric power</td>
<td>does not cause pollution</td>
<td>can flood areas; can destroy ecosystems</td>
</tr>
<tr>
<td>wind power</td>
<td>does not cause pollution</td>
<td>can produce energy only when the wind is blowing</td>
</tr>
<tr>
<td>nuclear power</td>
<td>does not cause air pollution</td>
<td>uranium is nonrenewable resource; mining can harm ecosystems; produces harmful radioactive wastes</td>
</tr>
<tr>
<td>geothermal power</td>
<td>unlimited supply</td>
<td>available only where there are geysers or volcanoes</td>
</tr>
<tr>
<td>solar power</td>
<td>inexhaustible source of energy</td>
<td>building materials need to be able to absorb and store heat; solar cells too expensive for generating large amounts of electricity</td>
</tr>
</tbody>
</table>

6. It is colorless and odorless. (p. 315)
7. Students name any two: air pollutants that fall to the water, wastewater from factories and litter. (p. 316)
8. Rivers flow into oceans, carrying pollutants with them. (p. 316)
9. the movement of soil from one place to another (p. 317)
10. If dumped into landfills, hazardous wastes could get into the soil, surface water, or groundwater. (p. 317)

After You Read (p. 318)

1. Students choose a term and write a sentence explaining how it can harm the environment. A sample sentence would be “Erosion of soil can lead to a lack of fertile topsoil, which is needed to grow crops.”
2. Students choose one of the question heads and write an answer to the question. For example, students may choose: “How can acid rain be prevented?” The answer would be by using low-sulfur fuels and reducing automobile use.
3. Students describe how using flash cards helps them remember what they have read.

Section 2

Before You Read (p. 312)
Answers will vary, but students should indicate what they think are the major pollution problems in their community.

Read to Learn

1. Acid precipitation occurs when acid reacts with the water in the atmosphere before it falls to Earth. (p. 313)
2. pH of 3.2: Yes; pH of 8.5: No; pH of 6.0: No (p. 313)
3. It shows that the amount of CO₂ in the atmosphere increased steadily over the period. (p. 314)
4. changes in rainfall patterns and an increase in the number of storms (p. 314)
5. Students add 20 km to the figure. (p. 315)

Section 3

Before You Read (p. 319)
Students’ responses will vary, but should indicate ways, such as turning off lights when they leave a room, that they conserve resources.

Read to Learn

1. Students circle yard waste, old newsprint, and steel cans. They put an X through aluminum cans, plastic soda bottles, and glass containers. (p. 320)
ANSWER KEY

2. water, oil, and electric energy (p. 321)

After You Read (p. 322)

1. Students write a sentence explaining how they personally can participate in recycling. Students might include such ways as recycling aluminum soda cans, plastic bottles, notebook paper, and newspapers.

2. 

Chapter 20 Properties and Changes of Matter

Dinah Zike's Foldables™ Teaching Strategies

Have students create the Foldable suggested for each section. For additional help making these organizers, refer to Dinah Zike's Teaching Science with Foldables.

To help students reinforce the concepts presented in Properties and Changes of Matter, have them combine their section Foldables into the following Foldables chapter project.

Use one 11 × 17 piece of construction paper or cardstock to make a folder project. Tape or glue each section's Foldable as shown. Students should place Foldable B from Section 2 on the back of the project. Title the project Properties and Changes of Matter.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 323)

Students should provide reasonable answers, such as: I would describe the person's height, hair color, eye color, and what the person's face looks like.

Read to Learn

1. volume and mass (p. 324)
2. Boiling point does not depend on size. (p. 324)
3. state, density, melting point, boiling point, solubility in cold water (p. 325)
4. not depend on size (p. 325)
5. the ability to burn (p. 325)

After You Read (p. 326)

1. You can see, touch, smell, or taste physical properties. You cannot see chemical properties.
2. Students should include reasonable responses, such as the following:

Ways to Describe Objects

<table>
<thead>
<tr>
<th>Definition</th>
<th>Physical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Things you can observe</td>
<td>Color, mass, volume, boiling point</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Definition</th>
<th>Chemical Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Things you cannot observe by looking</td>
<td>The ability to burn</td>
</tr>
</tbody>
</table>

3. Accept all reasonable answers, such as using the headings.

### Section 2

#### Before You Read (p. 327)

Students should provide reasonable answers, such as: Yes, I am taller than I was five years ago, but I am the same person.

#### Read to Learn

1. condensation (p. 328)
2. melting and vaporization (p. 328)
3. Substances are changed into different substances, or the makeup of substances changes. (p. 328)
4. chlorophyll (p. 329)
5. Sample answer: The inside of an avocado reacts to oxygen and turns black. (p. 329)
6. odor (p. 330)
7. chemical change (p. 330)
8. Students should give accurate answers, such as leaves being pulled off trees and chlorophyll in leaves turning to colorless chemicals. (p. 330)
9. physical change (p. 331)
10. 2 kg (p. 331)

#### After You Read (p. 332)

1. sublimation; Possible sentence: Sublimation is when a solid like ice or snow change into a gas like air.
2. a. chemical change
   b. physical change
   c. physical change
   d. chemical change
   e. chemical change
   f. physical change
3. Accept all reasonable answers. Student answers should reflect on how underlining and highlighting helped them understand the types of physical and chemical changes.

### Chapter 21 Substances, Mixtures, and Solubility

#### Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to *Dinah Zike’s Teaching Science with Foldables.*

To help students reinforce the concepts presented in Substances, Mixtures, and Solubility, have them combine their section Foldables into the following Foldables chapter project.

Use one 11 × 17 or 12 × 18 piece of construction paper or cardstock to make a three-pocket project. Place each section’s Foldables in the pockets as shown. Title the project *Substances, Mixtures, and Solubility.*
Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

**Section 1**

Before You Read (p. 333)
Sample answer: Sugar is sweet.

Read to Learn
1. Physical processes do not change substances, but chemical processes do. (p. 334)
2. It is made of two or more elements. (p. 334)
3. c (p. 335)
4. Minerals are the solute. Water is the solvent. (p. 335)
5. Earth’s atmosphere and carbonated beverages (p. 336)
6. the state of the solvent (p. 336)
7. solids, liquids, or gases (p. 337)
8. 20:30 or 2:3 (p. 337)

After You Read (p. 338)
1. Sample answer: The mixture of vegetables in a salad is an example of a heterogeneous mixture.

2. Students should include reasonable responses, such as the following:

   ![Mixtures Diagram]

3. Students’ answers will vary. They might say they underlined vocabulary terms and the main idea of each paragraph.

**Section 2**

Before You Read (p. 339)

Students should provide reasonable answers, such as: One teaspoon of sugar would dissolve in the water. One cup of sugar probably wouldn’t dissolve.

Read to Learn
1. Students should circle the four shared electrons. (p. 340)
2. a. gain; b. lose (p. 340)
3. Students should circle the sodium and chloride ions that are surrounded by water molecules. (p. 340)
4. Polar solvents dissolve polar solutes. Nonpolar solvents dissolve nonpolar solutes. (p. 341)
5. 280 g (p. 342)
6. unsaturated (p. 342)
7. concentrated (p. 343)
8. freezing point and boiling point (p. 343)
ANSWER KEY

After You Read (p. 344)
1. Sample sentences: The concentration of orange juice is 100 percent. The solution is saturated.
2. 
3. Students should provide reasonable answers, such as: You could make very weak lemonade to show a dilute solution. You could make strong lemonade to show a concentrated solution.

After You Read (p. 350)
1. Sample sentences: The pH of pure water is neutral. It has a pH of 7.
2. Students should write “Pure water” at the number 7 on the pH scale.
3. A pH of 9 is 100,000 times more basic than a pH of 4.
4. Students should provide reasonable answers, such as: 10 ml. An acid with a pH of 5 is 10 times stronger than an acid with a pH of 6. So, you divide 100 ml by 10 to get 10 ml.

Chapter 22 States of Matter

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in States of Matter, have them combine their section Foldables into the following Foldables chapter project.

Use one sheet of 11 x 17 or 12 x 18 paper or cardstock to create a chapter project. Place each section’s Foldable in the correct pocket of the folder. Title the project States of Matter.

Optional Foldable

You may want to have students make and include the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.
**ANSWER KEY**

### Section 1

**Before You Read (p. 351)**

Students should describe things such as desks, chairs, paper, and pencils.

**Read to Learn**

1. Students should find items that are close to cube shaped, possibly a tissue box. (p. 352)
2. Students should circle the first and third sentences. (p. 352)
3. They are more spread out and are not as organized. (p. 352)
4. mayonnaise (p. 353)
5. true (p. 353)
6. Possible answer: They are spread out and can move around. (p. 353)

**After You Read (p. 354)**

1. Both a solid and a liquid have a definite volume.
2. **States of Matter**
   - Solid
     - rock
     - table
   - Liquid
     - water
     - milk
   - Gas
     - air
     - water vapor
3. Possible answer: I could think about putting a solid, a liquid, and a gas in containers. How they change will remind me of the characteristics of a solid, a liquid, and a gas.

### Section 2

**Before You Read (p. 355)**

Students should provide reasonable answers, such as I would heat an ice cube to turn it into water and I would put water in the freezer to turn it into ice.

**Read to Learn**

1. 5 (p. 356)
2. hot tea (p. 356)
3. the sand (p. 356)
4. gaining (p. 357)
5. vaporization and condensation (p. 357)
6. Students should draw arrows pointing from the bottom of the water to the surface of the water. (p. 358)
7. evaporation and boiling (p. 358)
8. condensation (p. 359)
9. Their surface particles gain enough energy to become a gas. (p. 359)

**After You Read (p. 359)**

1. They are both process during the changing of the states of matter.
2. 


3. Students should provide reasonable answers such as highlighting made the ways matter can change states stand out.

### Section 3

**Before You Read (p. 361)**

Students should provide reasonable answers, such as if you keep blowing the balloon bigger and bigger it will pop. It pops because it has too much air in it.

**Read to Learn**

1. 5 N/cm² (p. 361)
2. Pressure increases. (p. 362)
3. Students should circle Area = 335 cm² and put a box around Pressure = 14 N/cm². (p. 362)
ANSWER KEY

4. Students should write “air pressure” by the arrow. (p. 363)
5. The balloon will decrease in size. (p. 363)
6. Air is being released from your ears. (p. 364)
7. Students should circle the third piston. (p. 364)
8. The water pressure pushing up is greater than the water pressure pushing down. (p. 365)
9. She would sink. (p. 365)
10. 3.0 g/cm³; No, it will not float in water. (p. 366)
11. force (p. 366)
12. c (p. 367)
13. Students should trace the arrows in this order: Blood from body, Blood to lungs, Blood from lungs, then Blood to body. (p. 367)

After you Read (p. 368)
1. Possible answer: When you put something in water, its buoyant force is the same as the weight of the water that was in the space the object takes up.
2. | Event: | Result: |
   | Force increases | increases / decreases |
   | Force decreases | increases / decreases |
   | Area over which force is applied | increases / decreases |
   | Volume decreases | increases / decreases |
   | Temperature increases | increases / decreases |
3. Students should provide reasonable answers such as “It made me find the exact answer for the question. This helped me to be sure I understood what I was reading and that I could answer the question.”

Chapter 23 Newton’s Laws of Motion

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Newton’s Laws of Motion, have them combine their section Foldables into the following Foldables chapter project.

Use one 11 × 17 or 12 × 18 piece of construction paper to make a shutterfold project. Tape or glue each section’s Foldable as shown. Attach the Foldable from the Start-Up Activity to the back of the project. Title the project Newton’s Laws of Motion.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.

Section 1

Before You Read (p. 369)

Students should provide reasonable answers, such as: I can feel my legs moving. I pass things by as I walk.

Read to Learn
1. 25 m/s (p. 370)
ANSWER KEY

2. total distance divided by the time (p. 370)
3. It changes speed, direction, or both. (p. 371)
4. 0.5 m/s² (p. 371)

After You Read (p. 372)
1. Students should demonstrate their understanding of velocity and acceleration. Sample sentences: The velocity of the runner was 3 m/s east. Maya accelerated on her bike when she turned the corner.
2. 1. e; 2. a; 3. c; 4. b; 5. d
3. Accept all reasonable answers. Student answers should reflect on how highlighting helped them learn about motion.

Section 2

Before You Read (p. 373)
Students should provide reasonable answers, such as: I’ve thrown a ball before and I know it will go up or forward until it falls to the ground.

Read to Learn
1. Students should circle the student or the student’s hands in the figure. (p. 373)
2. The rock will not move unless a force makes it move. (p. 374)
3. mass (p. 374)
4. zero (p. 375)
5. The force on the left is greater. (p. 375)

After You Read (p. 376)
1. Students should demonstrate their understanding of unbalanced forces. Sample sentence: Unbalanced forces are when one person pushes a box harder than another person.

Section 3

Before You Read (p. 377)
Students should provide reasonable answers, such as: The farther away the friend is, the harder I have to kick the ball.

Read to Learn
1. 9.8 m/s² (p. 378)
2. 82 kg (p. 378)
3. friction (p. 379)
4. b (p. 379)

After You Read (p. 380)
1. Students should demonstrate their understanding of friction. Sample sentence: Friction happens when you rub your hands together.
2. Students should provide reasonable answers, such as: I could drop a book in front of the class so it makes a loud noise when it hits the floor.

3. Students should provide reasonable answers, such as: I can roll one marble so that it gently taps the second one. The first marble’s action force will make the second one move. The second marble’s reaction force will stop the first marble. It might make it roll backward.

Chapter 24 Energy and Energy Resources

Dinah Zike’s Foldables™ Teaching Strategies

Have students create the Foldables suggested for each section. For additional help making these organizers, refer to Dinah Zike’s Teaching Science with Foldables.

To help students reinforce the concepts presented in Energy and Energy Resources have them combine their section Foldables into the following Foldables chapter project.

Use one sheet of 11 x 17 or 12 x 18 paper or cardstock to create a chapter project. Place each Foldable from the chapter in the correct pocket of the folder. Title the project Energy and Energy Resources.

Optional Foldable

You may want to have students make the chapter Foldable found in the Student Edition on the Start-Up Activities page. This Foldable can be included in the chapter project.
ANSWER KEY

3. Students should circle the hot chocolate and put a box around the block of ice. (p. 387)
4. food (p. 387)
5. when it is absorbed (p. 388)
6. b (p. 388)

After You Read (p. 389)
1. Possible answer: Potential energy is the energy an object has when it is not moving. Kinetic energy is the energy an object has when it is moving.
2. 1. e
   2. d
   3. a
   4. f
   5. c
   6. g
   7. b
3. Students should provide reasonable answers such as: I will use examples to help me remember the types of energy.

Section 2

Before You Read (p. 390)
Students should provide reasonable answers, such as: I used chemical energy to help my body move.

Read to Learn
1. a (p. 391)
2. chemical (p. 391)
3. sound waves/energy in motion (p. 392)
4. Thermal energy heats water into steam which powers engines that make kinetic energy. (p. 392)
5. It moves from the pan to the oven mitt. (p. 393)
6. a turbine (p. 393)

After You Read (p. 394)
1. The blades of a turbine turn. This makes the shaft of the generator turn to make electricity.
2. When a biker eats food, the food is transformed into chemical energy.
   - Energy from the food makes the biker’s muscles contract. So the energy from the food is transformed into kinetic energy in the muscles.
   - The movement of the biker’s muscles makes the biker hot. So some of the energy in the muscles is transformed into thermal energy.
   - The biker’s contracting muscles move the pedals on the bike. So some of the energy in the muscles is transformed into kinetic energy in the pedals.

Section 3

Before You Read (p. 395)
Students should provide reasonable answers, such as: It comes from power plants.

Read to Learn
1. time, heat, and pressure (p. 396)
2. kinetic (p. 397)
3. Uranium is nonrenewable and it produces nuclear waste. (p. 397)
4. a (p. 398)
5. kinetic energy (p. 398)
6. Accept answers around 1957. (p. 399)
7. inexhaustible (p. 399)
8. Black absorbs the most radiant energy. (p. 400)
9. steam (p. 400)
10. cool water (p. 401)
11. Heat moves from the warmer area to the cooler area. (p. 401)
ANSWER KEY

12. inexhaustible (p. 402)

13. Students trace along the two arrows. (p. 402)

14. If they were between hills and mountains, the wind would be blocked. (p. 403)

15. Possible answer: I could turn off lights that I am not using. (p. 403)

After You Read (p. 404)

1. Possible answer: A renewable resource can be replaced and a nonrenewable resource cannot be replaced.

2. | Renewable Resources | Nonrenewable Resources | Inexhaustible Resources |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>hydroelectricity</td>
<td>coal</td>
<td>motion from waves</td>
</tr>
<tr>
<td></td>
<td>oil</td>
<td>sunlight</td>
</tr>
<tr>
<td></td>
<td>natural gas</td>
<td>wind</td>
</tr>
<tr>
<td></td>
<td>nuclear energy</td>
<td></td>
</tr>
</tbody>
</table>

3. Students should state how highlighting information helped them identify different energy sources.