



## Learning Objectives

### Students will:

- identify the main ideas of the text, and explain how they are supported by key details.
- recall relevant information from the text to summarize it.
- understand that characteristics of living things are inherited from their parents through DNA.

## Standards

- **Reading:** Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.
- **Writing:** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
- **Content:** Know that many characteristics of plants and animals are inherited from its parents, and other characteristics result from an individual's interactions with the environment.
- **Language:** Communicate information, ideas, and concepts necessary for academic success in the content area of Science.

## Lesson Timeline

<p><b>Day 1</b> Task</p> <p><b>Introductory and Lab Activities</b> (page 84)</p> <p><b>Summary of Student Learning Activities</b></p> <p>Extract and examine the DNA of a strawberry.</p>	<p><b>Day 2</b> Task</p> <p><b>Before Reading</b> (page 85)</p> <p><b>Summary of Student Learning Activities</b></p> <p>Predict the main ideas and key details of the text.</p>	<p><b>Day 3</b> Task</p> <p><b>During Reading</b> (page 86)</p> <p><b>Summary of Student Learning Activities</b></p> <p>Identify how the main ideas in the text are supported by key details, and write a summary of a section of the text.</p>
<p><b>Day 4</b> Task</p> <p><b>After Reading</b> (page 87)</p> <p><b>Summary of Student Learning Activities</b></p> <p>Identify the main idea of the whole text and key details that support it.</p>	<p><b>Day 5</b> Task</p> <p><b>Activity from the Book</b> (page 87) and <b>Assessments</b> (pages 92–93)</p> <p><b>Summary of Student Learning Activities</b></p> <p>Record personal traits, and take the assessments.</p>	



## Day 1

Extract and examine the DNA of a strawberry.

## Materials

- copies of the *Smashing Strawberries* activity sheet (page 88)
- $\frac{1}{2}$  cup water
- $\frac{1}{2}$  cup rubbing alcohol
- 1 tsp. salt
- 2 plastic cups
- 2 strawberries (fresh or frozen)
- 2 tsp. dish soap
- coffee filter
- craft stick
- measuring cup
- measuring spoon
- plastic zipper bag

## Introductory Activity

## Engage

1. Have students look at one another. Point out features that students have in common and that are different, such as hair color, eye color, or curly hair.
2. Explain that people have similarities and differences because of their DNA. Tell students that DNA is very small and is found in cells. Tell students that they will experiment with DNA.

## Lab Activity

## Explore &amp; Explain

1. Place students in small groups. Distribute a set of materials and copies of the *Smashing Strawberries* activity sheet (page 88) to each group.
2. Have students remove the leaves or stems from the strawberries, place them in a zipper bag, and mash them until they are completely crushed.
3. Have students mix the dish soap, the salt, and the water in a plastic cup with a craft stick. Then, have them pour the mixture into the bag and gently mash it.
4. Have students place the coffee filter over the second plastic cup and pour the mixture through the filter. Have them squeeze the filter to get more of the liquid out.
5. Have students add the rubbing alcohol to the cup without stirring it. Have students pick up the white, cloudy mixture with the craft stick and record their observations on the activity sheet.
6. Tell students that this material is strawberry DNA. Ask questions to lead students to the idea that DNA is a vital part of living things.
  - *What happened to the strawberries? Why?*
  - *Why do you think the strawberries have so much DNA?*
  - *Think about the Introductory Activity. Why do you think DNA is important?*
7. Bring the class together for instruction. Clarify misconceptions by having students explain their understandings using logic and evidence to support their ideas.



## Materials

- DNA books
- copies of the *Word Sort* activity sheet (page 89)

### Day 2

Predict the main ideas and key details of the text.

## Vocabulary Word Bank

- chromosomes
- dominant
- genes
- inherited
- recessive
- trait

## Before Reading

## Elaborate

1. Write the vocabulary words on the board, and discuss their definitions as a class. Distribute copies of the *Word Sort* activity sheet (page 89) to students. Ask students to sort the words into categories. Categories may include parts of speech, function, how familiar students are with the words, or others. Then, have students sort the words another way. Have students share their groupings and the rationale behind each with the class. Discuss any types of groupings students may not have mentioned.
  - Challenge **above-level learners** to sort the words a third way.
2. Display the *DNA* book for students. Read the title and chapter headings from the table of contents aloud. Ask students to predict the main idea of the book based on the title and chapter headings.
3. Take a picture walk through the text. Invite students to discuss what they see. Point out images and text features. Ask students how they think these features will support the main ideas of the text. Explain to students that the main idea of sections or chapters may be key details that support the main idea of the entire text.
  - Support **below-level learners** and **English language learners** by creating a KWL chart with them. Help students ask questions about key details and vocabulary in the book. Have them complete the chart as they read the book.



## Day 3

Identify how the main ideas in the text are supported by key details, and write a summary of a section of the text.

## Materials

- DNA books
- copies of the *DNA Summary* activity sheet (page 90)

## During Reading

## Elaborate

1. Distribute the *DNA* books to students. Read the book aloud as students follow along for the first reading. After each page spread, model how to paraphrase a main idea. For example, after reading pages 4–5 of the book, explain that this section is about how DNA makes us who we are.
  - You may choose to display the Interactiv-eBook for a more digitally enhanced reading experience.
2. For the second reading of the book, have students read in small groups. Ask students to pause after each section and discuss how the main ideas are supported by key details.
  - You may wish to have students digitally annotate the PDF of the text by highlighting key details.
  - For **below-level learners** and **English language learners**, you may choose to play the audio recording as students follow along to serve as a model of fluent reading. This may be done in small groups or at a listening station. The recordings will help struggling readers practice fluency and aid in comprehension.
3. Distribute copies of the *DNA Summary* activity sheet (page 90) to students. Have students use the activity sheet to plan a paragraph summarizing a section of the text. Once students are finished, have them write their paragraphs on separate sheets of paper. Encourage students to use the book to find relevant information. **Note:** You may wish to have students review each other's activity sheets, looking for clear connections to the main idea before they begin writing.



## Materials

- DNA books
- copies of the *Key Details*, *DNA Quiz*, and *CODIS* activity sheets (pages 91–93)

**Days 4&5**

Identify the main idea of the whole text and key details that support it. Record personal traits, and take the assessments.

## After Reading

## Elaborate & Evaluate

1. Write the vocabulary words and definitions on the board. In small groups, have students create a movement or a gesture to represent each word. Give students 30 seconds to create each representation. Then, have students practice saying the words while doing the movements.
2. Ask students to identify the main idea of the whole text. Record their responses on the board. Then, discuss key details that best support the main idea. Review the idea that the main idea of sections or chapters may be key details that support the main idea of the entire text. Have students explain how each detail supports the main idea.
3. Distribute copies of the *Key Details* activity sheet (page 91) to students. Model for students how to cite the text to identify where key details can be found. Discuss student responses as a class.

## Activity from the Book

Read the Your Turn! prompt aloud from page 32 of the *DNA* book. Have students record all the traits that describe them.

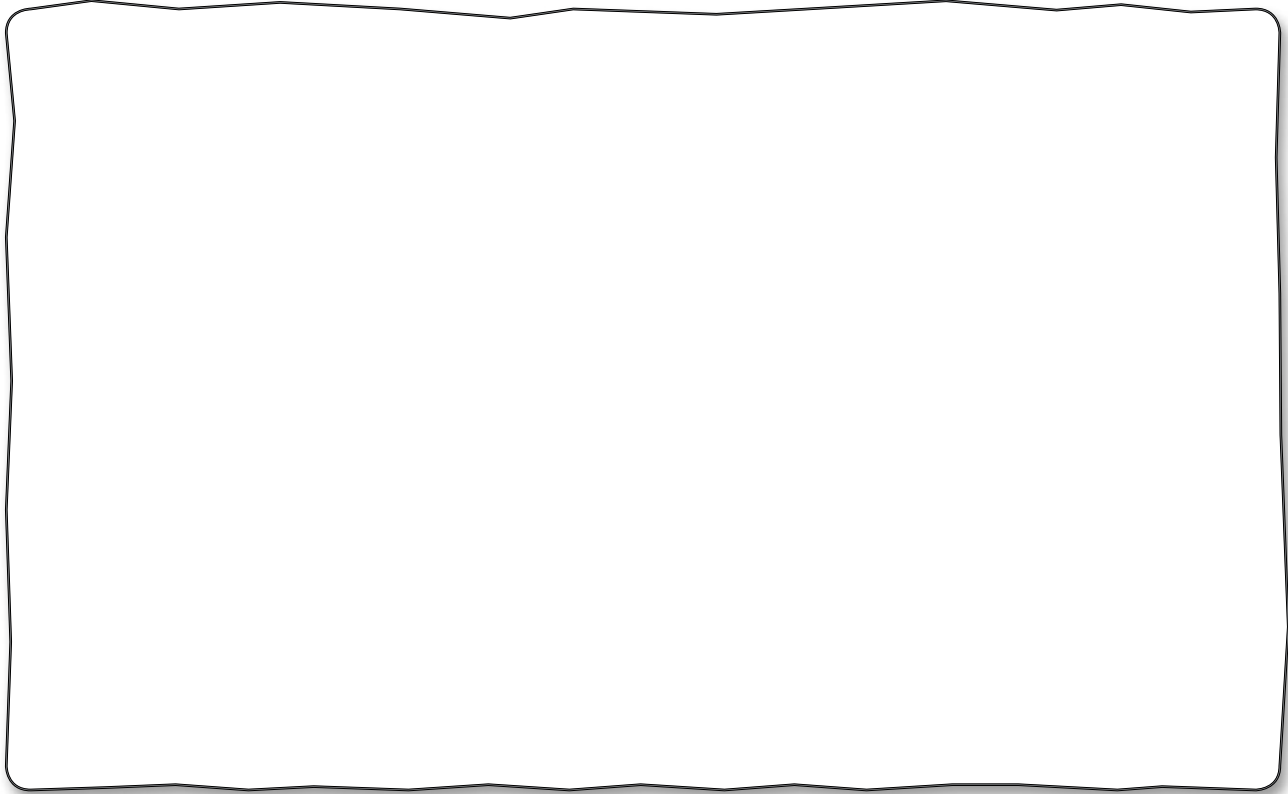
1. A short posttest, *DNA Quiz* (page 92), is provided to assess student learning from the book.
2. A data analysis activity, *CODIS* (page 93), is provided to assess students' understanding of how to analyze scientific data. Explain to students that CODIS is a national DNA database used to help find people who have committed crimes. **STEM**
3. The Interactiv-eBook activities may be used as a form of assessment (optional).



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Smashing Strawberries

**Directions:** Draw what you observed when you added rubbing alcohol to the strawberry mixture. Then, answer the questions below.



**1** Describe what you observed.

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**2** What do you think the mixture is?

---

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Word Sort

**Directions:** Sort the words below into two categories. Then, sort the words a different way. Label how you sorted the words on the lines.

recessive   chromosomes   trait   genes   dominant   inherited

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Life



Science



Life



Science

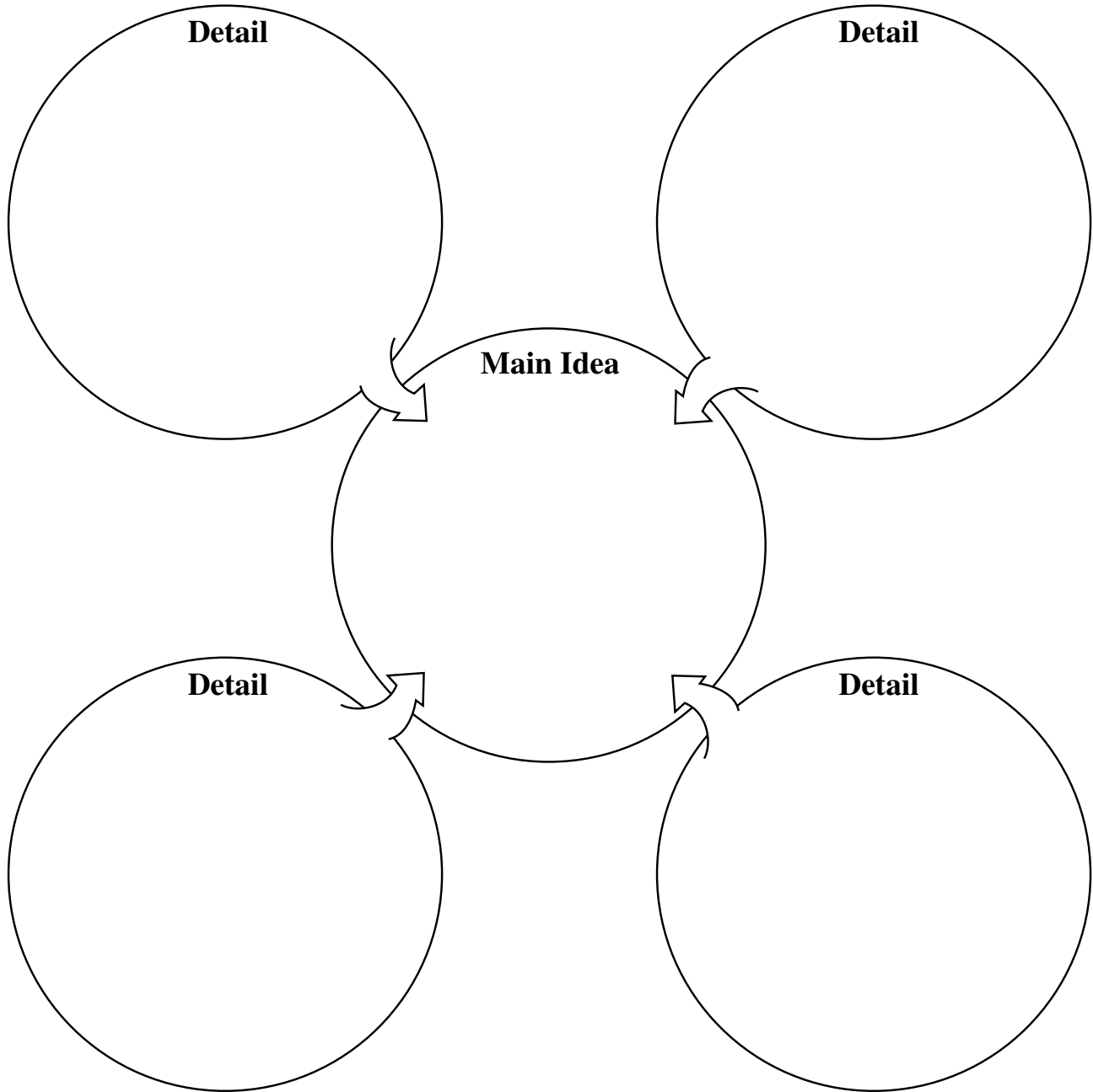


Science

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## DNA Summary

**Directions:** Write the main idea of one section of the book. Then, write details that support the main idea.







Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Key Details

**Directions:** Write the main idea of the entire text. Then, write a key detail from each section that supports it.

**Main Idea**

**Blueprint for Life**

**Page:** \_\_\_\_\_

**Understanding DNA**

**Page:** \_\_\_\_\_

**It's All in the Genes**

**Page:** \_\_\_\_\_

**Organizing DNA**

**Page:** \_\_\_\_\_

**Steps Forward**

**Page:** \_\_\_\_\_

**Looking Ahead**

**Page:** \_\_\_\_\_



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## DNA Quiz

**Directions:** Read each question. Choose the best answer. Fill in the bubble for the answer you have chosen.

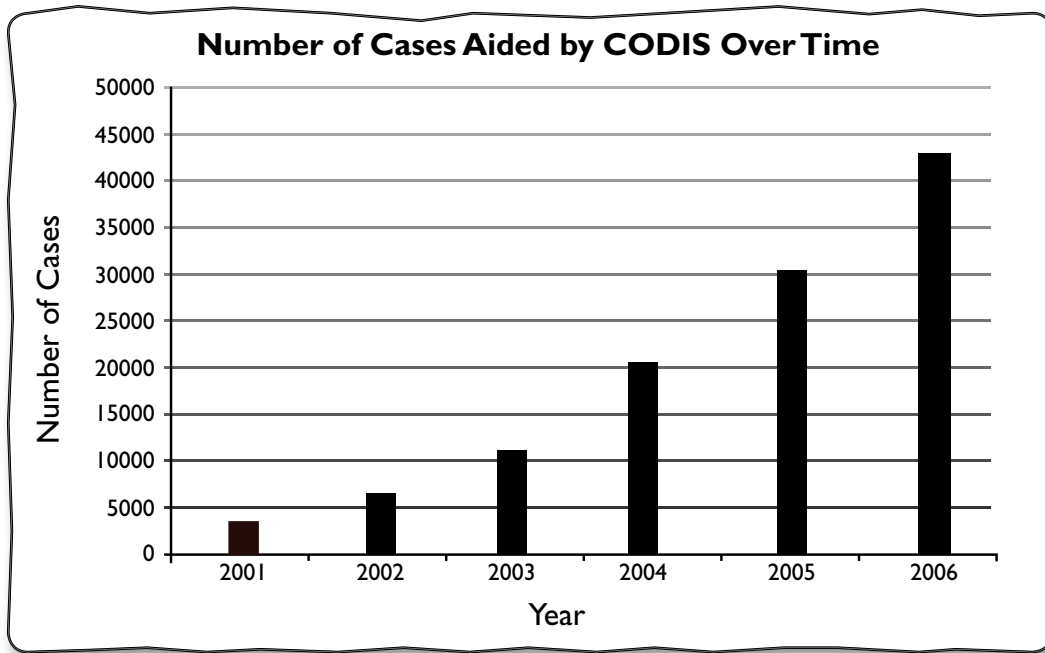
- 1** Which sentence does NOT support the idea that DNA is a building block of life?
- (A) Our DNA makes us who we are.
  - (B) Cells use the information from DNA to grow.
  - (C) DNA acts as the “boss” of your cells.
  - (D) Strands of DNA are found inside a cell’s nucleus.
- 2** Which sentence best describes a main idea of the book?
- (A) DNA is too small to be seen without a powerful microscope.
  - (B) DNA is a simple code.
  - (C) DNA makes us who we are.
  - (D) DNA is too small to be important.
- 3** What are gene mutations?
- (A) changes in genes that result in a new trait
  - (B) ribosomes that make proteins
  - (C) small strands of DNA
  - (D) a long chain of DNA
- 4** What supports the idea that DNA is very small?
- (A) You share 99 percent of the same genes with any other person.
  - (B) DNA wraps around proteins, creating a spiral.
  - (C) Cells can read the code of DNA.
  - (D) You need a microscope to see cells and DNA.
- 5** What is the study of how genes control the characteristics of living things?
- (A) heredity
  - (B) genetics
  - (C) replication
  - (D) cloning
- 6** Different forms of the same gene are called \_\_\_\_\_.
- (A) DNA
  - (B) cells
  - (C) alleles
  - (D) chromosomes



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## CODIS STEM

**Directions:** The Combined DNA Index System, or CODIS, is a database managed by the FBI to help solve crimes. The graph below shows the number of cases aided by CODIS over six years. Use the graph to help you answer the questions below.



- 1 How many more cases were aided by CODIS in 2006 than in 2001?  
\_\_\_\_\_
- 2 Why do you think there were more cases aided by CODIS each year?  
\_\_\_\_\_  
\_\_\_\_\_
- 3 If the trend of the graph continues, about how many cases might be aided by CODIS in 2007?  
\_\_\_\_\_

# All About Energy Reader

## Learning Objectives

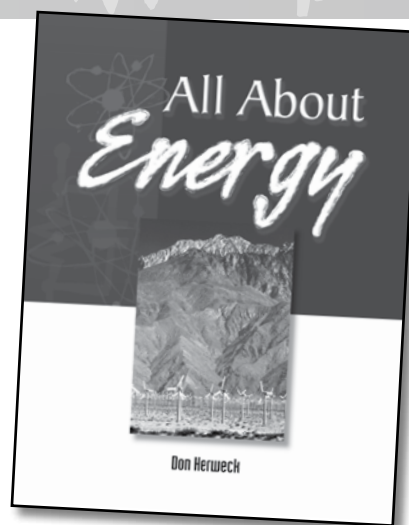
Students will make inferences based on explicit and implicit information in text. (Nonfiction Reading Objective)

Students will use a variety of resource materials to gather information for research topics. (Writing Objective)

Students will explore different types of energy. (Science Content Objective)

## Materials

- paper and pencils
- reference materials (library books, encyclopedias, Internet search engine)
- *All Wound Up* transparency and activity sheet (page 78)
- *Recycling Trends* activity sheet (page 79)
- *How Much Does That Cost?* activity sheet (page 80)
- materials for Lab (see page 74)
- *Reader Quiz* (page 81)



## Before Reading

- 1 Complete the Introductory Activity (page 70) with the whole class. Then divide the students into reading groups. The students who read this book should be reading on or above level.
- 2 Explain to the students that, during this unit, they will be asked to think about their questions and further need to research the topics in the reader *All About Energy*. Encourage the students to jot down thoughts and questions they have when they read the text so they will remember later when it's time to begin the research.
- 3 Tell students that some information is presented explicitly. In other words, the author directly makes his or her point. At other times, information is presented implicitly, which means that it is not directly stated, but rather implied. Present the objective of making inferences. The reader uses the information presented and then draws conclusions or makes inferences that are not written in the text. Tell students that this will be one of the goals of today's lesson. Ask students to pose their ideas about how to employ these skills while reading.
- 4 Ask students to consider what comes to mind when they think about energy. Encourage them to think of their own physical energy, energy used around the house, etc. Allow time for students to share their thoughts. Explain that the reader will address the science of energy.

## During Reading

- 5 Read the first few pages aloud to the students. Pause and encourage discussion about the pages you read.
- 6 Then instruct students to read the remainder of the book. You may decide to have the students read independently or divide them into pairs. (Students in pairs can take turns reading sections of the book.) Have students stop reading after they read about potential energy on page 6.
- 7 Ask the students to review the description of potential energy and then ask them to speculate about what this means. Potential energy is stored for later use. What examples of potential energy can they think of? Explain that they are using information provided in the text, combined with knowledge they have to answer this question. This is how we make inferences.
- 8 Instruct the students to continue reading, asking them to pay attention to other information that causes them to make inferences. The following sections lend themselves to making inferences:
  - Solar Power (page 14)—Ask students for locations where solar power would be effective and where not enough energy could be gathered.
  - How to Help (page 15)—Ask students why they should care about saving energy and what would be the result of making changes in a school building.
  - Wind and Wave (page 16)—Ask students to consider the complications that could be involved with collecting energy from the wind.
- 9 Encourage students to entertain their questions about the content of the reader. What topics presented in the text make them curious for more information? Where could they locate more information about the topics?

## After Reading

- 10 Have students work in pairs to share their thoughts and speculations about the text. Then ask the following questions:
  - How has the study of energy made a difference in our society?
  - What concerns should we have about the availability of energy?
  - What do you think scientists should continue to study about energy?
  - Which kind of energy source is the most intriguing to you?

**After Reading** *(cont.)*

- 11** As the students sit in class, do they have potential or kinetic energy? Explain that all mechanical energy is either potential or kinetic. Reread pages 6, 7, and 8 with students. Display the transparency. Discuss examples the students see demonstrating potential and kinetic energy. Distribute *All Wound Up* (page 78) to the students. Allow them time to complete the activity sheet independently.
- 12** Instruct pairs of students to select a form of energy mentioned in the reader. Ask them how they might locate more information about this topic. Tell them that it is important to use multiple sources when gathering information. Sometimes, information is not completely accurate and gathering facts from several sources can help to confirm the accuracy of information.
- 13** Have each pair of students gather information from reference materials, such as books, encyclopedias, CD-ROM encyclopedias, and the Internet. Have students record the facts they find and to make note of where it was found. After conducting their research, have partners work together to write a few paragraphs, presenting the information in their own words. Show students how to create a references page, indicating the sources of their information.
- 14** Discuss the energy students used to prepare for school this morning. Create a master list on the board. Then ask how the students acted to conserve energy. For example, did they turn off the lights when they left the bathroom? Direct students to reread page 15 (“How to Help”), 23, and 25. Discuss the idea of recycling. Poll the class to see how many families recycle on a regular basis. Distribute *Recycling Trends* (page 79) to students. Read the introduction together, and review the data on the chart. Allow time for students to answer the questions independently. Following, work through the Challenge formula together. As a class, make up a situation to calculate.
- 15** Have each student independently list, in one minute, all the electrical appliances in his or her home. If the students had to guess, which do they believe uses the most energy? Which is the most energy efficient? Reread pages 22 – 24. Discuss how the lists might change if the students were to make a list of appliances used at school or where their parents work. Distribute *How Much Does That Cost?* (page 80) to students. Read the top part of the activity sheet together. Have the students choose one appliance from the list, and calculate the cost per year. (Assist with this task, as needed.) Compare the data. Students then complete the remaining questions independently. Following, discuss question #6.
- 16** Use the *Reader Quiz* (page 81) in order to assess your students’ understanding.
- 17** Finally, gather the students back together in a whole group to have them complete the lab activity (pages 73–74) and the Concluding Activity (page 71).



## All Wound Up

Potential Energy = Stored Energy

Kinetic Energy = Energy of Motion

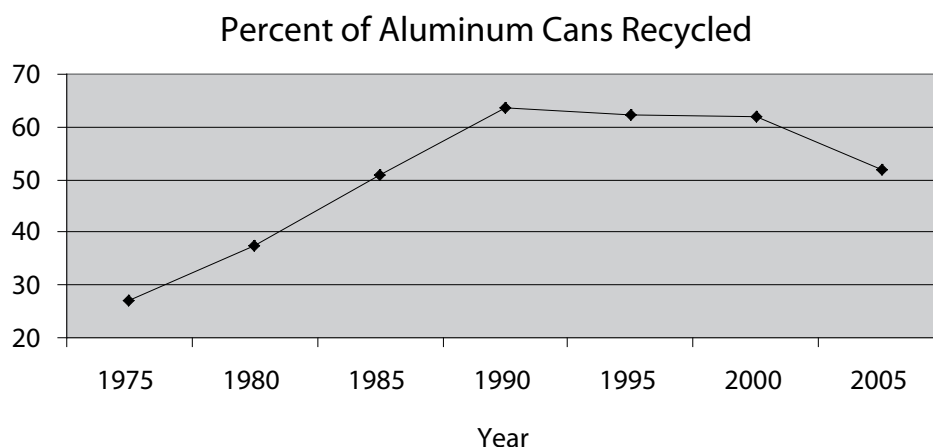
**Directions:** Look at the picture of the person winding up the toy. Use your observations and the information you read about in *All About Energy* to answer the questions. Circle whether each action demonstrates potential or kinetic energy.

- |  |           |         |
|--|-----------|---------|
| 1. The person winds up the toy.                  | Potential | Kinetic |
| 2. The person sets the toy on the ground.        | Potential | Kinetic |
| 3. The toy waits on the ground.                  | Potential | Kinetic |
| 4. The person releases the toy which then moves. | Potential | Kinetic |
| 5. The toy comes to a stop.                      | Potential | Kinetic |
| 6. The person picks up the toy.                  | Potential | Kinetic |
| 7. The toy waits on the shelf for the next play. | Potential | Kinetic |

## Recycling Trends

Many things can be recycled. This includes, but is not limited to, aluminum cans, plastic bottles, glass, paper, newspaper, and steel cans. Look at this chart showing the percent of aluminum cans collected for recycling over the past 30 years.

Use the information from the chart and what you learned from *All About Energy* to answer these questions.



1. The percent of aluminum cans being recycled showed a steady increase until what year?
2. According to *All About Energy*, recycling one aluminum can save enough energy to run a TV for three hours. How many hours could a TV run when 5 cans are recycled? 10 cans? 100 cans?
3. According to *All About Energy*, besides powering a TV, toward what other energy could aluminum can recycling be used? (Hint: Think about the energy needs of homes, businesses, manufacturing, and transportation.)
4. Describe the trend in aluminum can recycling since 1990.
5. How does this trend differ from the first 15 years of data collection?
6. Besides recycling, what is one way you can conserve energy?

**Challenge:** This is the formula used to determine the percent of cans recycled.

Step 1: Weight of scrap cans collected  $\times$  cans per pound (33.9) = number of cans collected

Step 2: Number of cans collected  $\div$  number of new cans made = percent of cans recycled

**Try it!** Weight of cans collected by a Girl Scout can drive = 50 pounds

50 lbs.  $\times$  33.9 = 169.5 cans

169.5  $\div$  1000 new cans distributed in their area = .1695 (or about 17%)

Make up your own data. Start with the weight of cans collected.

## How Much Does That Cost?

This list shows estimated amounts of energy used by typical home appliances. This energy use is measured in watts. 1 kilowatt (kW) = 1,000 Watts.

- |                             |                          |                            |
|-----------------------------|--------------------------|----------------------------|
| aquarium – 800 watts        | clock radio – 10 watts   | clothes washer – 500 watts |
| clothes dryer – 3,000 watts | dishwasher – 2,000 watts | ceiling fan – 150 watts    |
| iron – 1,500 watts          | microwave – 1,000 watts  | refrigerator – 700 watts   |
| TV – 120 watts              | vacuum – 1,300 watts     |                            |

You can estimate the cost of running these appliances for the year. Choose an appliance. Write the number of Watts it uses. Multiply the number of Watts this appliance uses by the hours it is used in a day. Multiply this number by the number of days per year it is used. Divide this by 1,000 to convert to kWh. Multiply this by the cost per kWh (from a recent electric bill).

Example:

Appliance	Watts	× hours per day	× days per year	÷ 1,000	× kWh rate	= cost per year
Coffee Maker	1,000	× 2	× 365	÷1,000	× .11	\$80.30

Try one on your own.

Appliance	Watts	× hours per day	× days per year	÷ 1,000	× kWh rate	= cost per year
				÷1,000		

**Directions:** Use the information above and from the book *All About Energy* to answer these questions.

- How does your home or school mostly get its energy? (coal, natural gas, solar power, etc.)
- Is this a renewable or nonrenewable resource?
- Of the appliances listed above, which does your family use the most? Estimate the cost of using that appliance for one year.
- Of the appliances listed above, which does your family use the least? Estimate the cost of using that appliance for one year.
- Write a statement to compare the energy uses of the two appliances from questions 3 and 4.
- How might your family's energy bill change if you were to use more efficient appliances?

## Reader Quiz

**Directions:** Use what you learned from reading *All About Energy* to choose the best answer for each question.

- Which of the following is a true statement about energy?
  - It can be created by chemical reactions.
  - It can be destroyed and used up.
  - Energy stops when an object stops.
  - It is the ability to do work.
- Energy that is stored in a system is...
  - potential energy
  - kinetic energy
  - heat energy
  - chemical energy
- Energy that shows objects in motion is...
  - potential energy
  - kinetic energy
  - heat energy
  - chemical energy
- Which of the following fossil fuels are renewable resources?
  - coal
  - oil
  - natural gas
  - none of these
- Which of the following energy sources are non-renewable?
  - solar
  - nuclear
  - wind
  - wave
- What do manufacturing, homes, business, and transportation all have in common?
  - They all need energy.
  - They all move people.
  - They all make goods.
  - They all provide services.
- Which of the following lists the uses of energy from greatest to least?
  - Businesses, manufacturing, homes, transportation
  - Manufacturing, businesses, homes, transportation
  - Manufacturing, transportation, homes, businesses
  - Homes, businesses, transportation, manufacturing
- The author states that fuel products will be gone one day. Choose one renewable energy source. Describe its advantages and disadvantages as an alternative energy source. Use details and examples from the book *All About Energy* to support your answer.

## All About Energy Answer Key

### All Wound Up

- |              |            |              |            |
|--------------|------------|--------------|------------|
| 1. kinetic   | 2. kinetic | 3. potential | 4. kinetic |
| 5. potential | 6. kinetic | 7. potential |            |

### Recycling Trends

- 1990
- 15; 30; 300
- Sample list includes: cooling and heating; running electrical appliances; running lights; cooking; refrigeration; refining oil; manufacturing goods
- It has declined.
- The first 15 years recycling showed a steep incline. Since then, it has slowly declined.
- Accept reasonable answers: using fluorescent lights; turning off lights before leaving a room; dress warmer in winter and cooler in summer; taking shorter showers, etc.

### How Much Does That Cost?

- Coal is the most common answer.
- nonrenewable
- Answers will vary. Check students' calculations.
- Answers will vary. Check students' calculations.
- Students should compare the cost of the appliances listed in answers 3 and 4.
- Energy-efficient appliances cost less to run each year.

### Reader Quiz

- d
- a
- b
- d
- b
- a
- c
- Answers will vary. Example: Hydroelectric power produces a lot of energy for very little cost, and water power is renewable. But the cost of building the stations is expensive, and they have to be built where there is a lot of water.

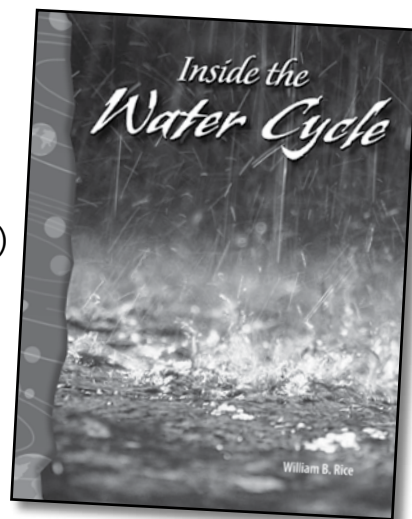
# Inside the Water Cycle Reader

## Learning Objectives

Students will read aloud passages of text, emphasizing elements of fluency—phrasing, accuracy, rate, and expression. (Nonfiction Reading Objective)

Students will write summaries of passages read. (Writing Objective)

Students will explore concepts related to the science of water. (Science Content Objective)



## Materials

- paper and pencils
- *Precipitation Tracker* activity sheet (page 78)
- *Precipitation Tracker* transparency
- *A Chilling Study* activity sheet (page 79)
- *Hot and Cold Trends* activity sheet (page 80)
- materials for Lab (page 74)
- *Reader Quiz* (page 81)

## Before Reading

- 1 Complete the Introductory Activity (page 70) with the whole class. Then divide the students into reading groups. The students who read this book should be reading on or above level.
- 2 Read aloud pages 4 and 5, but pause before the last sentence and ask, “What is the process described in the text?” Allow students time to discuss their ideas and then read the final sentence indicating that the process is called the **water cycle**.
- 3 Tell the students that they will focus on **fluency** during this lesson and that they will have the opportunity to read portions of the text aloud. Explain that there are many elements involved in fluent reading, including phrasing, accuracy, rate, and expression.
- 4 Define the elements of fluency below.
  - phrasing**—refers to the smoothness of the reading with appropriate pauses
  - accuracy**—refers to reading words correctly
  - rate**—refers to reading speed
  - expression**—refers to the natural sound of the reading



## **During Reading**

- 5 Demonstrate the use of these elements by reading the first paragraph on page 4 again. Draw students' attention to the way you read smoothly and with appropriate expression.
- 6 Then give them an example of non-fluent reading by reading the second paragraph in a choppy, monotone manner. Allow students to express the difference between the two readings.
- 7 Instruct students to read the remainder of the book. You may decide to have the students read independently or divide them into pairs. (Students in pairs can take turns reading sections of the book to each other to practice fluency.)
- 8 As students read, have them determine the portion of text they would like to work on for fluency.
- 9 Encourage students to share their thoughts about the text. Then ask the following questions:
  - What information did the text provide about the make up of a water molecule?
  - What is evaporation?
  - What is condensation?
  - What is groundwater and how is it used?
- 10 Use the transparency's data to share with students how much precipitation their state sees each year. Based on the students' knowledge of their region, do they believe the states surrounding theirs have similar precipitation totals? Review the steps to the water cycle (pages 8–9) and what parts of it affect weather the most.
- 11 Display the data transparency for students to review. Can they draw conclusions as to where it rains the most? The least?

## After Reading

- 12 Distribute *Precipitation Tracker* (page 78) to each student. Have a United States map on display for reference. Allow time for students to color their maps following the criteria on the activity sheet. Afterwards, have students make observations across the nation. (See below.) Have students use additional information related to the heating and cooling of the Earth to explain why some states see so much less precipitation than others.
  - What patterns do they notice?
  - Which colors are the most common?
  - Which colors are the least common?
- 13 Allow students to practice reading their selected portions of text. Review tone, voice, expression, and timing. Encourage students to read their text aloud several times independently. Then have them read aloud to a partner. Invite students to make constructive comments and offer words of praise for fluency efforts.
- 14 Review with students the contributions glaciers, snow and ice caps make to the water cycle on pages 20–21. Distribute *A Chilling Study* (page 79) to students. Allow them time to review the information and answer the questions. Discuss the students' thoughts to questions 5 and 6.
- 15 Review with students the effects winds have on the water cycle. Reread pages 12–13. What does the author mean that “When the sun hits Earth, it doesn’t heat evenly”? Why is this an important fact when learning about the water cycle? Distribute *Hot and Cold Trends* (page 80) to students. Review the experiment and data chart together. Have students share their conclusions as to what the data chart shows. Allow students time to complete the activity sheet.
- 16 Next, have students summarize what they learned from the text by writing a two-paragraph summary. Remind students that a summary gives an overview of the information. It does not repeat every detail of the text. Encourage each student to think about the information that was most interesting to him or her and then write the summary using a maximum of five sentences per paragraph.
- 17 Use the short *Reader Quiz* (page 81) in order to assess your students' understanding.
- 18 Finally, gather the students back together in a whole group to have them complete the lab activity (pages 73–74) and the Concluding Activity (page 71).

## Precipitation Tracker

**Directions:** Use the data showing the average precipitation for each state. Color each state according to the amount of rain it receives.

0 – 10" = light blue

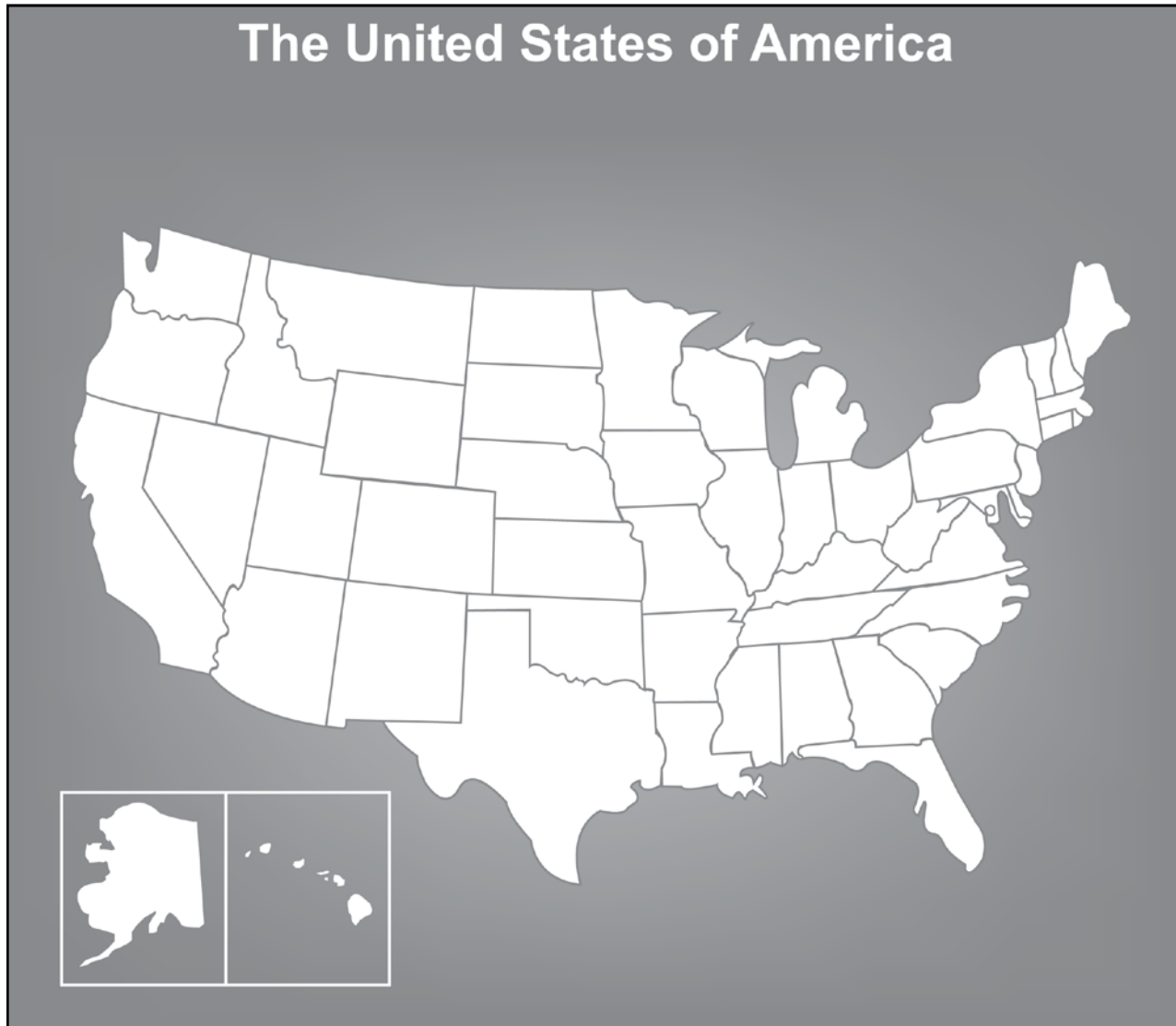
20 – 30" = yellow

40 – 50" = red

10 – 20" = green

30 – 40" = orange

50" + = purple

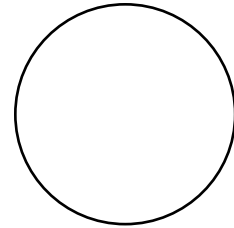


## A Chilling Study

Scientists study glaciers in the Arctic, Antarctic, and in the mountains to learn how they affect the Earth's climate. They check the depth of the ice and how its movement affects the land. They also study how much water glaciers hold. Scientists use satellites to measure the size of glaciers. The study of glaciers gives scientists information about the Earth's past climate. They use this information to predict future climate changes.

Glaciers have changed since the last Ice Age.

Glaciers Then	Glaciers Now
Covered 32% of land	Cover 10% of land
Held nearly all freshwater	Hold 75% of Earth's freshwater
Moved .3 meters/day	Can move 34 meters/day



Melting glaciers have many benefits.

1. The melt water provides fresh drinking water.
2. The melt water is used to irrigate crops.
3. Melting glaciers provide hydroelectric power (energy through the use of moving water).

Some regions of the Earth have experienced an increase in average temperatures. This can affect the existence of glaciers. When glaciers melt too quickly or retreat (shrink), this can affect the Earth.

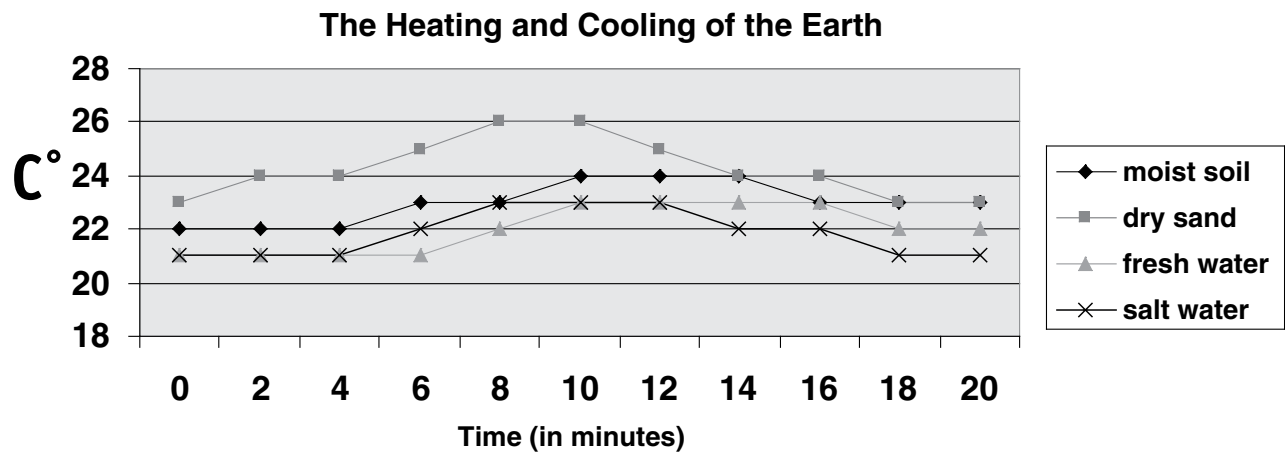
**Directions:** Use the data and information above and what you read in *Inside the Water Cycle* to answer the questions.

1. Use the circle to make a pie chart showing the amount of freshwater stored in glaciers compared to other freshwater sources. List at least two other sources of freshwater. Label your chart.
2. How have glaciers changed since the last Ice Age?
3. How might the retreat (or disappearance) of glaciers affect regions which depend on glacier melt water?
4. If some areas around the world are warming, how might their weather change?
5. How are glaciers related to the water cycle? Why were these pages included in this book?
6. How can the continued study of glaciers provide information related to future weather patterns?

## Hot and Cold Trends

Mr. Riley’s science class knew that the uneven heating of the Earth played a part in the water cycle. They tested two soil samples and two water samples to see which heated and cooled the fastest. This would let them learn more about wind patterns.

The class tested the following samples: moist soil, dry sand, fresh water and salt water. They placed an equal amount of each compound in a beaker. They placed each beaker in the sun for 10 minutes. They recorded the temperature every two minutes. Then they brought the beakers inside. They recorded the temperature every two minutes for ten minutes. The chart below shows the results of their study.



**Directions:** Use the data and what you read about in *Inside the Water Cycle* to answer the questions.

1. Which element heated the fastest?
2. Which element cooled the fastest?
3. How did salt water compare to fresh water when heated and cooled?
4. How does this data support the fact that the Earth heats unevenly?
5. How does this information help Mr. Riley’s students understand wind patterns?

## Reader Quiz

**Directions:** Use what you learned from reading *Inside the Water Cycle* to choose the best answer for each question.

1. What happens when water disappears from the ground?
  - a. It remains part of the water cycle.
  - b. Rain falls.
  - c. Clouds form.
  - d. Eventually it reappears again.
2. Water can be in which form?
  - a. solid
  - b. liquid
  - c. gas
  - d. any of these
3. What has the greatest impact on the Earth's weather?
  - a. the sun warming the atmosphere
  - b. evaporation of ocean water
  - c. the wind
  - d. the uneven heating of the Earth
4. Why do clouds look different from day to day?
  - a. The formation of the cloud depends on where it forms in the atmosphere.
  - b. Clouds form different shapes.
  - c. The size of clouds is different.
  - d. all of these
5. How are snow, sleet, and hail similar forms of precipitation? Use details from the book to explain your answer.
6. Describe how storms, both small and great, are important parts of the water cycle. Use details and examples from the book to explain your answer.
7. Why is the water cycle important? What would life be like without it?



## Inside the Water Cycle Answer Key

### Precipitation Tracker

Check students' maps.

Light blue states = AZ, NV, NM

Green states = CA, CO, ID, MT, ND, SD, UT, WY

Yellow states = HI, KS, MN, WA

Purple states = AL, AK, LA, MS, SC

Orange states = IL, IN, IA, MI, MS, NE, NH, NY, OH, OK, OR, TX, VT, WI

Red states = AR, CT, DE, FL, GA, KY, ME, MD, MA, NJ, NC, PA, RI, TN, VA, WV

### A Chilling Study

1. Check students' charts. They should have shaded and labeled  $\frac{3}{4}$  of the chart for glaciers. The remaining  $\frac{1}{4}$  should list at least two other sources of freshwater (rivers, lakes, streams). The chart should have a title.
2. They cover less of the Earth and are moving faster than they once did.
3. These regions may lose their water supply, including drinking water, irrigation, and power.
4. They might see more rain instead of snow.
5. Snow is a form of precipitation. As the snow/ice is carried to rivers and oceans, it melts and becomes part of the water cycle.
6. Accept all reasonable answers. Example: Scientists can predict world patterns in weather so people can be ready to find different sources of water.

### Hot and Cold Trends

1. Dry sand
2. Dry sand
3. Salt water heated and cooled faster. They both started at the same temperature. The salt water peaked after 8 minutes. The fresh water peaked after 10 minutes. The salt water's temperature fell quickly once brought inside. The fresh water held its temperature longer.
4. Sample: Each element heated and cooled at a different rate.
5. Sample: When air gets hotter, its pressure changes. Air moves from high pressure areas to low pressure areas. This causes wind.

### Reader Quiz

1. a
2. d
3. b
4. d
5. Sample: They are all forms of frozen water. Snow is fallen ice crystals. Sleet is frozen rain drops. Hail is ice balls that were frozen instantly when they met dust particles in the clouds.
6. Sample: Storms let precipitation fall to Earth. Eventually this precipitation makes its way back to the ocean where the water cycle begins all over again.
7. Sample: The water cycle is very important because it recycles water all across the planet. Without the water cycle, there would be no rain and crops would die. Everyone would have to get their water by carrying it in buckets.