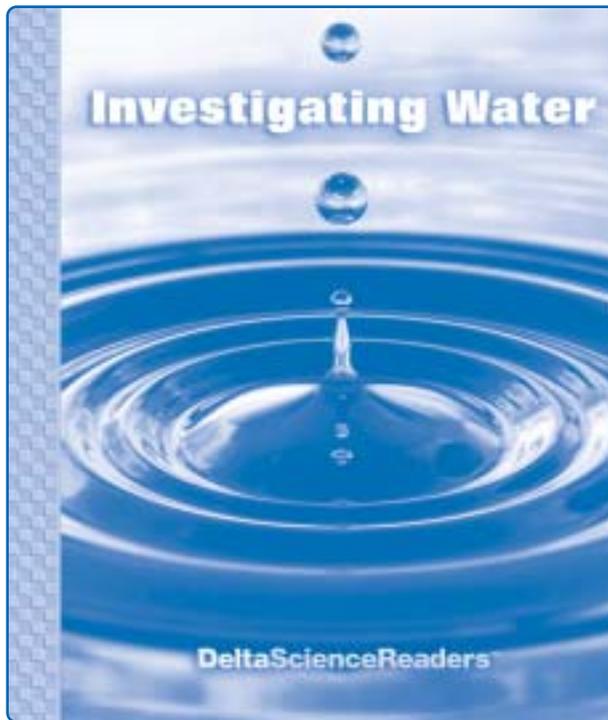


Investigating Water



Delta Science Readers are nonfiction student books that provide science background and support the experiences of hands-on activities. Every **Delta Science Reader** has three main sections: *Think About . . .*, *People in Science*, and *Did You Know?*

Be sure to preview the reader Overview Chart on page 4, the reader itself, and the teaching suggestions on the following pages. This information will help you determine how to plan your schedule for reader selections and activity sessions.

Reading for information is a key literacy skill. Use the following ideas as appropriate for your teaching style and the needs of your students. The After Reading section includes an assessment and writing link.

OVERVIEW

In the Delta Science Reader *Investigating Water*, students read about the properties of water. They learn that water can exist as a solid, a liquid, or a gas and find out how water changes from one state to another. They observe that objects either sink or float in water and that some substances dissolve in water. They also read about scientists who study glaciers in Antarctica. Finally, students discuss the importance of water to living things and ways to conserve water.

Students will

- ▶ identify properties of water
- ▶ observe water in different states
- ▶ predict how water changes when it is cooled or heated
- ▶ predict and observe whether objects sink or float in water
- ▶ observe and describe what happens when a substance dissolves in water
- ▶ examine nonfiction text elements such as table of contents, headings, and glossary
- ▶ interpret photographs and illustrations to answer questions

READING IN THE CONTENT AREA SKILLS

- Cause and effect
- Make predictions
- Classify and categorize
- Draw conclusions
- Critical thinking
- Interpret graphic devices
- Summarize

NONFICTION TEXT ELEMENTS

Investigating Water includes a table of contents, headings, photographs, illustrations, boldfaced terms, and a glossary.

CONTENT VOCABULARY

The following terms are introduced in context and defined in the glossary: *dissolve, evaporate, float, flow, freeze, gas, liquid, melt, sink, solid, water, water vapor, wet.*

Optional vocabulary: *temperature*

BEFORE READING

Build Background

Access students' prior knowledge of water by holding up a clear glass of water. Ask, *What is this? What can you tell me about the water in this glass?*

Invite students to share what they know about water from their personal experiences and hands-on explorations in science. If necessary, ask specific questions to guide students' observations, for example, *How does water feel? Does water have a color? What would the water do if I tipped this glass over?*

Begin a vocabulary diagram by drawing a large drop of water on the board or chart paper and labeling it *Water Words*. Inside the

drop, list words that students have used to describe the properties of water, for example, *wet, no color, and pours easily.*

Point to the individual words as you read the title of the book aloud. Tell students that to *investigate* something means to study it closely and gather information about it. Ask, *What kinds of things might you do to investigate water?* (Students may suggest that they might look at it, touch it, taste it, stir it, and so on.)

Preview the Book

Tell students that one way to find out what a book is about is to preview the book. Explain that they can preview a book they are about to read by looking at its cover, chapter titles, pictures, and other important parts.

To preview the book with students, flip through the pages and briefly discuss the photographs and illustrations. Ask questions such as, *What do you see in this picture? What do you think the words on this page tell about? What are some words that you think we might find in this book?* (Accept all reasonable answers at this time.)

Have students turn to the table of contents. Explain that the table of contents is a list that tells what is written in the book. Ask, *What do you notice about this page?* Read aloud the headings and point to the page numbers listed after each heading. Explain that each number tells the page on which they will find information about each heading.

Point to and read aloud the word *Glossary* at the bottom of the page. Tell students that a glossary is a list of words and their meanings. Explain that the words in the glossary are important words they will need to know in order to understand the information in the book. Ask, *What words do you think you might find in the glossary of this book?* Have students turn to the glossary at the back of the book. Tell them, *In the book, these words are printed in dark print. The dark print tells you that you can find out what the word means by looking in the glossary.* Choose one word and model how to find its definition in the glossary.

Preview the Vocabulary

You may wish to preview some of the vocabulary words before reading rather than waiting to introduce them in the context of the book. Possibilities include creating a word wall, vocabulary cards, sentence strips, or a concept web.

For example, you might create word cards for each vocabulary word. As you preview the book, ask volunteers to find and match the word cards to words in the book. Have students look at the picture on the page where each word is found and ask, for example, *What do you see happening in this picture? What do you think the word melt means?* Confirm students' predictions by reading aloud the words' definitions listed in the glossary.

Set a Purpose

Discuss with students what they might expect to find out from the book, based on their preview. Ask, *Do you have any questions about water that you would like this book to answer? What are they?* Use students' questions and predictions to set an overall purpose for reading.

GUIDE THE READING

Preview the book yourself to determine the amount of guidance you will need to give for each section. Depending on your schedule and the needs of your class, you may wish to consider the following options:

- **Whole Group Reading** Read the book aloud with a group or the whole class. Encourage students to ask questions and make comments. Pause as necessary to clarify and assess understanding.
- **Shared Reading** Have students work in pairs or small groups to read the book together. Ask students to pause after each text section. Clarify as needed and discuss any questions that arise or have been answered.

- **Independent Reading** Some students may be ready to read independently. Have them rejoin the class for discussion of the book. Check understanding by asking students to explain in their own words what they have read.

Tips for Reading

- If you spread out the reading over several days, begin each session by reviewing the previous day's reading and previewing what will be read in the upcoming session.
- Begin each text section by reading or having a volunteer read aloud the heading. Have students examine any illustrations or graphics and read accompanying captions and labels. Discuss what students expect to learn, based on the heading, illustrations, and captions.
- Help students locate context clues to the meanings of words in boldface type. Remind them that these words are defined in the glossary. Provide help with words that may be difficult to pronounce.
- As appropriate, model reading strategies students may find helpful for nonfiction: adjust reading rate, ask questions, paraphrase, reread, visualize.

Think About . . . (pages 2–13)

Pages 2, 3 *What Is Water?*

- Have students study the photograph on page 2. Ask, *What is happening in this picture?* (Someone is filling a glass with water.) *What do you think the person is going to do with the water?* (drink it) *Where do you get the water you drink?* (Students may say their water comes from a faucet, from bottles, or from a drinking fountain.) *What else do you use water for?* (washing, watering plants, swimming or playing in, cooking)
- Read aloud page 2. Point to the words *water*, *wet*, and *flow* and ask students what they notice about the words. (They

are in dark print.) Remind students that they can find the meanings of these words in the glossary in the back of the book. Ask, *What do you think the word flow means?* Have students turn to the glossary and find the word *flow* on the page. Read aloud the definition.

- Ask students to look at the photographs on page 3. Ask, *How are these pictures alike?* (They all show water.) *How are they different?* (One shows a puddle. The others show larger bodies of water.)
- Read aloud the text on page 3. Ask, *Where else can you find water?* (Students may mention lakes, streams, swimming pools, and so on.) *Where does rain come from?* (clouds in the sky) *Where does the water in rivers, lakes, and oceans come from?* (rain)

As appropriate, explain that nearly three-quarters of Earth's surface is covered with water. Point out that every living thing needs water to stay alive. In the United States, the average person requires almost 100 gallons (379 liters) of water a day. (To help students understand this volume, tell them that it equals about two full bathtubs!) Most of the water we consume comes from rivers, lakes, and wells (groundwater).

- Refer students to the vocabulary diagram on the board. Ask, *What new words might we add to our list of water words?* Record students' suggestions on the diagram.

Pages 4, 5 *Water Can Change*

- Ask students to describe what they see in the picture on page 4. (a glass of water) Read aloud the text beneath the picture.
- Ask students to name other liquids they know, such as milk, juice, and honey. Ask, *Have you ever spilled a glass of water? What happened? Did the water keep its glass shape, or did it spread out all over the table or floor?* Explain that

liquids take the shape of the container they are in and flow when they are poured.

- Ask students to describe what they see in the first picture on page 5. (an ice cube) Then read the text aloud. Point out that a solid has its own shape. Ask, *What shape is this ice?* (a cube or block shape) Hold up a book and ask, *Is this book a solid or a liquid?* (solid) *What other solids do you see around this room?* Guide students to conclude that nearly all of the objects in the room are solids.
- Ask students to describe what is happening in the second picture on page 5. Elicit that heating water causes it to boil. Tell students that the water in the kettle is going to change to water vapor. Water vapor is a gas. Explain that the air that we breathe is made of gases like water vapor.
- Point to the words *liquid*, *solid*, and *gas*. Ask, *What is special about these words?* (They are in dark print and listed in the glossary.) Have students find each word in the glossary and follow along as you read the definition aloud.

Pages 6, 7 *Water Can Freeze*

- Direct students' attention to the pictures of water and ice on pages 4 and 5. Ask, *How do you think water changes from a liquid to a solid?* (Accept all answers at this time.) Tell students that they will find out by reading the next two pages.
- Have students look at the photograph on page 6. Ask, *What is the girl doing?* (putting an ice cube tray in the freezer) *Is it hot or cold inside a freezer?* (very cold) *What do you think will happen to the water?* Read pages 6 and 7 to confirm students' predictions.
- Ask, *Have you ever seen ice? Where?* Briefly discuss students' experiences with ice. Explain that *temperature* tells how hot or cold something is. Ask questions such

as, *Does the lake freeze in the summer or winter? In the wintertime, is the temperature outside usually hot or cold?* Lead students to conclude that water will freeze only under very cold temperatures.

- Add the words *freeze* and *ice* to the vocabulary diagram on the board.

Pages 8, 9 Water Can Melt

- Ask students to think about the tray of ice cubes on page 7. Ask, *Suppose you left this tray of ice cubes out in the hot sun for a while. What do you think would happen to the ice?* Suggest that students read the next two pages to find out if their predictions are correct.
- Have students look at the pictures on pages 8 and 9 as you read aloud the text. Ask, *Is ice a solid or a liquid?* (a solid) *What happens to ice when it gets warm?* (It melts.) *After ice melts, is it a solid or a liquid?* (a liquid) *Do you know any other things that melt?* (Students may suggest ice cream, snowballs, or juice pops.)
- Have students look at the pictures again. Ask, *Do you think the pictures show a hot day or a cold day? How can you tell?* Guide students to infer that heat from the sun makes ice melt. Explain that the warmer the temperature is, the faster the ice will melt.
- Add the word *melt* to the vocabulary diagram on the board.

Pages 10, 11 Water Can Evaporate

- Write the word *evaporate* on the board and track the letters with your finger as you sound the word out. Ask, *What do you think this big word means?* (Accept all answers at this time.)
- Ask, *Have you ever seen puddles on the street or sidewalk? When do you see them? Are they always there? What happens to them?* Have students look at

the picture on page 10. Ask, *What kind of day does this picture show?* (a warm, sunny day) *What do you think is going to happen to this puddle?* (Students may predict that the puddle will dry up.)

- Read aloud pages 10 and 11. Ask, *Look at the water in the puddle. Is it a liquid, solid, or gas?* (a liquid) *What happens to the water when it gets warm?* (It evaporates.) *After the water evaporates, is it a liquid, a solid, or a gas?* (a gas) *Can we see the gas that the water has become?* (no) *Where do you think it is?* (Students may say that it disappeared or that it went into the air.)
- Ask, *Have you ever hung a wet towel or swimsuit out to dry? What do you think happens to the water that is in the towel or the swimsuit?* Help students conclude that the water in the towel or swimsuit evaporates into the air as the towel or swimsuit dries.
- Add the word *evaporate* to the vocabulary diagram on the board.

Page 12 What Sinks? What Floats?

- Read aloud the heading and the first sentence on page 12. Point to the word *float* and ask, *What do you think this word means?* (to stay on top of a liquid) Have students find the word in the glossary to confirm their definitions.
- Read aloud the second sentence and use the same procedure to confirm the meaning of the word *sink*.
- Read the questions on the page, and help students identify the objects pictured. (key, coins, rubber duck, toy boat, life-saver ring) Ask, *Which of these objects do you think will sink in water?* (the key and coins) *Which do you think will float on water?* (rubber duck, toy boat, and life-saver ring) *What are some other things that float on water?* (Students may suggest a raft, a leaf, a beach ball, or a feather.)

- Ask, *What could you do to find out if an object sinks or floats?* (place it in water) *What do you think makes an object sink?* (Accept all ideas. Students may suggest that heavy objects sink and light objects float.)

If appropriate, explain that when an object is put in water, the object and the water push against each other. If the water pushes harder than the object is pushing, the object floats. If the object pushes harder than the water is pushing, the object sinks.

- Add the words *sink* and *float* to the vocabulary diagram on the board.

Page 13 *What Dissolves in Water?*

- Ask students if they have ever used a drink mix to make lemonade or other drink. Ask, *What happened to the drink mix when you stirred it into water?* Briefly discuss students' experiences.
- Write the word *dissolves* on the board and track the letters as you sound out the word. Tell students they will find out the meaning of the word as they read the next page.
- Read aloud page 13. Ask, *What happens when something dissolves in water?* (Students may say that it disappears or that it mixes with the water.)
- Tell students that when a substance seems to disappear when it is stirred into water, we say that the substance *dissolves* in the water. Explain that the substance does not actually disappear but rather breaks up into tiny bits that are too small for our eyes to see.
- Help students brainstorm other substances that will dissolve in water, such as sugar and salt. Point to the coins on page 12. Ask, *Do you think these coins would dissolve in water?* (no) Help students conclude that while some substances dissolve in water, many others do not.

- Write the word *dissolve* in the vocabulary diagram on the board.

People in Science (page 14)

Ice Scientists

- Direct students' attention to the photograph on page 14. Ask, *What do you see in this picture?* (Accept all answers at this time.)
- Explain that the large white masses in the picture are made of ice. Ask, *Where do you think these people might be?* Suggest that students find out by reading the page.
- Read aloud page 14. Ask, *What are the people in the picture doing?* (studying the ice)
- If possible, point out Antarctica on a map or globe. Explain that Antarctica is the continent at the South Pole—one of the coldest places on Earth. More than 95 percent of Antarctica is covered with large sheets of ice. Scientists study the ice to find out about climate changes, to learn about the geological history of the world, and to predict the movement of icebergs—giant pieces of ice that break off glaciers and float out to sea.

Further Facts

- The Antarctic ice sheet contains 70 percent of Earth's fresh water and more than 90 percent of Earth's ice.
- Antarctica is the coldest, driest, windiest, and highest continent on Earth.
- Most of the animal life in Antarctica, including seals, whales, and penguins, lives in or near the coastal waters.
- Scientists who study ice are called glaciologists. Other scientists doing research in Antarctica include geologists, biologists, meteorologists, and oceanographers.

- Scientists live at international research stations. The length of a scientist’s stay can range from a few weeks to up to 2½ years.

Did You Know? (page 15)

We Need Water

- Read aloud the heading and text on page 15. Ask, *Why do animals need water?* (for drinking, for washing) *Why do plants need water?* (to grow, to make food) *Why do people need water?* (for drinking, washing, brushing teeth, preparing meals, growing plants) Record students’ responses in a list on the board.
- Ask, *What would happen if we ran out of clean water?* Help students draw the conclusion that all living things need water to survive.
- Ask, *What are some things we can do to save water or to keep water clean?* If necessary, mention one or two of the following water-saving ideas to help students get started. Record students’ suggestions on the board.
 - ▶ Take shorter showers or only fill the bathtub half full.
 - ▶ Don’t leave the water running when you brush your teeth.
 - ▶ Turn faucets off tightly.
 - ▶ Don’t use detergents or other substances that contain harmful chemicals.
- If appropriate, review the other needs of plants and animals besides water. Animals also need air, food, and shelter. Plants also need air, light, and nutrients.

Further Facts

- Less than 1 percent of the water in the world is available for drinking. The rest is salt water or frozen in glaciers.

- People can survive about a month without food but only 5 or 6 days without water.
- Each person in the U.S. uses an average of 100 gallons (379 liters) of water each day.
- A 5-minute shower uses between 25 and 50 gallons (95 to 189 liters) of water.
- Even a small drip can waste as much as 20 gallons (76 liters) of water a day—enough for a shower or 80 quarts of lemonade.
- On average, people use 2 gallons of water each time they brush their teeth. Turning the faucet off while brushing reduces this amount significantly.
- Two-thirds of the water a family consumes is used in the bathroom.
- The human body is about two-thirds water.

AFTER READING

Summarize

Review the words listed in the vocabulary diagram on the board. Help students sort the words into categories, for example: *Words That Describe Water, Where We Find Water, How Water Changes.*

Have students think about the questions they had before they read the book. Ask, *Did the book answer any of your questions? Which ones? Do you still have questions? What are they?* List students’ outstanding questions on the board or chart paper. Then ask, *Where do you think we might find the answers to these questions?* (Students may suggest books, magazines, computers, or people who know about water.)

Flip through the book one more time. Use the headings, photographs, and boldfaced terms to help students use the vocabulary and summarize their learning,

Review/Assess

Use the questions that follow as the basis for a discussion of the book or for a written or oral assessment.

1. What does water feel like? What does it look like? (Water is wet. It has no color. It changes shape depending on the container it is in.)
2. Where might you find water as a liquid? (rain, rivers, lakes, oceans; also from water faucets, drinking fountains, and hoses) Where might you find water as a solid? (ice cubes, ice on puddles or lakes, Antarctica) Where might you find water as a gas? (above boiling water, water vapor in the air)
3. Look at the pictures of water on pages 4 and 5. Which picture shows a liquid? Which shows a solid? Which shows a gas?
4. What happens if you freeze water? (It becomes ice.)
5. What would happen if you put an ice cube in the hot sun? (It would melt and become a liquid.) What happens when water gets very hot? (It evaporates, or changes into a gas.)
6. How could you find out if something dissolves in water? (Stir it into water and see if it seems to disappear.) How could you find out if something sinks or floats? (Place it in a container of water and see if it stays on top or drops to the bottom.)

Writing Links/Critical Thinking

Present the following as writing assignments. Provide help as needed.

1. Create a predictable class story using the sentence pattern, *I use water when I . . .*. Encourage each student to contribute a sentence telling how he or she uses water throughout the day, for example:
 - Mr. Price uses water when he waters his lawn.
 - Grace uses water when she takes a bath.
 - Michael uses water when he brushes his teeth.
 - Alisha uses water when she makes lemonade.
2. Suggest that students make posters showing why we need water and what we can do to save it.
3. Have students draw or cut out magazine pictures of water in its various forms. Help them mount and label the pictures on squares of poster board. Encourage students to sort the cards into the categories *liquid*, *solid*, and *gas*. Or use the pictures to create a bulletin board labeled *Water, Water, Everywhere*.

Science Journals: You may wish to have students keep the writing activities related to the Delta Science Reader in their science journals.

References and Resources

For trade book suggestions and Internet sites, see the References and Resources section of this teacher's guide.