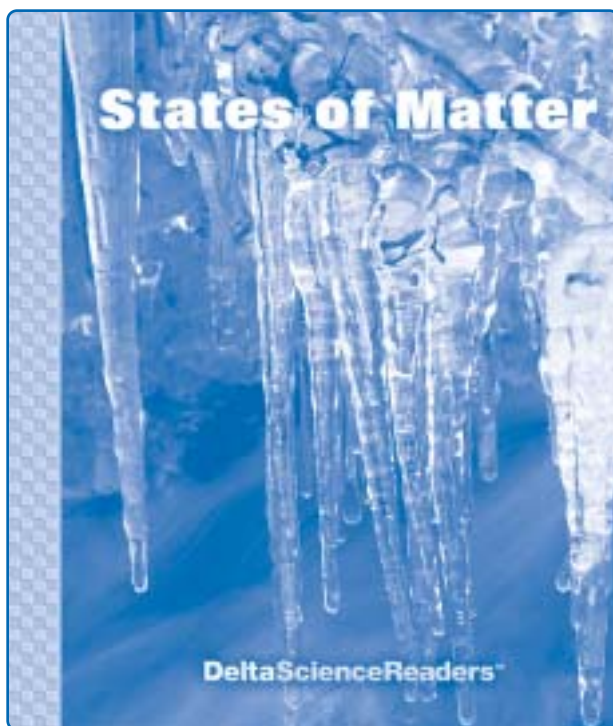


States of Matter



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 links.

OVERVIEW

The Delta Science Reader *States of Matter* introduces students to matter and its physical properties. Students learn about three states of matter: solid, liquid, and gas. They read about changing from one state to another by melting, freezing, evaporation, and condensation. Students meet two scientists who work with matter in different states—one at a crayon factory and another in Antarctica. Finally, they discover how heating gases keeps a hot air balloon afloat.

Students will

- ▶ read about matter
- ▶ identify the properties of solids, liquids, and gases
- ▶ discuss physical changes in matter
- ▶ discuss chemical changes in matter
- ▶ discuss the function of a table of contents, headings, captions, and a glossary
- ▶ make inferences from photographs
- ▶ complete a concept web

READING IN THE CONTENT AREA SKILLS

- Compare and classify matter
- Predict outcomes
- Identify cause and effect relationships
- State the main idea of a passage
- Draw conclusions based on information read
- Demonstrate critical thinking
- Summarize information

NONFICTION TEXT ELEMENTS

States of Matter includes a table of contents, headings, photographs and illustrations, captions, boldfaced terms, and a glossary.

CONTENT VOCABULARY

The following terms are introduced in context and defined in the glossary: *atom, balance, chemical change, condensation, evaporation, gas, liquid, mass, matter, mixture, physical change, physical property, solid, solution, state of matter, temperature, volume, water vapor.*

BEFORE READING

Build Background

Access students' prior knowledge of states of matter by displaying the cover, reading the title aloud, and inviting students to share what they know about the topic from personal experiences and hands-on science explorations. Ask, *Have you ever seen something melt?* If necessary, give students examples in addition to the icicles on the cover, such as butter or ice cream or snow melting. Explore their ideas about changing states of matter by asking questions: *What shape was the butter in before it melted? What shape was it in after it melted? Was it still butter? How do you know?*

To stimulate further discussion of states of matter, ask questions such as these: *Let's say you have a fort made of snow and a fort made of bricks. Which fort might melt on a hot, sunny day? Have you ever seen anything else change when it's heated or cooled?* (Accept reasonable suggestions.)

Begin a class KWL chart by recording facts students know about states of matter in the K column. You may wish to copy the KWL chart and ask students to maintain their own charts as they read.

K What I Know	W What I Want to Know	L What I Learned	+ What I Want to Explore Further

Preview the Book

Take a few minutes to have students look through the book. Remind them of the steps involved in previewing nonfiction: read and think about the title; think of what they already know about the topic; read the table of contents, headings, and boldfaced words; and examine the photographs, diagrams, and illustrations.

Call attention to the various nonfiction text elements and explain how they can help students understand and organize what they read. Point out that the table of contents lists all the main headings in the book and their page numbers. Ask: *How do you think the headings help you know what you will learn about?* Point to some of the illustrations and ask questions such as: *What does this picture show you? How do you think it will help you understand the text?* Explain that the words in dark type, called **boldface** type, are important words related to states of matter. Point out that they are listed with their meanings in the glossary. Have students find the glossary in the table of

contents. *What page is the glossary on?* (page 16) Choose one word and have students find its meaning 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.

Set a Purpose

Discuss what students might expect to find out from the book, based on their preview. List students' predictions on the board. Use the list and the questions in the KWL chart 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 books 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 form pairs or small groups and read the book together. Ask students to pause after each text section. Clarify the text as needed. 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 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. Discuss what students expect to learn, based on the heading. Have students examine any illustrations or graphics and read accompanying captions and labels.
- 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.

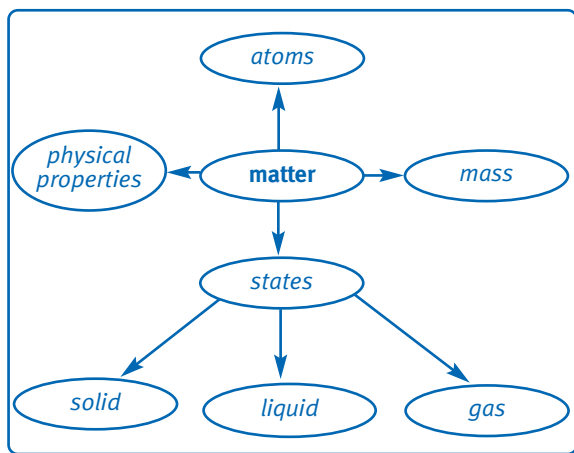
Think About . . . (pages 2–12)

Pages 2, 3 *What Is Matter?*

- Read aloud the heading and the first paragraph on page 2. Confirm students' understanding by asking questions such as, *Is this desk made of matter? Is rain made of matter? Is the air you breathe made of matter?* (Yes, everything is made of matter.)
- Read the second paragraph. Have students look at the pictures on page 3 and ask, *What are the physical properties of this rock?* (Students may say that it is large or hard or rough.) *What are the physical properties of ocean water?* (Students may suggest that it feels wet or tastes salty.)
- Read the third paragraph. Then direct students' attention to the photograph of the balance. Ask, *Have any of you ever seen or used something like this before?* Read aloud the caption and ask, *Which object in the picture has more mass? How do you know?* Hold up a heavy and a light object, for example, a large book and a paper clip. Ask, *Which of these objects do you think has more mass?* (the book) *How might you find out for sure?* (use a balance) *If you were to put this book in*

one pan and the paper clip in the other pan, which pan would sink lower? (the one with the book in it)

- Read the text and discuss the photographs and captions on page 3. Point to the windmill and ask, *Why do you think there is a picture of a windmill to show a gas? What makes a windmill turn?* (the wind, or air blowing) Point out that air is a gas. Ask, *Can you see air?* (no) *How do you know it is there?* (because it turns the windmill)
- Begin a concept web by writing *matter* in a circle on the board. Ask, *What have you found out about matter so far?* Record students' responses in connecting circles, as shown.



▲ A concept web for *matter*.

- Point out the words printed in boldface type on pages 2 and 3. Ask, *What does that tell us about each of these words?* (that it is listed in the glossary) Have students turn to the glossary, locate the word *matter*, and read its meaning.

Page 4 What Are Solids, Liquids, and Gases?

Solids

- Read aloud the question at the top of the page. Then have students read the text on page 4 to find out about solids.

- Direct students' attention to the photographs on page 4. Ask, *What solids do you see pictured?* (log, blocks, bowling ball) *What are some other solids you can see right now?* (Accept all reasonable answers. Students may mention desks, chairs, books, pencils, and other solid classroom objects.)
- Invite students to describe the shapes of some of the objects they name. Then ask how they might find out the sizes of these objects. (Students could measure them with rulers, meter sticks, or measuring tapes. They could use nonstandard units of measurement such as string, paper clip chains, or handspans.) Reinforce that a solid has a shape and a size of its own.
- Discuss the diagram on page 4. Ask what the diagram shows. If necessary, explain that it shows what the particles in a solid look like. Elicit that the particles in a solid are packed very close together. This is why the solid keep its shape.
- Point to the circle labeled *solid* on the concept web. Ask, *What have you found out about solids?* Record students' suggestions on the concept web.

Page 5 Liquids

- Have students look at the pictures on page 5. Ask, *What state of matter do you think you will read about next?* (liquid) Read page 5 with students to find out if their predictions are correct.
- Look at the photographs on page 5. Ask, *What liquid is pictured here?* (honey) *What is different about the two pictures of honey?* (The honey is in different containers. The honey has different shapes in each picture.) *What do you notice about the shape of the honey?* (It is the same shape as the container it is in.) Ask students to name

