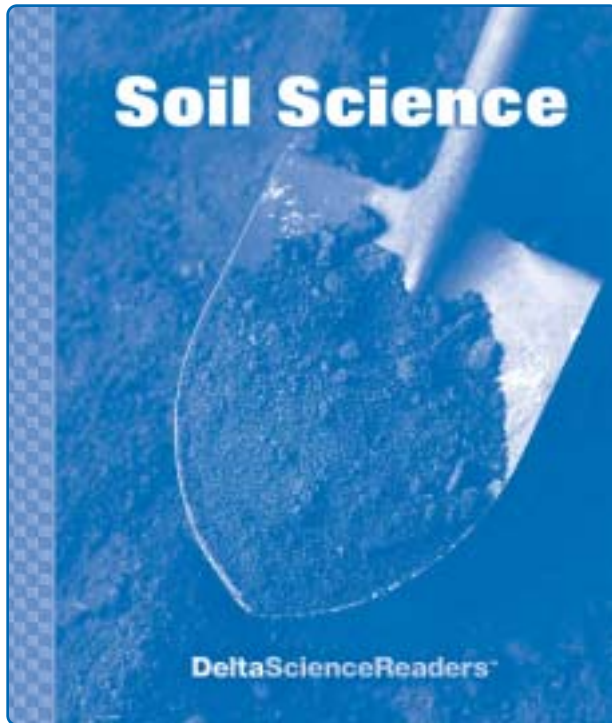


Soil Science



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

In the Delta Science Reader *Soil Science*, students read about the composition and characteristics of different types of soil. They learn about the effects of weathering and erosion in producing and changing soil. They find out about ways that people both harm and protect this vital natural resource. Students also read about soil scientists and their work. Finally, students learn how earthworms keep soils rich and productive.

Students will

- ▶ identify the parts of soil
- ▶ recognize the effects of weathering and erosion
- ▶ compare and contrast different soil layers and types of soil
- ▶ draw conclusions about people's roles in soil pollution and conservation
- ▶ infer how earthworms help enrich soil
- ▶ examine nonfiction text elements such as table of contents, headings, and glossary
- ▶ interpret photographs and diagrams to answer questions
- ▶ complete a KWL chart

READING IN THE CONTENT AREA SKILLS

- Cause and effect
- Compare and contrast
- Critical thinking
- Draw conclusions
- Interpret graphic devices
- Main idea and supporting details
- Make predictions
- Sequence of events
- Summarize

NONFICTION TEXT ELEMENTS

Soil Science includes a table of contents, headings, photographs, diagrams, captions, boldfaced terms, diagrams, labels, and a glossary.

CONTENT VOCABULARY

The following terms are introduced in context and defined in the glossary: *bedrock, castings, clay, composting, conserve, contour plowing, decay, earthworms, erosion, glacier, humus, loam, minerals, natural resource, property, sand, silt, soil, strip cropping, subsoil, texture, topsoil, weathering*

Optional vocabulary: *decomposer*

BEFORE READING

Build Background

Access students' prior knowledge of soils by displaying and discussing the cover. Read aloud the title and ask, *What do you see in this photograph?* (a shovel or spade digging into soil) *What do you think the soil is made up of?* (Students may say dirt, leaves, mud, pieces of rock, sticks, and so on. Accept all answers at this time.) *Do you think all soil is alike? Why or why not?* (Accept all reasonable answers. Students will probably observe that soils in different places look or feel different.)

Read the title aloud, and invite students to share what they know about soil from their personal experiences and hands-on explorations in science. If possible, pass around a small container of ordinary soil. To stimulate discussion, ask questions such as these: *Have you ever looked closely at a handful of soil? What did you notice? Is the soil at a beach the same as the soil in your back yard or on the playground? How are they different? How do you think the soil gets there?*

Begin a KWL chart by recording facts students know about soil in the K column. You may want students to copy the KWL chart so they can 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

Tell students that one way to find out what a book is about is to *preview* the book. Explain that when students preview nonfiction, they should look at the title, the table of contents, headings, boldfaced words, photographs, diagrams, and captions.

Then preview the book with students. As you flip through the pages, call attention to the various nonfiction text elements and explain how they can help students understand and organize what they read. Ask questions such as these: *What do you see in this picture? What do you think this photograph is showing us about soil? What on this page might help you find out what this section is about? Why do you think these words are in darker type? How might these words help you predict what you will be reading about?* Explain that the words in boldface type are important words related to soil science. Point

out that these words are defined in the glossary. Choose one word and have students 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 draw the following chart on the board. List vocabulary words in the first column. Briefly discuss what students already know about the word, and encourage them to predict the word's meaning. Record their responses in the "Before Reading" column. After students read the book, record their revised understandings of each word in the third column.

WORD	BEFORE READING	AFTER READING
soil	dirt	made of minerals, humus, air, and water

Set a Purpose

Discuss with students what they might expect to find out from the book, based on their preview. Record students' questions in the W ("Want to Know") section of the KWL chart. Encourage them to use the questions on the 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 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.

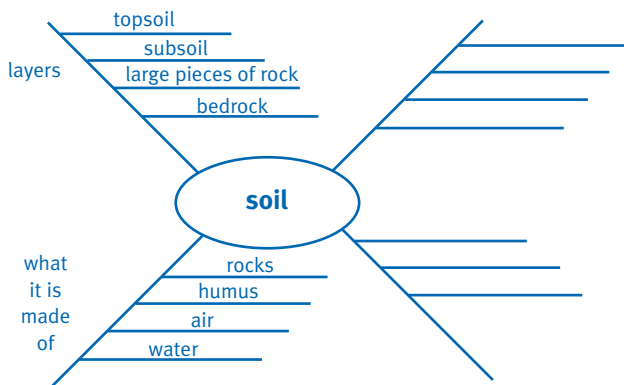
Think About . . . (pages 2–12)

Pages 2, 3 *What Is Soil?*

- Ask students if they have ever dug a hole in the ground. Briefly discuss students' prior experience with soil by asking questions such as, *What did the soil feel like? What did it look like? Did the soil have a smell?*
- Read aloud the heading on page 2 and ask volunteers to predict the answer to the

question, What Is Soil? Tell students that they can find out if their predictions are correct by reading pages 2 and 3.

- Read aloud page 2. Ask, *What is soil made of?* (rocks, humus, air, water) *What are rocks made of?* (minerals) *What are minerals?* (solid materials that form in nature) *Are minerals alive?* (no) *What makes humus?* (plants and animals that were once alive but are now dead and decayed)
- Ask students to look at the diagram on page 3. Point to the tree and ask, *What is this?* (a tree with roots growing down into soil) *What do you think this diagram shows?* (layers of soil underground) Read aloud page 3. Ask volunteers to point to each layer on the diagram as you say its name. Ask, *In what layers of soil are the tree's roots growing?* (topsoil and subsoil) *Why do you think the tree's roots don't grow in the layer with large pieces of rock or in bedrock?* (There is no humus in those layers.)
- You may wish to start a spider diagram to record students' responses and help them visualize the main idea and details of each section.



Pages 4–6 How Does Soil Form?

Pages 4, 5

- Ask a volunteer to read aloud the heading on page 4. Help students identify the photographs on pages 4 and 5. Then ask,

How might these pictures help us understand how soil is formed? (Accept all reasonable answers at this time.) Tell students they will find out as they read the next two pages.

- Read aloud pages 4 and 5. Ask, *What is weathering?* (rocks breaking down into smaller and smaller pieces) *What are some things that can cause weathering?* (rainwater, streams and rivers, wind, temperature changes, glaciers, living things such as plant roots) Discuss how each force breaks down rocks into small pieces that can form soil.
- Ask, *Does weathering happen quickly?* (No, weathering is a very slow process.) Tell students that it can take up to a thousand years to produce an inch of weathered material that will become soil.

Page 6

- Remind students that soil is made of rocks, humus, air, and water. Ask, *How do you think humus gets into the soil?* (Plants and animals die and decay.) Have students read to confirm their responses.
- Ask, *What kind of animals live in soil?* (Students may suggest worms, insects such as ants, moles, gophers, and so on.) *How do they help soil?* (They help change leaves to humus. They mix the materials in soil. They dig tunnels that let air and water into soil.)
- Have a volunteer read the caption for the photograph of the mushroom on page 6. Mushrooms break down dead things for food. Explain that mushrooms are not plants or animals. Mushrooms are fungi. Some people say that fungi, along with bacteria, are the world's smallest recyclers!

As appropriate, introduce the word *decomposer*. Explain that the word *compose* means “to put together,” as in “compose a paragraph.” Ask students to guess at the meaning of the prefix *de-* for this word. (undo) Tell students that

