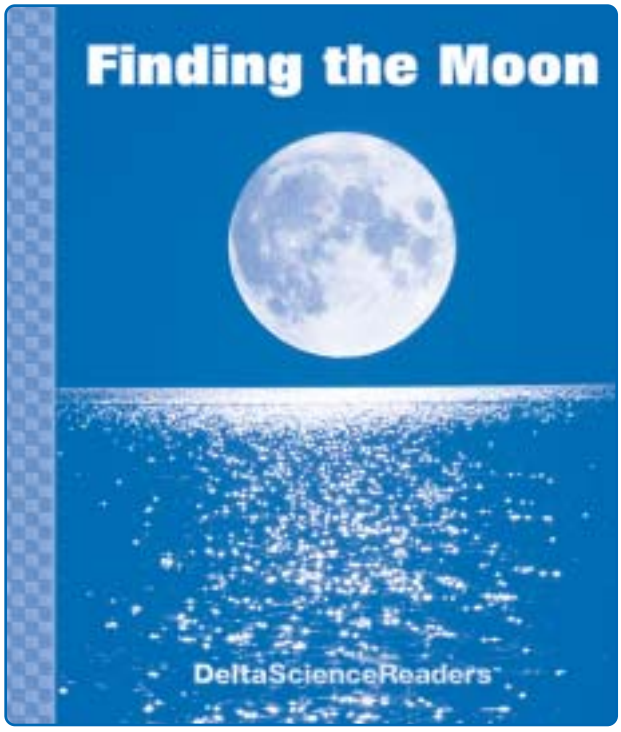
DELTA SCIENCE READER

Finding the Moon



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

The Delta Science Reader *Finding the Moon* introduces students to what we see in the sky and to Earth's closest neighbor, the Moon. Students discover what makes the Moon shine and why the Moon appears to have different shapes. They read about craters, seas, and other parts of the Moon's environment. Students are introduced to Neil Armstrong, the first person to walk on the Moon. Students also compare the size of the Moon to that of Earth and the Sun.

Students will

- compare and contrast daytime and nighttime skies
- learn that the Moon reflects light from the Sun
- learn about Moon phases
- read about the Moon's surface
- read and discuss biographical information
- interpret photographs
- discuss the functions of the parts of a book, table of contents, and glossary
- complete a concept web

READING IN THE CONTENT AREA SKILLS

- Compare and contrast the daytime and nighttime sky
- Recognize cause-effect relationship of why we can see the Moon shine
- Compare and contrast the Moon, the Sun, and Earth
- Recognize a pattern
- Demonstrate critical thinking
- Summarize information

NONFICTION TEXT ELEMENTS

Finding the Moon includes a table of contents, headings, photographs, boldfaced terms, and a glossary.

CONTENT VOCABULARY

The following terms are introduced in context and defined in the glossary: *astronaut, crater, Earth, full Moon, Moon, new Moon, phases, reflect, seas, Sun.* Optional vocabulary: *constellation, cycle.*

BEFORE READING

Build Background

Access students' prior knowledge of the Moon by asking, *Have you ever seen the Moon? When have you seen it? What did it look like?* Briefly discuss students' experiences.

To stimulate additional discussion, ask questions such as these: *Where was the Moon when you saw it? Did you see it in the daytime or the nighttime? What shape was it? Have you ever seen the Moon when it was a different shape? What other shapes have you seen?*

Begin a class concept web by drawing a large crescent Moon on the board or chart paper. Ask, *What do you know about the Moon?* Record students' responses in circles connecting to the Moon. Tell them that they will be able to check their answers in the web and to add new information to it as you read the book.

To create interest in the topic, have students draw pictures of the Moon. Encourage them to put themselves in the picture as well.

Preview the Book

Ask students to look at the picture on the front cover of the book. Ask, *What do you see in this picture?* Read aloud the title and ask a volunteer to come up and point to the word *Moon.*

Flip through the book and briefly discuss the photographs. To stimulate discussion, ask questions such as, *Does this picture show the daytime or the nighttime? What shape is the Moon in this picture? What else do you see in the picture? Does this look like Earth or the Moon? What makes you think that?*

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?* Give students a few minutes to share their observations. Point to the first three headings in boldface type and explain that the book is divided into three parts: Think About . . . , People in Science, and Did You Know? Read aloud the headings listed in the Think About . . . section and note that they are in the form of questions. Ask, *Where do you think you might find the answers to these questions?* Point to the page numbers listed after each heading. Explain that each number tells where they might find the answers to the questions.

Point to the word Glossary at the bottom of the page and read it aloud. Tell students that a glossary is a list of words and their meanings. Have students turn to the glossary at the back of the book. Explain that the words in the glossary are important words that they will need to

know in order to understand the information in 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.* Suggest that students look for these words as they read the book *Finding the Moon*.

Preview the Vocabulary

To activate students' prior knowledge of vocabulary words, write several key words on the board, such as *astronaut, crater,* and *phase*. Tell students that each of the words on the board has something to do with the book. Read each one aloud and ask, *What do you think this word has to do with the Moon?*

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

For example, you might create a "Moon words" word wall by writing the letters of the alphabet on crescent Moon-shaped cutouts. Place the letters in alphabetical order along the top of a blank wall or bulletin board.

Then write each vocabulary word on a card. Read the word aloud and ask, *What do you notice about this word?* Briefly discuss the meaning of the word within the context of the book. Then post the card under the appropriate letter on the wall. Set aside a few minutes each day to review the words on the wall and to add new words as appropriate.

Set a Purpose

Tell students to think about what they have seen and talked about as they have previewed the book's cover, table of contents, vocabulary words, and pictures. Ask, *What kinds of things would you like to learn about the Moon as you read this book?* Use students' suggestions to set a 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. Encourage students to add or revise information on the concept chart as you read.

- **Shared Reading** Pair readers with nonreaders and have them read the book together. Ask students to pause after each text section. Clarify the text as needed. Discuss any information students may want to add to the concept web on the board.

- **Independent Reading** Some students may be ready to read independently. Instruct them to pause at designated stopping points and have them rejoin the class for discussion. 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 aloud the heading. Discuss what students expect to learn, based on the heading. Briefly discuss the photos in the section.

- Help students use context and picture clues to figure out the meanings in boldface type. Demonstrate how to look up the words in the glossary and help students read their meanings.

- As appropriate, model reading strategies students may find helpful for nonfiction: making personal and text-to-world connections, asking questions, visualizing, making inferences, self-correcting.

Think About . . . (pages 2–13)

Pages 2, 3 *What Do We See in the Sky?*

- Have students look at the photographs on pages 2 and 3. Ask, *How are these two pictures different?* (Students may notice that one shows the daytime and the other shows nighttime.) *What other differences do you see?* (Students may name different objects they see in the photographs.) *How are the two pictures alike?* (They both show the sky. They both show water, or the ocean.)

- Read aloud the heading. Ask, *What are some things you might see in the sky during the day?* (Possible answers include the Sun, clouds, or airplanes.) *What might you see in the sky at night?* (Students may suggest the Moon and stars.) Ask students to listen as you read aloud the text on pages 2 and 3.

- Ask, *What does the Sun look like?* (Students may say that the Sun is bright or looks like a ball of fire.) Have students point to the Sun in the photograph on page 2.

- Ask, *What does the Moon look like?* (Students may answer that the Moon can look as if it has different shapes or that it is not as bright as the Sun.) Have students point to the Moon in the photograph on page 3.

- Ask, *Can you see the Sun during the night?* (no) *Can you see the Moon during the day?* If any students say no, point out that the Moon can often be seen in the sky during the day as well as at night.

Pages 4, 5 *Why Does the Moon Shine?*

- Before reading page 4, ask, *What do you think makes the Sun shine?* (Accept all ideas.) If necessary, tell students that the Sun is like a ball of burning gas. The Sun glows and gives off heat.

- Direct students' attention to the photograph on page 4. Ask, *What do you see in this photograph?* (the Moon) *How do you know it is the Moon?* (Accept all answers.) Read aloud the heading on the page. Ask, *Why do you think the Moon shines?* (Accept all answers.)

- Read aloud the text on page 4. Point out the word *reflects* and ask, *What do you notice about this word?* (It is printed in dark print.) *Do you remember what is special about words printed in dark print?* (They are listed in the glossary.) Have students turn to the glossary and find the word *reflect* on the page. Read aloud the definition.

  Discuss the word *reflect* and the related word *reflection*. Students may be familiar with the idea of a *reflection* in a mirror. Have them look back at the cover to see the reflection of the Moon in the ocean. The image of the Moon "bounces off" the surface of the water.

- Then turn to page 4 again and reread the third sentence. This time, substitute the glossary definition for the word *reflect: The light from the Sun bounces off the Moon.*

- Ask, *Does the Moon have its own light?* (no) *What makes the Moon shine?* (Light from the Sun bounces off the surface of the Moon.) Explain that the light that is reflected off the Moon is called *moonlight*. Be sure students understand that without the Sun, there would be no moonlight.

- Ask, *Do we have any new information to add to our web about the Moon?* Record students' suggestions on the web.

Pages 6–10 *What Are Moon Phases?*

Pages 6, 7

- Explain to students that the Moon, like the Sun, is shaped like a ball. Ask, *When you see the Moon in the sky, do you always see a round shape, like a ball?* (no) *What other shapes might you see?* Ask volunteers to draw the different shapes on the board. Confirm that the Moon appears to have different shapes at different times. Tell students that they will find out why this happens when they read the next few pages of the book. Leave the drawings on the board for reference as students read on.

- Read aloud page 6. Ask, *What are the different shapes of the Moon called?* (phases) Invite students to compare the shape of the Moon in the photograph to the pictures they drew on the board. Does the photograph match any of their pictures?

- Point out the people in the photograph on page 6. Ask, *What do you think these people are doing?* (pointing at the Moon, looking at the Moon through a telescope) If necessary, explain that a telescope makes things that are far away look closer and bigger.

- Ask students to look at the photograph on page 7. Ask, *Do you see the Moon in this picture?* (no) *Where do you think it is?* (Accept all answers.) Tell students to listen to find out if they are right.

- Read aloud page 7. Ask, *Can you see a new Moon?* (no) *Does that mean the Moon is not there?* (No, it is still there. You just can't see it.)

  As appropriate, discuss with your class *why* the Moon has different phases. The Moon's shape appears to change because of the Moon's orbit, or movement around, Earth. As the Moon travels around Earth, we can see different amounts of its lighted surface.

  There are five basic phases of the Moon: new, crescent, quarter (or half), gibbous, and full. In the new Moon phase, the lighted surface of the Moon faces away from Earth, and we do not see the Moon at all. In the full Moon phase, the surface of the Moon facing toward Earth is entirely lighted. We see the Moon as a "big circle" in the sky. It takes about 4 weeks for the Moon to make one revolution around Earth. In this time period, the Moon goes through its cycle of phases, from new Moon to full Moon and back to new Moon again.

- Ask students to look at all the stars in the sky in the photograph. Ask if they have ever seen a pattern of stars in the sky at night. Explain that a pattern of stars is called a *constellation*.

Pages 8, 9

- Read aloud page 8 and have students look at the photograph. Ask, *How much of the Moon can you see?* (just a little bit) *What words would you use to describe this Moon shape?* (Students may suggest *fingernail, crescent*, or *banana*.) Invite a volunteer to find a drawing on the board that matches the shape of the Moon in the photograph.

- Now read page 9 and have students look at the photograph. Ask, *How much of the Moon do you see in this picture? More than the picture on page 8? Less? About the same?* (more) Some students may call this a half Moon.

Page 10

- Have students turn to page 10 and look at the photograph. Ask, *Now how much of the Moon can you see?* (the whole Moon) *Have you ever seen the Moon when it looked like this?* Briefly discuss students'

experiences. Then ask, *Does anyone know what the Moon is called when it is fully lighted like this?* (the full Moon) Read page 8 to confirm students' guesses.

Tell students that in about four weeks the Moon goes through all its phases. About every four weeks, the Moon is a full Moon. Then the cycle of phases starts all over again.

Discuss the word *cycle* with students. Tell them that a cycle goes around, like a circle. Ask if they know about any other cycles. (bicycles, tricycles; plant or animal life cycles)

- Ask, *What have we found out so far about the different shapes of the Moon we can see?* Add students' suggestions to the web on the board.

Pages 11–13 *What Is the Moon Like?*

Page 11

- Ask, *When you look out the window, what do you see?* (Students may suggest buildings, people, trees, grass, clouds, and so on.) *How many of these things do you think you would find on the Moon?* (Accept all responses at this point.) Tell students that the next few pages will tell them more about what the Moon is like.

- Ask students what they see in the picture on page 11. (rocks and mountains; possibly footprints and Moon buggy tracks—*see Further Facts page 119*) Ask, *Do you see any plants or animals in this photo?* (no) *Do you see any water?* (no) *Where do you think this photo was taken?* (Accept all ideas.)

- Read aloud page 11. Ask, *How is the Moon like Earth?* (They both have mountains.) *How is it different?* (The Moon has no air.) *Do you think there are any plants or animals on the Moon? Why not?* (Accept reasonable responses.)

Page 12

- Ask students where they think the photograph on page 12 was taken. Ask, *What do you see in this picture?* Point to the craters in the picture and ask, *Do you know what these are called?* Suggest that students find out by reading the page.

- Read page 12. Then ask a volunteer to point to the word in dark print and read it aloud. Ask, *What are craters?* (big holes on the Moon's surface) *What made the craters?* (rocks hitting the Moon) Tell students that some of the rocks are big—some bigger than a house—while others are small. Explain that the rocks fly around space at different speeds. Very large rocks and rocks that were traveling very fast when they hit the Moon made the biggest craters.

Page 13

- Have students look at the photograph of the Moon on page 13. Ask, *What do you think the dark patches on the Moon are?* (Accept all answers.)

- Read aloud page 13. Ask, *What is a sea?* (an ocean, or a big area of water) *How are seas on the Moon different from seas on Earth?* (Seas on the Moon are not really seas; they have no water.)

Long ago, people thought that these areas on the Moon had water, so they called these areas *maria,* which means "seas." Tell students that some of the dark areas have names like Sea of Clouds, Sea of Showers, and Ocean of Storms. Look back at some of the other photographs of the Moon in the reader. Have students try to find the seas on the Moon pictures.

- Ask, *How do you think people found out what the Moon is like?* If necessary, explain that the Soviet Union and the United States sent spaceships to the Moon. Ask, *Does anyone know what a person who travels in a spaceship is called?* (an astronaut)

People in Science

Page 14 *Neil Armstrong*

- Direct students' attention to the photograph on page 14. Ask, *What do you see in this picture?* (an astronaut and a United States flag) *Where do you think this astronaut is?* (on the Moon)

- Read aloud the heading on page 14. Ask, *Does anyone know who Neil Armstrong is?* Suggest that students read the page with you to check their answers.

- Ask a volunteer to find the word in dark print on the page. Then read the word *astronaut* aloud. Ask students what the dark print indicates and have them turn to the glossary. Tell students, *The words on this page are listed in ABC order. What letter does the word* astronaut *start with? Where on the page would you expect to find this word?* (at the top of the page) Have students point to the word *astronaut*. Then read aloud the definition.

- Have students turn back to page 14 and listen as you read aloud the text. Ask, *Who was Neil Armstrong?* (the first person to walk on the Moon) *Why did Neil Armstrong bring rocks back from the Moon?* (so that scientists could study them) *What else do you think Neil Armstrong found on the Moon?* (Students' suggestions may include craters, mountains, flat rocks, and so on.) Ask students why they think it would be helpful to have Moon rocks to study.

- Discuss the word *collect* and the related word *collection*. Ask if any of the students have collections. What kinds of collections do they have? How do they collect objects for their collections?

- Ask, *What do you notice about how this astronaut is dressed? Why do you think he is wearing a suit like this?* (Accept all observations and ideas.)

Further Facts

- The astronauts on the *Apollo 11* mission to the Moon were Neil Armstrong, Edwin "Buzz" Aldrin, Jr., and Michael Collins.

- Armstrong and Aldrin landed on the Moon on July 20, 1969, in a lunar module called the *Eagle,* while Collins orbited above in the command module *Columbia*.

- The *Eagle* landed in a flat space called the Sea of Tranquility.

- Neil Armstrong's words as he stepped onto the Moon's surface were, "That's one small step for man, one giant leap for mankind."

- The astronauts took more than 100 photographs, collected soil and rock samples, and deployed scientific instruments.

- In total, nine spaceships and 27 astronauts made trips to the Moon. The last trip was in 1972.

- The *Apollo 11* team brought back 22 kilograms (almost 50 pounds) of lunar material, including 50 Moon rocks. In total, astronauts have collected 382 kilograms (842 pounds) of rocks, pebbles, sand, dust, and core samples from the Moon's surface.

  Most of the samples are stored in a special building at the Johnson Space Center in Houston, Texas. Each year, almost 1,000 samples are sent to museums and universities for research and teaching projects. Samples also have been displayed at science museums around the country.

- The photograph on page 14 shows astronaut Buzz Aldrin. It was taken by Neil Armstrong. The United States flag in the

photograph is still on the Moon. Apollo astronauts have also left behind boot prints and buggy tracks (see the photograph on page 11), some golf balls, and scientific instruments.

Did You Know?

Page 15 *About the Size of the Moon*

- Invite a volunteer to read the labels on the photograph on page 15. Ask, *Which looks bigger in this photograph, the Moon or Earth?* (Earth) *When you look at the Moon in the sky, does it seem bigger or smaller than Earth?* (smaller) *Does it look bigger, smaller, or about the same size as the Sun?* (usually about the same size)

  This photograph was put together by NASA from two images. The photograph of Earth was taken using filters that give land areas a red coloring.

- Read aloud page 15. Ask, *Is the Moon bigger or smaller than Earth?* (smaller) *Is it bigger or smaller than the Sun?* (smaller)

- Ask students if they have ever looked at the ground from an airplane or from the top of a tall building. Ask, *What did the objects on the ground look like?* (small) Explain that the farther away an object is, the smaller it looks. You could also demonstrate this by holding an object such as a book in your hand and walking backward away from students. They can watch the object "get smaller." Or simply look out the window at a faraway large object and note how small it looks. Guide students to understand that even though the Moon is much smaller than the Sun, they may appear to be the same size because the Sun is farther away.

After Reading

Summarize

After reading, ask students what ideas and words they would like to add to the web on the board. Review the web together as a way of summarizing what students have learned.

Flip through the book one more time. Use the photographs and boldfaced terms to help students summarize the information in each section.

Review/Assess

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

1. *Does the Moon make its own light?* (no) *Why does the Moon seem to shine?* (Light from the Sun reflects, or bounces, off the Moon's surface.)

2. *What are the phases of the Moon?* (the different shapes of the Moon that we see)

3. *If you were an astronaut and landed on the Moon, what would you see around you?* (craters, mountains, large flat places called seas)

4. *Could you live on the Moon without a spacesuit? Why not?* (Accept reasonable responses that relate to the environment on the Moon.)

5. *Which is bigger, the Sun or the Moon?* (the Sun) *Why do the Sun and Moon look about the same size to us?* (The Moon looks as big as the Sun because it is much closer to Earth.)

Writing Links/Critical Thinking

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

1. Have students imagine that they are astronauts who have landed on the Moon. Have them draw pictures and label what they see around them.

2. Suggest that pairs or small groups of students create picture dictionaries of Moon words. Encourage students to begin with the words in the glossary and add any other interesting Moon-related words they can find or think of.

3. Suggest that pairs or groups of students illustrate and label a "Visitor's Guide to the Moon." Help students brainstorm the kind of information they will need to put in their guides. For example, they can include how the visitors will get to the Moon, what they will need to take with them on their trip, and what they can expect to see and do once they reach the Moon. They can also draw what Earth looks like from the Moon.

Science Journals: You may wish to have students keep the writing activities related to the 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.