



Reading, Writing and Science Connections

EARTH & SPACE VOYAGE

TEACHER'S GUIDE

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About the Guide

Introduction

It is no surprise that the mysterious subject of space captures the interest of people of all ages. Students in particular enjoy learning about space and how humans are constantly discovering new information, the features of the planets in our solar system, and how everything is connected in the universe. In addition, national and state content standards require that students learn about Earth and space sciences.

The resources in *Reading, Writing and Science Connections—Earth & Space Voyage . . .*

- motivate students to learn more about space by providing them with well-written and beautifully illustrated nonfiction resources.
- help teachers meet reading, writing, and science requirements through lessons and activities that improve students' nonfiction reading comprehension skills.
- take learning to a higher, cross-curricular level by connecting writing, reading, and science.
- provide correlations to reading, writing, and science standards.
- enhance students' awareness of the diversity and similarities among planets and their importance in the universe.

What's Included

This supplemental kit includes the following helpful resources:

- a two-part Teachers' Guide—*Reading and Writing Activities* (Part A) and *Science Resource Activities* (Part B).
- six copies of each of the five *Space Guides* titles:
 - Exploring the Earth*
 - Exploring the Moon*
 - Voyage Through Space*
 - Discovering the Universe*
 - Discovering the Solar System*

The nonfiction science readers are full of factual, fascinating information. The easy-to-understand text and the lavish, full-color photographs will be sure to capture student interest and transform the task of research into an intriguing investigation.

- 20 full-color Solar System cards with beautiful images and interesting information about each space object.
- a CD (Windows and Mac compatible) of the reproducible student pages found in both parts of the Teacher's Guides and the Solar System cards. This will make duplicating materials easier and will improve the copy quality. The pages have been prepared as PDF files and can easily be printed.



EXPLORING THE MOON

Reading Focus: Comprehension / Using Structural Features of Informational Texts

Grades 3–5 Standard 5. Benchmarks 1, 2, 3, 5, 6, 7

Grades 3–5 Standard 7. Benchmarks 1, 4, 6, 7

Grades 6–8 Standard 5. Benchmarks 1, 3, 6

Grades 6–8 Standard 7. Benchmarks 1, 3, 4, 5

Materials (per student)

- 1 copy of *Exploring the Moon*
- 1 copy of the Exploring the Moon Study Guide Bookmark (page 19A)
- 1 copy of Where Is It Found? (page 20A)
- 1 copy of KWL Chart (page 21A)
- 1 copy of Earth and Moon—Venn Diagram (page 22A)
- 1 copy of Can You Find It? (page 23A)

Preparation

Have students cut out and prepare the Exploring the Moon Study Guide Bookmarks. Introduce students to their copies of *Exploring the Moon*. Make a list on the board or a chart indicating what students should be looking at: titles, headings, subheadings, bold or italicized words, and pictures.

Allow students several minutes to examine the book and discuss what they've already learned by flipping through the pages.

Have students complete the *Know* and the *What* sections of the KWL Chart before reading the text in detail. Compare student responses. Tell students that they will complete the last section on the chart at the end of the moon unit.

Lesson

Explain to students that they will be paying specific attention to how the book is organized and what information is in each section. You may have students fill out the Study Guide Bookmarks either while you read together as a group or as an independent activity later on. Students should save the bookmarks for later activities and as a study guide. Afterwards, students can use these Study Guide Bookmarks for information reports or other types of writing activities once they have finished studying all of the books in the *Space Guides* series.

Have students read the book and use the following questions to help guide group discussion. Encourage students to acquire the meanings of new words through context and by looking for key words or phrases that indicate the core meaning of the text. Demonstrate for students how to use the glossary at the back of the book to learn the meaning of and define words they cannot determine from the context. All of the words in **bold** type are included in the glossary.

Guided Questions**Page 3**

Have students look at the Table of Contents. Ask students to tell you what they might expect to learn in the different sections of the book.

Pages 4 and 5

How long did it take astronauts to reach the moon? (3 days) How long does it take the moon to make one orbit around Earth? (about 1 month) Does the moon have any light of its own? (no) How many phases does the moon go through in a month? (8) What is light reflected on the moon from Earth called? (earthshine)

Pages 6 and 7

In the past, what images were thought to be seen on the surface of a full moon? (Man-in-the-Moon, a leaping rabbit, a crab, a poodle, and a kissing couple) What did Leonardo da Vinci think the brighter areas of the moon were? (seas)

Pages 8 and 9

What instrument proved that the moon was a solid, rocky world? (the telescope) How do astronomers today think the moon was formed? (they think a small planet smashed into Earth when it was young and large amounts of material were thrown into space creating the moon) Why is the moon lighter than Earth? (Earth has a heavy iron core at its center)

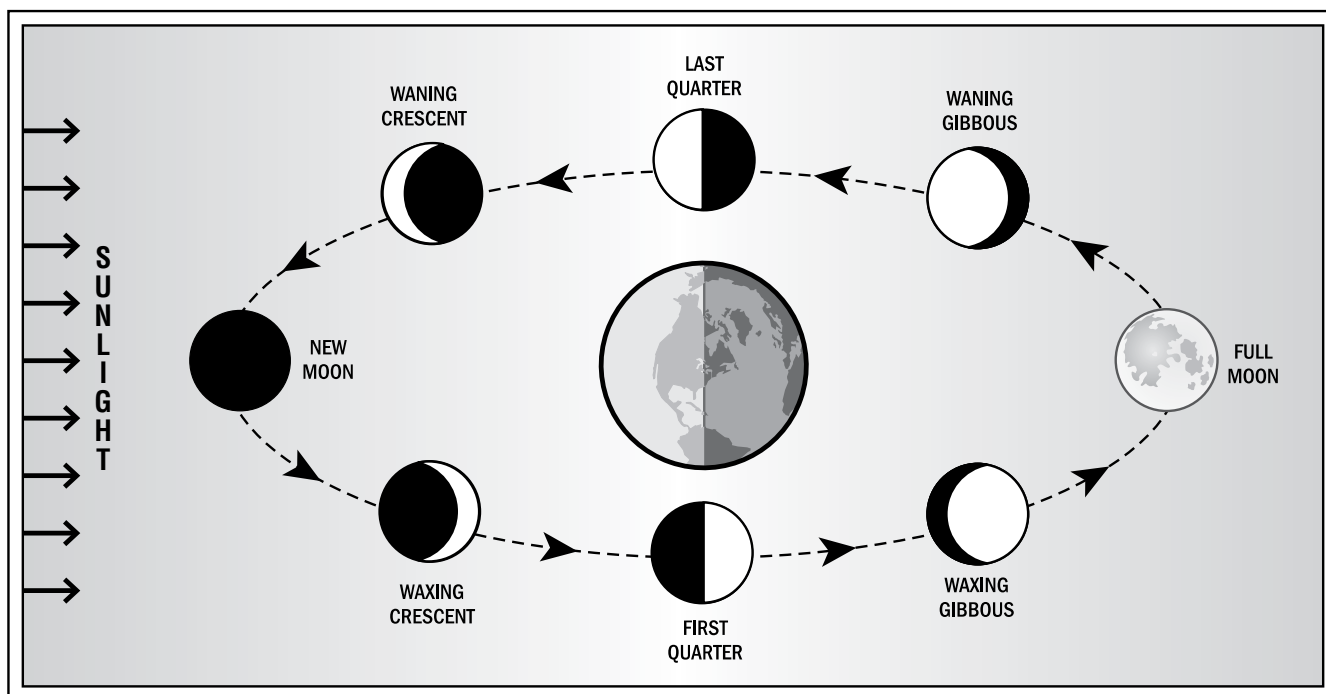
Pages 10 and 11

What created the large dark areas called *seas* on the moon? (asteroid impacts caused lava to flow out of the moon onto the moon's surface) What kind of names were given to the moon's seas? (romantic names) Name two lunar mountain ranges. (Alps and Apennines)

PHASES OF THE MOON

The sun illuminates the moon. We see the sun's light reflected off the moon. As the moon orbits Earth during a period of slightly more than 29 days, we see a changing portion of its face visible to Earth. These are called *phases of the moon*.

The 8 Phases of the Moon



Facts About the Phases

- Half of the moon is always in sunlight.
- The phases of the moon depend upon how much of the near half of the moon we see from Earth.
- When the moon is between Earth and the sun, its daylight side is turned away from Earth and is not seen. This is the *new moon* phase.
- As the moon revolves around Earth, more of its lighted surface becomes visible. The first visible phase is the *waxing crescent* phase.
- *Waxing* means growing. A waxing crescent/waxing gibbous means a growing or enlarging portion.
- *Waning* means shrinking. A waning crescent and a waning gibbous are gradually shrinking from view.
- A “blue moon” is not really blue. A “blue moon” occurs when a second full moon is visible in a single calendar month.
- A “blue moon” occurs about once every three years.
- A “blue moon” never occurs in February because the month is only 28 or 29 days long.

Assignment

1. Complete the phases of the moon log on page 28B each night for 30 days.
2. Record the date and time you observed the moon each night under the correct moon phase.
3. Refer to this page for the names of the moon phases.

OUR SUN

THE NEAREST STAR

Did
You
Know?

Every second, the sun loses four million tons of its weight as it burns up the gas at its center. Despite this, the sun will continue to shine for several **BILLION** more years!

All plant and animal life on Earth depends upon energy from the sun.

OUR SUN

THE NEAREST STAR

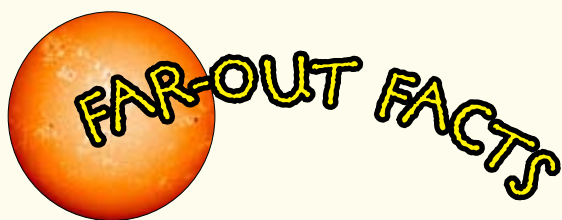
At the center of the solar system is the sun. It has an immense gravitational pull that keeps all of the planets, dwarf planets, moons, and other space objects orbiting around it. The closer a planet is to the sun, the warmer it is, and conversely, the farther away a planet is from the sun, the colder it is. Earth is just the right distance away from the sun! The heat and light from the sun support life on Earth by creating its climate and weather.

The sun is about 109 times larger than Earth! It is mostly made up of the gasses hydrogen (74%) and helium (24%). The sun is not solid like the other objects in the solar system; rather, it is plasmatic and does not have a definite boundary, since it is made up

of gasses. However, it does have a specific structure.

The sun is actually a star! In fact, it is one of the largest and brightest stars in the universe. The sun is classified as a large, yellow dwarf star. Stars as hot and bright as the sun are rare. It is a relatively young star, about halfway through its life. Eventually, in about five billion years, the sun will become much larger and cooler and change colors, becoming a red giant. For now, scientists say the sun continues to get brighter. In fact, compared to the beginning of the sun's history, it is about 33% brighter now.

The sun actually orbits the center of the Milky Way galaxy. The Milky Way is a spiral galaxy that consists of over 400 billion stars, plus gas and dust.



Distance from Sun	27,000 light years
Period of Revolution (year)	250 million years
Period of Rotation (day)	25 days
Diameter	870,000 miles
The sun is believed to be at least 4.5 billion years old.	

Check It Out!

- Why would it be harder for a planet closer to the sun than Earth to sustain life? What about a planet farther away?
- In what ways does the sun help "power" Earth?
- Why does the sun look red at sunset?