

Below Level



SCIENCE • GRADE 3

California Content Standards
Earth Sciences: 4.A
Earth Sciences: 4.B
Earth Sciences: 4.C
Earth Sciences: 4.D
Earth Sciences: 4.E

The Earth in Space

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The Earth in Space

California's Science Content Standards Met

GRADE 3 SCIENCE

EARTH SCIENCES: 4—Objects in the sky move in regular and predictable patterns. As a basis for understanding this concept:

- a. Students know the patterns of stars stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.
- b. Students know the way in which the Moon's appearance changes during the four-week lunar cycle.
- c. Students know telescopes magnify the appearance of some distant objects in the sky, including the Moon and the planets. The number of stars that can be seen through telescopes is dramatically greater than the number that can be seen by the unaided eye.
- d. Students know that Earth is one of several planets that orbit the Sun and that the Moon orbits Earth.
- e. Students know the position of the Sun in the sky changes during the course of the day and from season to season.

GRADE 3 ENGLISH LANGUAGE ARTS

1.0 WORD ANALYSIS, FLUENCY, AND SYSTEMATIC VOCABULARY DEVELOPMENT

Vocabulary and Concept Development 1.6—Use sentence and word context to find the meaning of unknown words.

2.0 READING COMPREHENSION

Structural Features of Informational Materials 2.1—Use titles, tables of contents, chapter headings, glossaries, and indexes to locate information in text.

Comprehension and Analysis of Grade-Level-Appropriate Text 2.2—Ask questions and support answers by connecting prior knowledge with literal information found in, and inferred from, the text.

Comprehension and Analysis of Grade-Level-Appropriate Text 2.6—Extract appropriate and significant information from the text, including problems and solutions.

Below Level



SCIENCE • GRADE 3

California Content Standards

Earth Sciences: 4.A

Earth Sciences: 4.B

Earth Sciences: 4.C

Earth Sciences: 4.D

Earth Sciences: 4.E

Student Book

The Earth in Space

Print pages 5 – 18 of this PDF for the student book.

How to Make the Student Book

- The student book is contained on pages 5–18 of this PDF. It begins on the next page.
- To make one student book, or a two-sided master copy that can be photocopied, you will print on both sides of seven sheets of 8.5" x 11" paper.
- Do a test printout of one book first to familiarize yourself with the procedure.
- Follow these instructions carefully.

First—Select the Paper

Since you will be printing on both sides of the sheets of paper, select a good quality white paper. We recommend using at least a 22lb sheet.

Second—Check Printer Settings

Be sure you have the correct page setup settings for your computer and printer. You will print these pages in landscape format.

Third—Print EVEN Pages

Open the PDF of the book you want to print. Select print from your file menu. In your printer's dialogue box enter pages 5–18 to print. Then select EVEN pages only. It is important to print only the EVEN pages first. Click "Print" to print the even pages. (**Important note:** The first page that prints will be blank. DO NOT discard this page. It will be needed to print the cover in the next step.)

Forth—Print ODD Pages

When the even pages have printed, flip the stack of pages over to print the odd pages. Place the stack back in your printer. Select print from the file menu again. In your printer's dialogue box, select ODD pages. Click "Print" to print the odd the pages.

Fifth—Fold the Book

You now have a complete book. Check to be sure the pages are in the correct order with the book's cover as the top page. Then fold the stack of paper in half.

Sixth—Staple the Book

Use an extended-length stapler to staple the pages together. Place three staples in the spine of the book.

Please note that printers vary in how they output pages. Do a test printing with one book and adjust the procedure as necessary.

If you want to make a one-sided master copy, print ALL pages 5–18 at once. Then select "one-sided to two-sided" on the copy machine.

The Earth in Space California's Science Content Standards Met

BL

GRADE 3 SCIENCE

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Text 2.2—Ask questions and support answers by connecting prior knowledge with literal information found in, and inferred from, the text.

Comprehension and Analysis of Grade-Level-Appropriate

Text 2.6—Extract appropriate and significant information from the text, including problems and solutions.



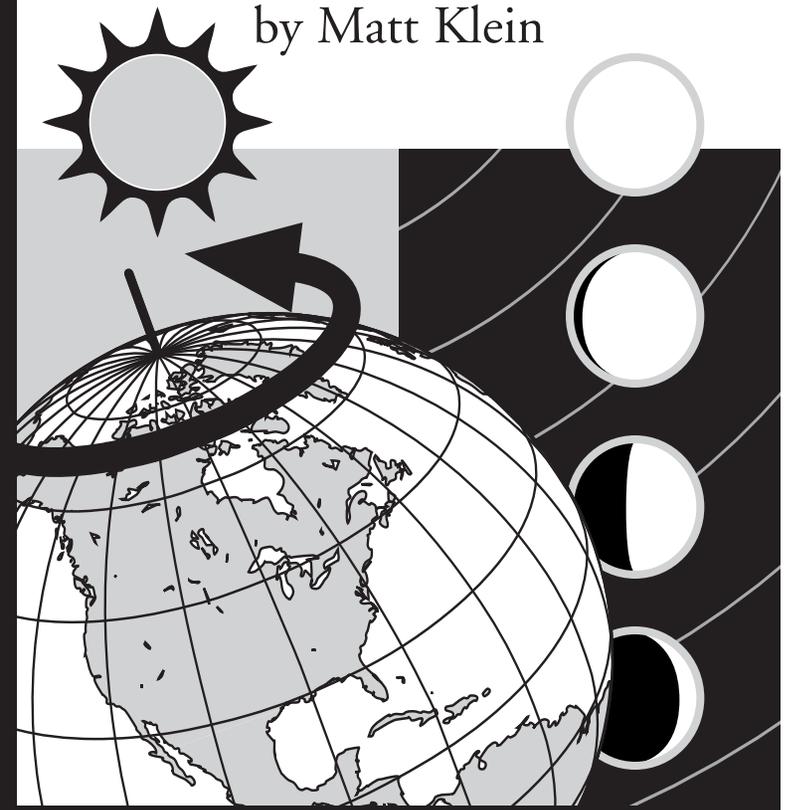
SCIENCE • GRADE 3

California Content Standards

Earth Sciences: 4.A, 4.B, 4.C, 4.D, 4.E

The Earth in Space

by Matt Klein





SCIENCE • GRADE 3

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Table of Contents

Introduction:

The Solar System	5
The Sun.	6
The Stars	7

Chapter 1:

Earth	9
Earth's Rotation	10
Day and Night	12
Earth's Seasons	14

Chapter 2:

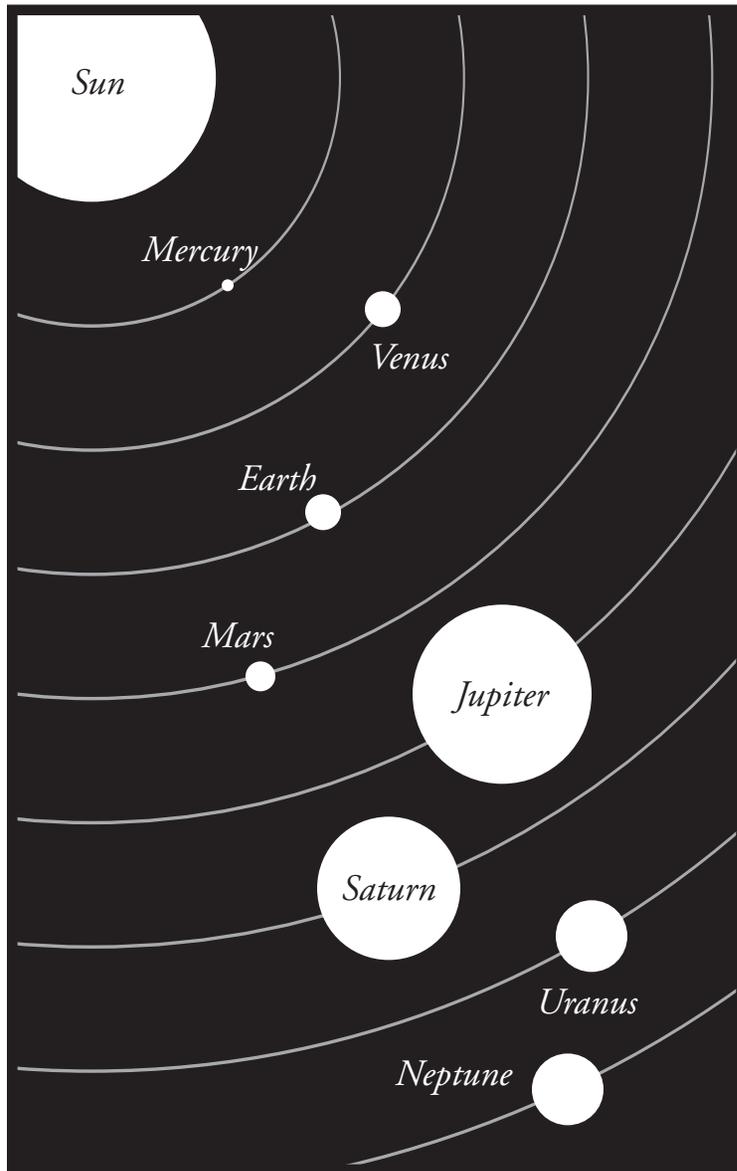
The Moon	16
Phases of the Moon	18

Chapter 3:

Eclipses	20
Glossary	22
To Find Out More	23
Index	24

*What do you think you will
learn from this book?*

The Solar System



INTRODUCTION

The Solar System

Although most of space is empty and dark, there are things in it. Our solar system is found in space. It is made up of the sun, eight planets, moons, and other objects.

The sun is at the center of the solar system. It is huge! Over a million planets the size of Earth could fit into it.

The planets **orbit** the sun. Look at the picture on page 4. Point to and name the eight planets in the solar system.

orbits: circling a planet or sun

The Sun

The sun is a giant ball of gas. It is very, very hot. The sun glows brightly. The sun is so bright that you should never look directly at it.

Although it is huge, the sun looks small. That's because it is so far away. The sun is about 93 million miles away from Earth. Even though the sun is so far away, it provides Earth with light and heat.

The sun is a star. Although some stars are smaller than the sun, there are some stars that are much, much bigger. The sun is the closest star to Earth.

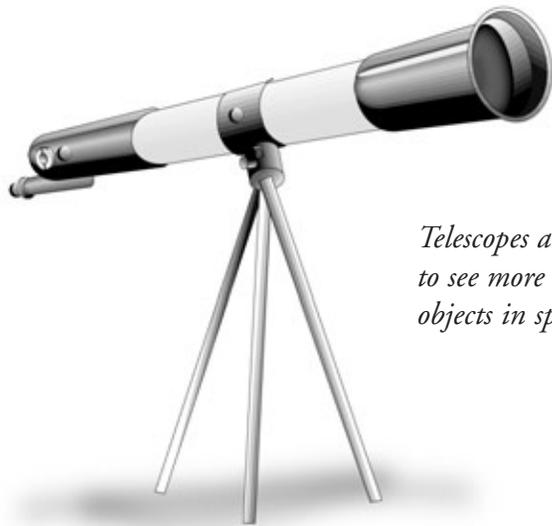
The Stars

Like the sun, all stars are balls of hot, glowing gas. All stars produce light and heat energy.

Stars can be very different from one another. Dwarf stars are the smallest stars. Other larger ones are called giant stars. Stars can be blue, white, yellow, or red. Eventually, all stars grow old and die.

How are stars alike? How are stars different?

In the night sky, you can see many stars. You can see even more if you use a telescope. A telescope is an instrument that makes objects appear larger and closer.



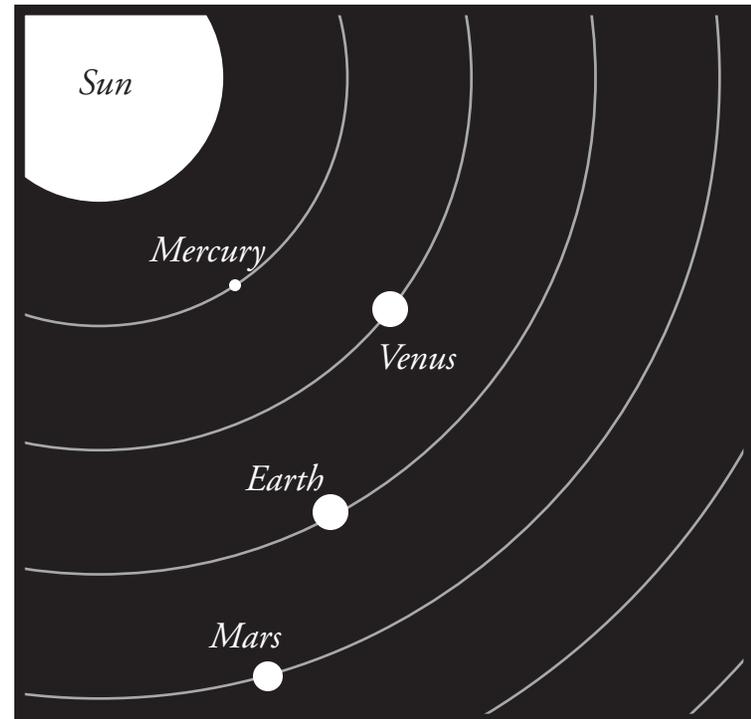
Telescopes allow scientists to see more details on objects in space.

If you look in the night sky over time, it seems like the stars move. However, they actually stay in place. It is not the stars that are moving. It is Earth that is moving!

CHAPTER 1

Earth

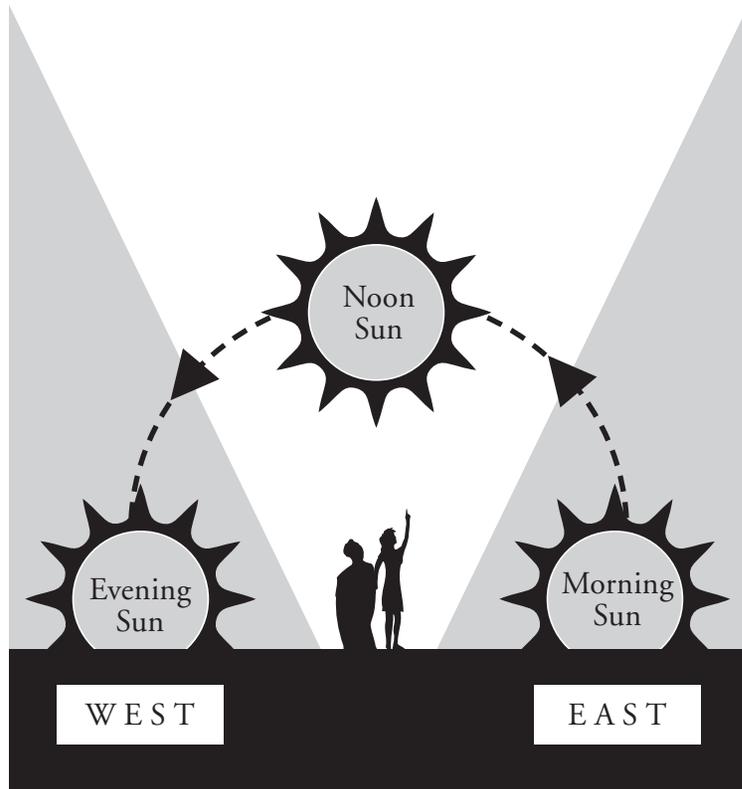
Earth goes around and around the sun. It orbits the sun. Earth is the third planet from the sun. The two planets closer to the sun are Mercury and Venus. Mars is just beyond Earth.



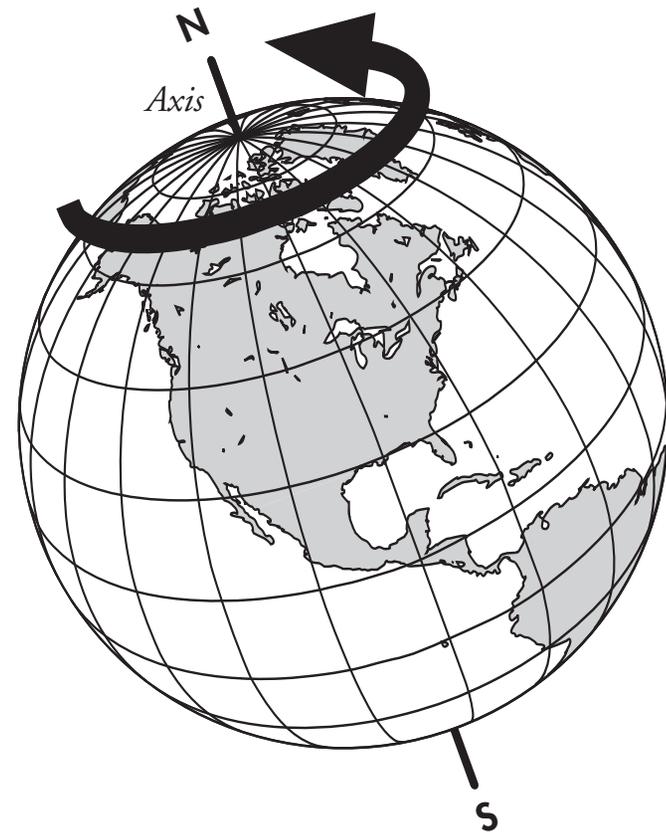
Explain where Earth is located in the solar system.

Earth's Rotation

Each day, if you look up in the sky, the sun seems to rise in the east in the morning. It is above you at midday, or noon. The sun sets in the west in the evening.



However, the sun is not moving at all. Earth is spinning around. The spinning of Earth makes the sun appear to move. Earth spins counterclockwise around its **axis** once a day.

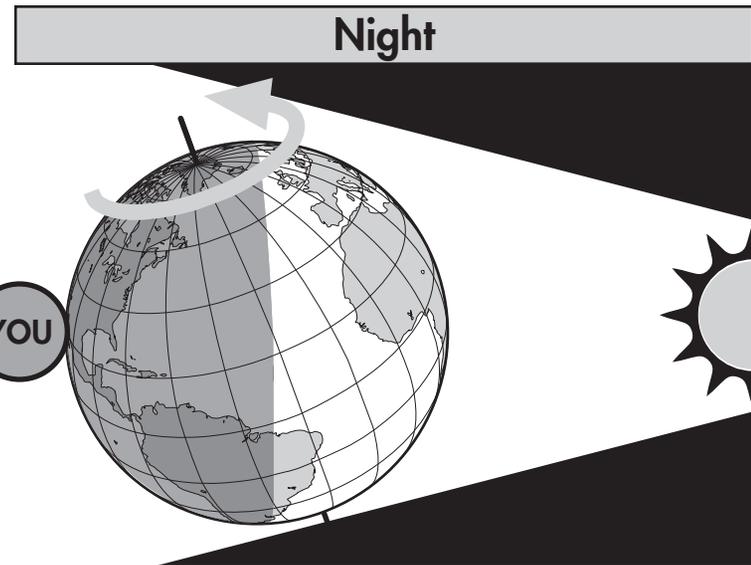
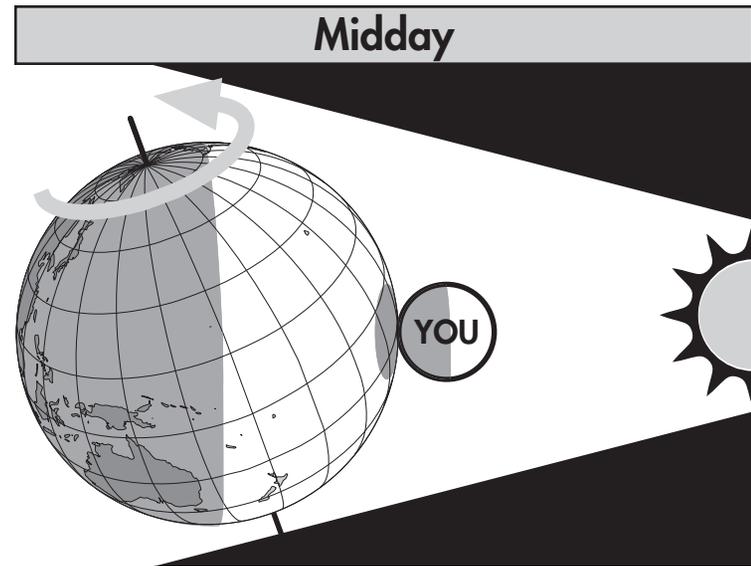
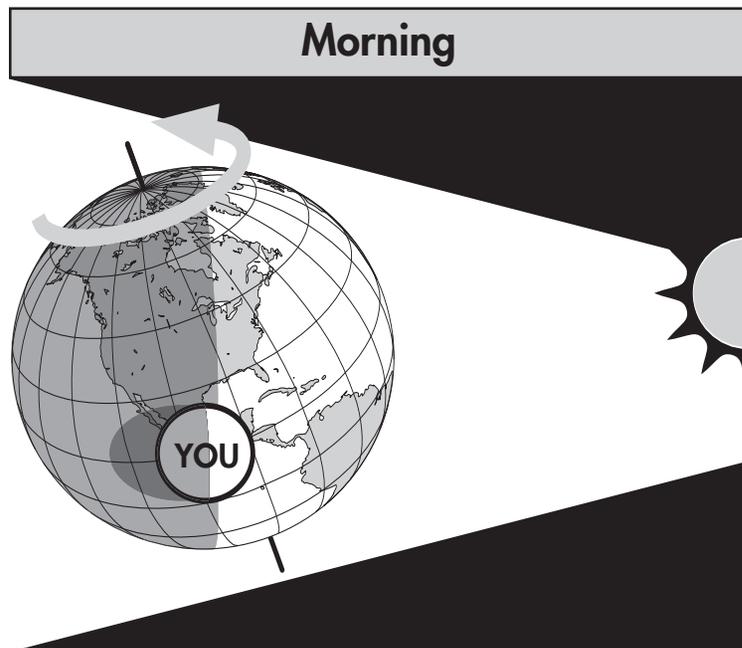


axis: a real or imaginary line about which something turns

Day and Night

The spinning of Earth around its axis is what causes day and night. Look at the picture below. Find the label *YOU*. Imagine you are standing at that place.

As the spinning Earth turns you towards the sun, it becomes morning. At noon, or midday, you face the sun. When Earth turns you away from the sun, it becomes night.

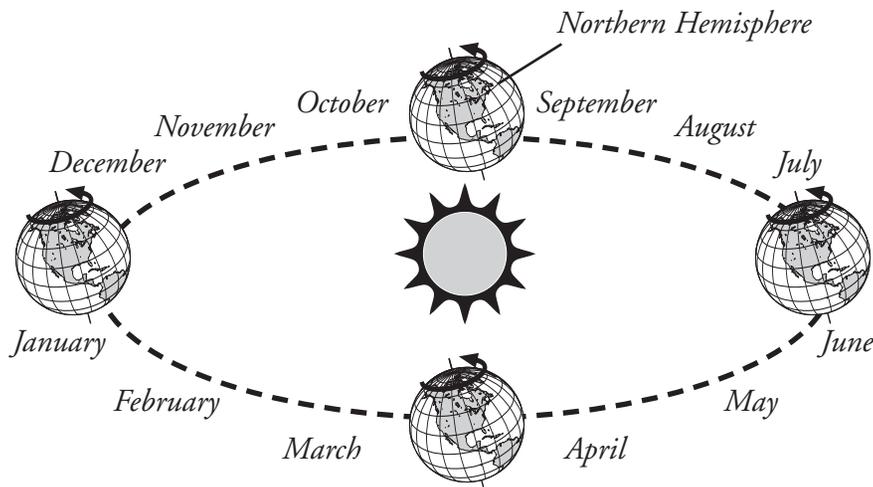


Why does the position of the sun change during the day?

Earth's Seasons

Besides turning on its axis, Earth also orbits the sun. It takes Earth one year to orbit the sun.

Earth's axis is tilted when it orbits the sun. Look at the diagram below. You can see the Northern Hemisphere. This is where you live. Use the diagram and read page 15 to find out how the tilt of Earth causes something to happen each year—the seasons!



Spring

Earth moves in its orbit. The North Pole begins to tilt towards the sun. Spring begins in the Northern Hemisphere.

Summer

Earth moves along its orbit. The North Pole points toward the sun. Summer begins in the Northern Hemisphere. The sun at noon is almost overhead. The days are longer.

Fall

Earth continues to move around the sun. The North Pole begins to tilt away from the sun. Days become shorter. Temperatures begin to drop. Fall begins.

Winter

Earth moves in its orbit to a position where the North Pole tilts away from the sun. Temperatures in the Northern Hemisphere are the coldest of the year. Winter begins. The sun is low in the sky. The days are short.

The Moon

The moon is another object in the solar system. The moon orbits Earth. The moon is made of dust, soil, and rocks. It has valleys and mountains.

The moon's outside surface is rough. There are craters, or large dents, where the moon has been hit by flying rocks. Dust covers the entire surface of the moon.

The moon is a shining light in the night sky. Yet, it does not make its own light. Rather, the moon reflects light from the sun.

Sometimes the sun shines on the entire moon. It can look to us like a big shining plate. At other times, we see the sun shining on only a thin section of the moon. You might think the moon is changing, but the moon does not change.

Each night, the sun lights different parts of the moon. Those different shapes of the moon we see are known as **phases**.

phases: stages in a series of changes

Phases of the Moon

The moon goes through phases every 29 days, or about 4 weeks. That is the amount of time it takes the moon to circle Earth.

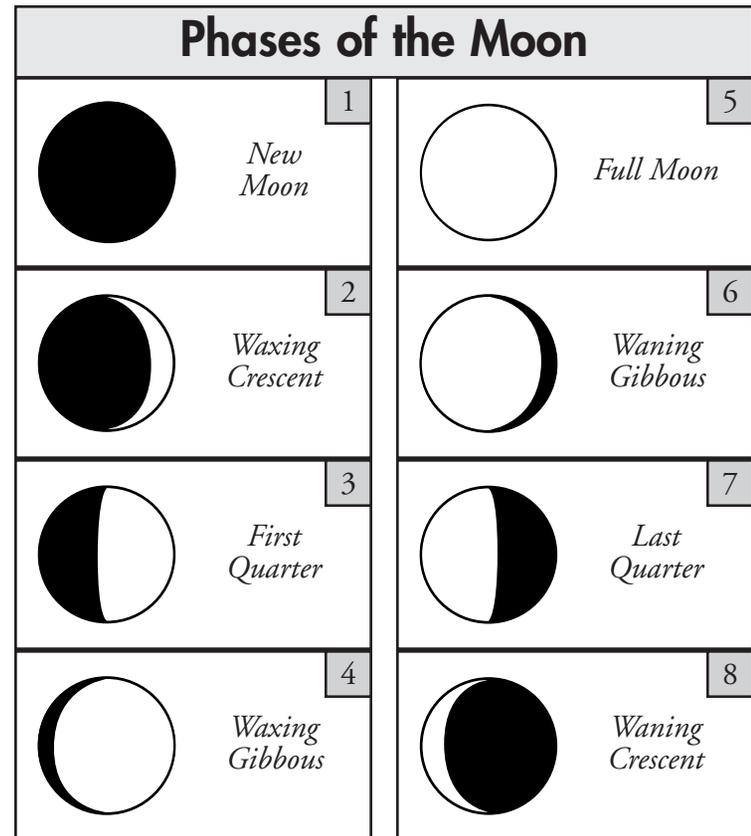
New Moon—The moon is between Earth and the sun. No sunlight can be seen reflecting off the moon during this phase.

Crescent Moon—*Crescent* means “curved shape,” and that is what the moon looks like during this phase.

Quarter Moon—The moon looks like half of a circle during this phase.

Gibbous Moon—A gibbous moon is almost, but not quite, a full circle.

Full Moon—When the moon is full it looks like a complete circle.

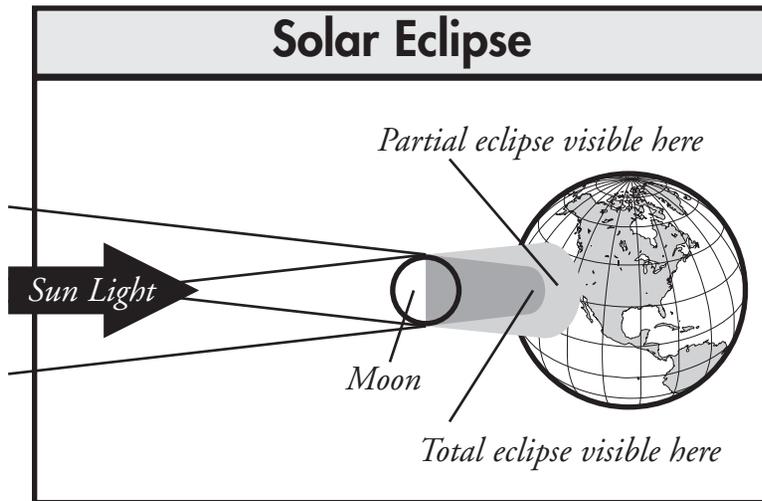


Look at picture number 6. The full moon is starting to get dark again. Day by day, it will get darker and darker. The phases will go on until the moon is all dark. Then it is a new moon again. The phases will begin all over again.

Explain the way in which the moon's appearance changes during the four-week lunar cycle.

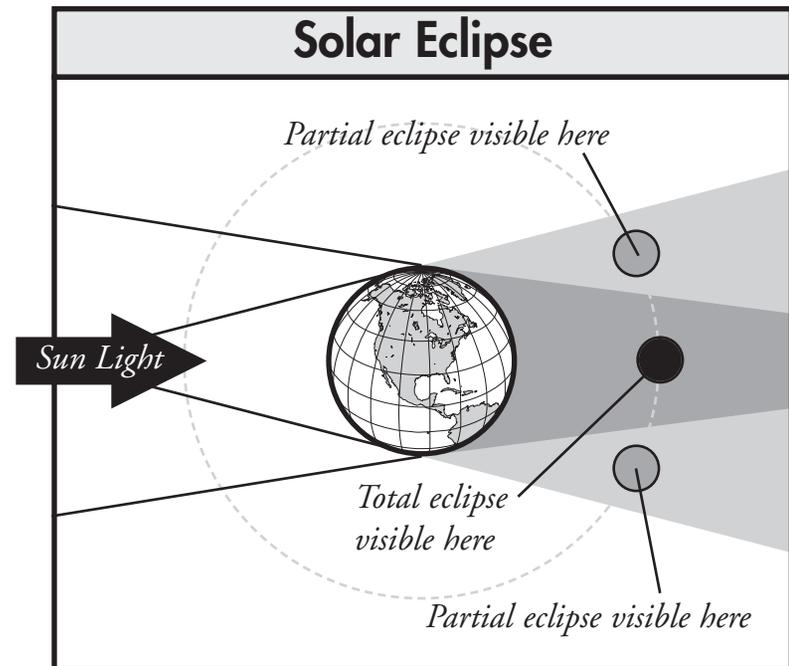
Eclipses

An eclipse occurs when the sun's light is **obscured**. There are two different types of eclipses, solar eclipses and lunar eclipses. During a solar eclipse the moon obscures the sun's light.



obscured: kept from being seen

During a lunar eclipse, Earth blocks the sun's light. The light can not reflect off the moon. As the moon continues in its orbit around Earth, it can be seen again. Look at the picture below to see how a lunar eclipse happens.



Glossary

axis—a real or imaginary line about which something turns

obscured—kept from being seen

orbits—circling a planet or sun

phases—stages in a series of changes

To Find Out More . . .

Want to learn more about Earth and space?

Try these books

Earth: Our Planet in Space by Seymour Simon. Simon & Schuster, 2003.

Space Exploration (DK Eyewitness Books). Dorling Kindersly, 2004.

Space (Insiders) by Alan Dyer. Simon & Schuster, 2007.

Earth (Watts Library: Space) by Donna Walsh Shepherd. Franklin Watts, 2003.

Earth's Outer Atmosphere: Bordering Space (Earth's Spheres) by Gregory Vogt. Twenty-First Century Books, 2006.

Access these Web sites

NASA Kid's Club

<http://www.nasa.gov/audience/forkids/kidsclub/flash/index.html>

NASA, For Kid's Only, Earth Science Enterprise

<http://kids.earth.nasa.gov/>

Index

axis, 11, 14
day and night, 12–13
Earth's rotation, 10–11
Earth's seasons, 14–15
eclipse, lunar, 21
eclipse, solar, 20
Mars, 9
Mercury, 9
moon, 16–19
phases of the moon, 16–19
stars, 7
sun, 6
Venus, 9

Below Level



ENGLISH-LANGUAGE ARTS • GRADE 3

California Content Standards
Vocabulary and Concept Development: 1.6
Structural Features of Informational Materials: 2.1
Comprehension and Analysis of Grade-Level-Appropriate Text: 2.2
Comprehension and Analysis of Grade-Level-Appropriate Text: 2.6

English-language Arts Activities

The Earth in Space

Print pages 20–24 of this PDF for the reading activities.

Context Clues

TRY THE SKILL

To figure out the meaning of an unknown word, look for words in the same sentence or nearby sentences that give you clues.

Look for word clues in each sentence at the right to figure out which word from the box should complete it. Then write the correct word on the line.

axis—a real or imaginary line about which something turns

obscured—kept from being seen

orbits—circling a planet or sun

phases—stages in a series of changes

1. Earth rotates around an imaginary _____ similar to a wheel rotating around an axle.
2. The light from outside was _____ so you could not see what was in the room.
3. When water boils, it goes through several _____ of the water cycle.
4. The moon _____ around Earth and Earth _____ around the sun.

Compare and Contrast

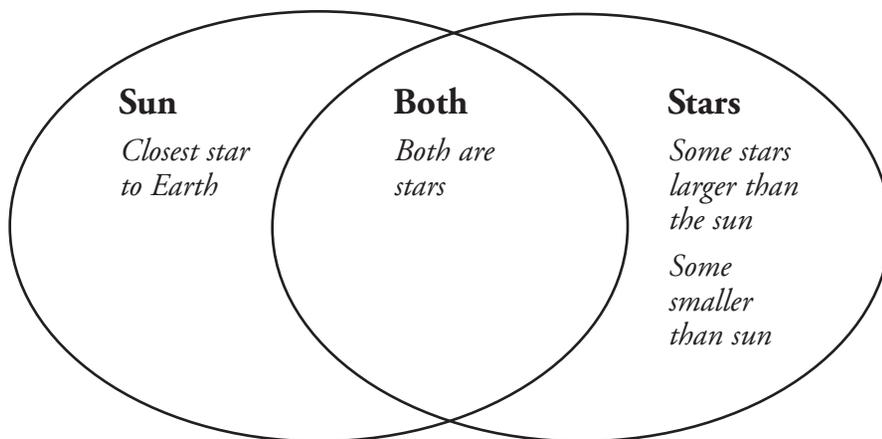
TRY THE SKILL

Comparing and contrasting can help you understand what you read.

- Comparing tells how things are alike.
- Contrasting tells how things are different.

Read this paragraph. Then, read the Venn diagram that compares and contrasts.

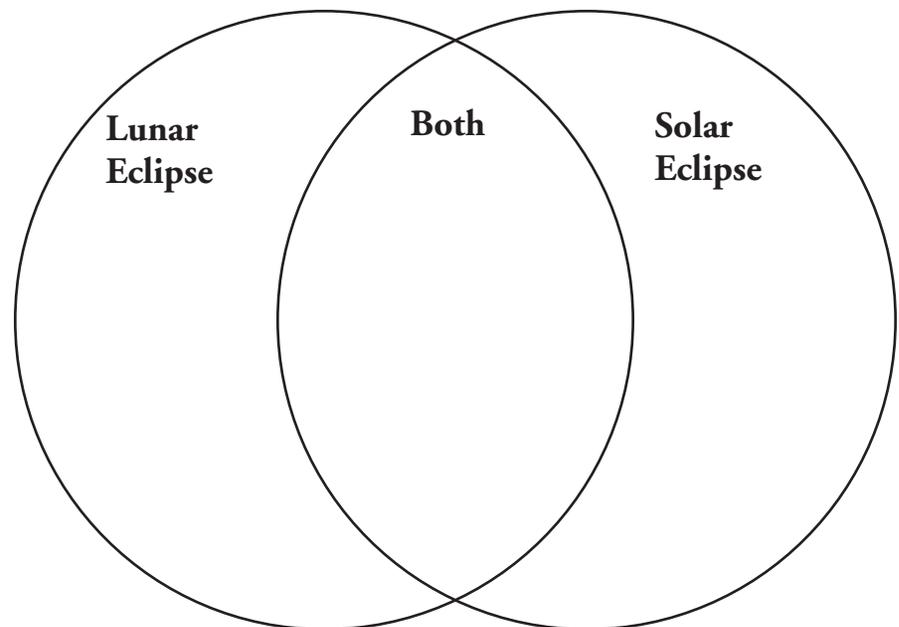
The sun is a star. Although some stars are smaller than the sun, there are some stars that are much, much bigger. The sun is the closest star to Earth.



Read the paragraphs. Think about comparing and contrasting. Then complete the Venn diagram.

An eclipse occurs when the sun's light is obscured. There are two different types of eclipses, solar eclipses and lunar eclipses. During a solar eclipse the moon obscures the sun's light.

During a lunar eclipse, Earth blocks the sun's light from reflecting off the moon. As the moon continues in its orbit around Earth, it becomes visible again.



Question and Answer

TRY THE SKILL

You can monitor your understanding of what you read by asking questions about the topic and then reading to find the answer. Sometimes authors will even write a question in the text and then answer it.

Read the paragraph.

Seasons occur because Earth's axis is tilted as it orbits the sun. When you are at a place on Earth that tilts toward the sun, the days get longer and it gets warmer. Think about being in California in July. When you are at a place that tilts away from the sun, the days get shorter and it gets colder. Think about the weather in California in January.

What is the question?

Why do seasons occur on Earth?

What is the answer?

Seasons occur because of the tilt of Earth's axis toward the sun. When Earth tilts toward the sun, the days get longer and warmer. When Earth tilts away from the sun, the days get shorter and colder.

Read the question. Write an answer in your own words.

What causes day and night?

Now think of another question you could ask based on *The Earth in Space*. Then, write an answer in your own words.

Locate Information

TRY THE SKILL

The index tells a reader what information can be found in the book, and where it can be found.

Read the index from *The Earth in Space*.

Index

axis, 11, 14
day and night, 12–13
Earth's rotation, 10–11
Earth's seasons, 14–15
eclipse, lunar, 21
eclipse, solar, 20
Mars, 9
Mercury, 9
moon, 16–19
phases of the moon, 16–19
stars, 7
sun, 6
Venus, 9

On what page would you begin reading about a solar eclipse?

page 20

Read the index from *The Earth in Space* again and answer the questions.

1. How many pages could you read to get information about the moon?
Ⓐ 9
Ⓑ 6
Ⓒ 4
2. Which page(s) would you read to find information about specific planets?
Ⓐ page 9
Ⓑ page 18
Ⓒ pages 10–20

3. How is an index organized?

4. Explain how an index is different from a table of contents.

Answer Key

Context Clues

1. axis
2. atmosphere
3. obscured
4. phases
5. orbits; orbits

Compare and Contrast

Lunar Eclipse: Earth blocks the sun's light from reflecting off moon

Both: Occurs when the sun's light is obscured

Solar Eclipse: Moon obscures the sun's light

Question and Answer

1. The spinning of Earth around its axis is what causes day and night. As the spinning Earth turns us towards the sun, it becomes morning. At noon, we face the sun. When Earth turns us away from the sun, it becomes night.
2. Questions and answers will vary.

Locate Information

1. C
2. A
3. An index is an alphabetical list of topics with page references to locate the topic.
4. An index provides an alphabetical list of topics covered on specific pages of a book. A table of contents list general topics listed in the order they appear in a book or other publication.