

Science

# Earth and Space



by Beth Stewart



## Before Reading

### Show What You Know

**Before** you read this book, look through it.

Find the main headings. They divide the book into parts.



**Draw** a chart like the one shown. It lists the parts of the book.

Part of Book	My Question	What I Learned
How Earth Moves		
Earth's Moon		
Eclipses		
Stars		
The U.S. Space Program		

Look at the pictures in the book.



**Write** one question you hope will be answered in each part of the book.

**After** you read this book, **write** one thing you learned from each part.



## During Reading

rotation



rotación

eclipse



eclipse

revolution



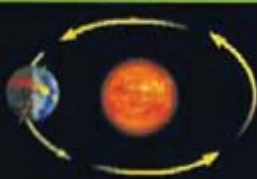
revolución

lunar eclipse



eclipse lunar

orbit



órbita

solar eclipse



eclipse solar

ellipse



elipse

constellation




constelación

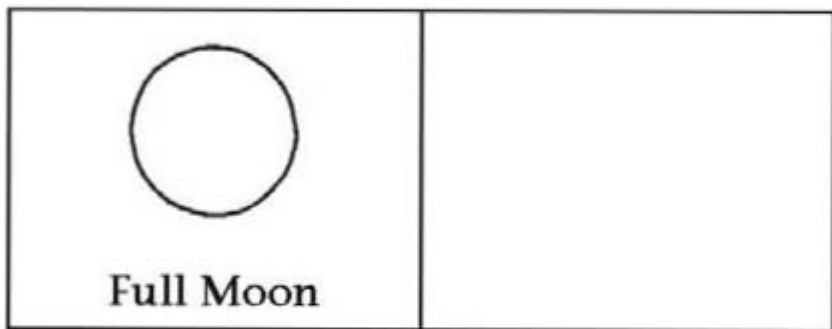


## During Reading

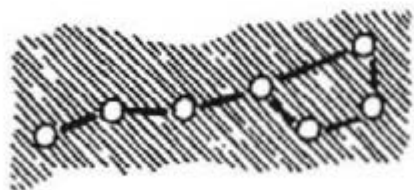
### Do you understand?

 **Write** and  **draw** your answers.

1. How do you know that  is turning?
2. Look at the picture of the full moon.  
**Draw** a moon that is not full.



3. What is this star pattern called?



4. **Write** About Science

Stars look like they move across the sky.

**Write** a sentence to explain why.

**Draw** a picture to go with your sentence.



# Earth and Space

by Beth Stewart



PEARSON

Glenview, Illinois  
Boston, Massachusetts  
Chandler, Arizona  
Upper Saddle River, New Jersey

## Photographs

Every effort has been made to secure permission and provide appropriate credit for photographic material. The publisher deeply regrets any omission and pledges to correct errors called to its attention in subsequent editions.

Unless otherwise acknowledged, all photographs are the property of Pearson Education, Inc.

Photo locators denoted as follows: Top (T), Center (C), Bottom (B), Left (L), Right (R), Background (Bkgd)

Opener: ©Arnulf Husmo/Getty Images; 6 (B) ©Diane Miller/PhotoLibrary Group, Inc.; 7 (B) John Sanford/Photo Researchers, Inc.; 8 (C) John Sanford/Photo Researchers, Inc.; 10 (BL) ©Alexey Stiop/Shutterstock, (BR) ©Mark Garlick/Photo Researchers, Inc.; 11 (B) ©Ali Kabas/Alamy Images; 12 (B) ©Sander van Sinttruya/Shutterstock; 13 (B) ©Gerard Lodriguss/Photo Researchers, Inc.; 14 (Inset) JSC-ES&IA/NASA, (B) Kennedy Space Center; 15 (BL) ©Science and Society/SuperStock, (BR) JSC/NASA, (BR) NASA; FP2 (TCR) ©Alexey Stiop/Shutterstock, (BC) ©Ali Kabas/Alamy Images, (BR) Royal Greenwich Observatory/DK Images, (TR) Thinkstock; FP5 (B) ©Ali Kabas/Alamy Images.

**Copyright © 2012 Pearson Education, Inc., or its affiliates.** All Rights Reserved. Printed in the United States of America. This publication is protected by copyright, and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or likewise. For information regarding permissions, write to Pearson Curriculum Group Rights & Permissions, One Lake Street, Upper Saddle River, New Jersey 07458.

ISBN-13: 978-0-328-61734-0

ISBN-10: 0-328-61734-2

Pearson® is a trademark, in the U.S. and/or other countries, of Pearson Education, Inc., or its affiliates.

1 2 3 4 5 6 7 8 9 10 VOFL 14 13 12 11 10

# How Earth Moves

Earth is always moving. You cannot feel Earth move because you move with it. But things you see can help you know that Earth moves. For example, you can see the sun and stars seem to move across the sky.

## Earth Spins

Earth spins, or turns, on its axis. Earth's axis is an imaginary line. This is the line from the North Pole, through Earth's center, to the South Pole.

The spinning of a planet, moon, or star around its axis is **rotation**. Each time Earth makes a full turn, it makes one rotation.



Earth rotates from west to east on its axis.

## Day and Night

Every day, the sun and moon seem to move across the sky from east to west. But it is really Earth that is moving.

Earth makes one rotation every 23 hours and 56 minutes. Earth's rotation causes day to change into night and night into day. The part of Earth facing the sun has day. The part facing away from the sun has night.

## Shadows Change

Earth's rotation also causes shadows to change. As Earth rotates, the way sunlight shines on objects changes. Shadows are longest at the start and end of the day. They are shortest around noon.



The flagpole's shadow is longest in the morning and in the evening. It is shortest around noon.



## Earth Moves in Space

As Earth rotates, it also moves in space. It moves in a path around the sun. The movement of one object around another is **revolution**. One trip Earth around the sun is one revolution. A single trip takes about 365 days, or one year.

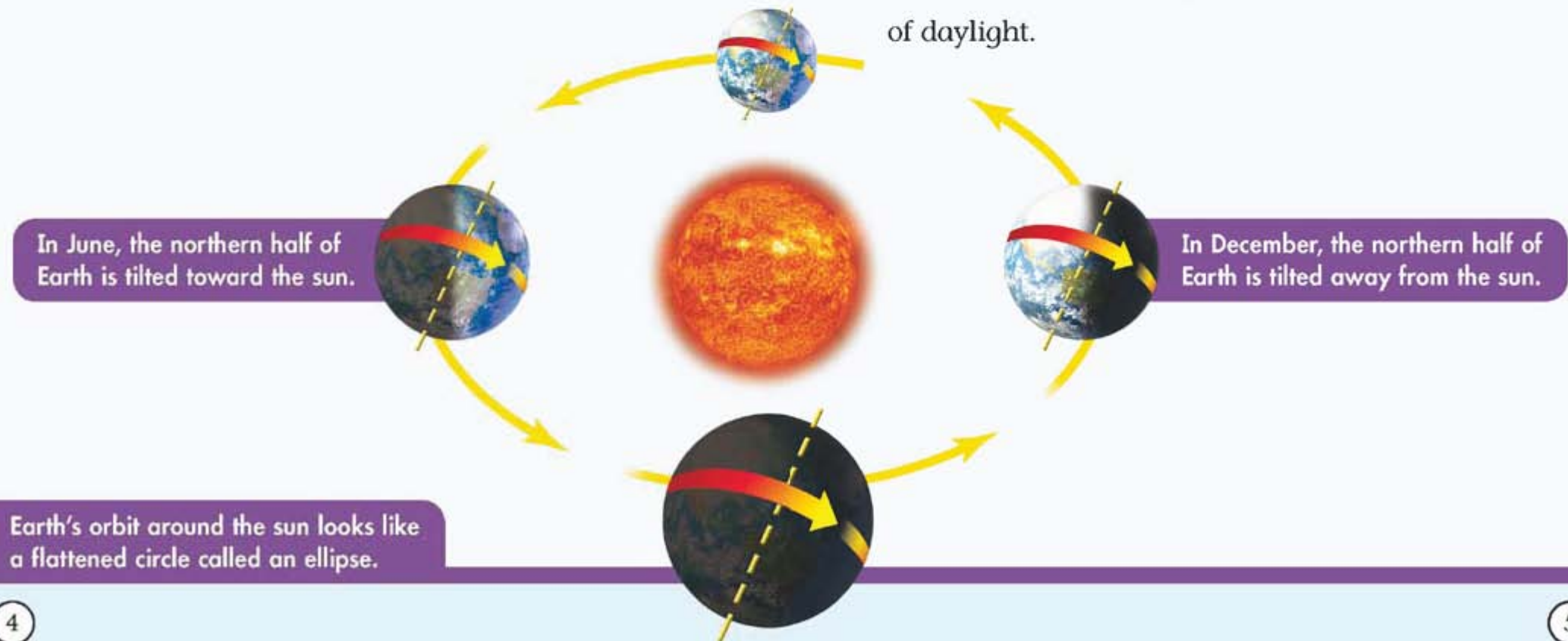
The path an object follows as it revolves around another object is its **orbit**. Earth's orbit follows a shape called an ellipse. An **ellipse** is like a circle that is stretched out.

## Seasons on Earth

As Earth moves around the sun, its axis is always tilted in the same direction. In late June, Earth's northern half is tilted toward the sun. Six months later, its southern half is tilted toward the sun.

The half of Earth that is tilted toward the sun is heated more than the other half. The half tilted toward the sun is warmer. It is summer for that half. That half has more hours of daylight too.

It is winter in the half tilted away from the sun. It is cooler for that half, and there are fewer hours of daylight.



# Earth's Moon

Often you can see the moon at night. Sometimes you can even see it in the daytime. The moon looks bright, but it does not make its own light. You see the moon because it reflects sunlight. That means that sunlight shines on the moon. The light reflects, or bounces, off the moon.

The moon revolves around Earth. It takes the moon about 27.3 days to make one trip around Earth.

The moon also rotates on an axis. Each time the moon makes one spin, it also revolves once around Earth. That is why the same side of the moon always faces Earth. It is the only side of the moon that you can see from Earth.

The moon can look different at different times of the month. The moon may look full and round one night. Another night it may look like a thin slice of the moon. Sometimes you cannot see the moon at all.



You see the moon because sunlight reflects off its surface.



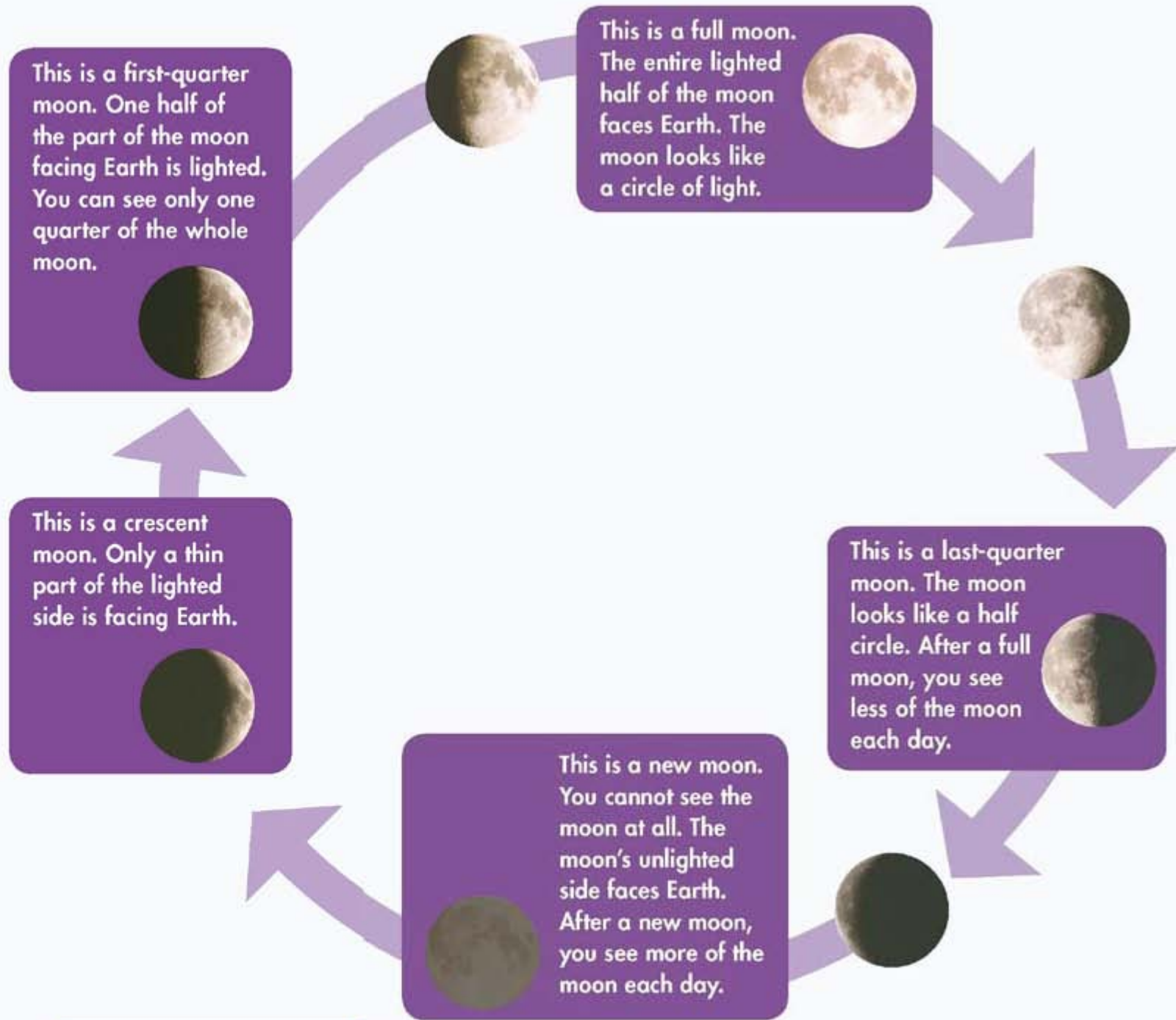
The moon appears to change shape during the month.



## Phases of the Moon

All the different shapes of the moon are called the phases of the moon. The moon does not really change shape. It is always shaped like a ball.

From Earth, you see only the part of the moon that is lighted by the sun. As the moon moves around Earth, different amounts of its lighted side face Earth. When the lighted half of the moon faces Earth, it looks like a circle of light. You cannot see the moon when the lighted half faces away from Earth.



phases of the moon

# Eclipses

An object in space can get between the sun and another object. The first object casts its shadow on the other object. This is called an **eclipse**.

## Lunar Eclipse

Sometimes during a full moon the sun, Earth, and the moon are in a straight line. When this happens, Earth's shadow can block light from the sun. A **lunar eclipse** is when the moon passes through Earth's shadow.

A lunar eclipse can last as many as 100 minutes. It can happen many times in one year. You can see a lunar eclipse if you have a clear view of the moon.

These photos show the moon during a lunar eclipse.



All of the moon is in Earth's shadow during a total lunar eclipse.

## Solar Eclipse

Sometimes the moon can pass directly between the sun and Earth. The moon casts its shadow on Earth. A **solar eclipse** is when the moon passes between the sun and Earth.

A solar eclipse looks like something is slowly covering the sun. The sun may look like it is changing shape.

During a solar eclipse the day can become as dark as night. A solar eclipse can last almost eight minutes. Solar eclipses happen two to five times each year.



These photos show the sun during a solar eclipse.



# Stars

There are many trillions of stars in the universe. The sun is the star that is nearest Earth. Other stars are much farther from Earth.

A star is a hot ball of gas. Because it is so close, the sun looks like the brightest star in the sky. But many stars are bigger and brighter than the sun. Others are smaller and not as bright.

You cannot see stars during the day because the sun is so bright. If you are in a place that has a lot of lights, it may be hard to see stars at night.

The sun is one of billions of stars in the Milky Way Galaxy.



## Star Patterns

Stars can appear in shapes and patterns in the sky. People have seen these patterns for thousands of years. A star pattern is called a **constellation**.

People can find some stars if they look for the constellations they are part of. The stars in a constellation may be far from each other. They look like they are close to each other because stars are very far from Earth.

As Earth rotates, stars seem to move across the sky. Some star patterns can be seen only during some parts of the year. Orion is a constellation. You can see Orion from the northern half of Earth during winter.

The Big Dipper is part of a constellation called the Big Bear.





# The U.S. Space Program

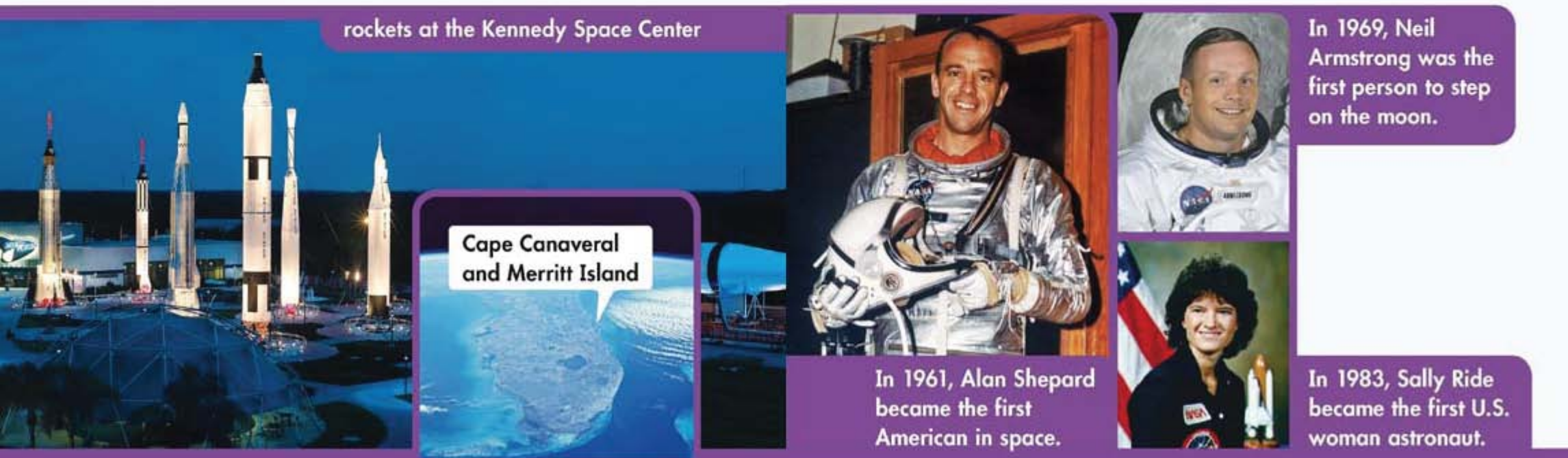
After World War II, the United States needed a safe place to test rockets. The U.S. Air Force began working at Cape Canaveral in 1958. Then NASA was formed. **NASA** is the government agency that runs the U.S. space program. NASA stands for *National Aeronautics and Space Administration*.

In 1962, NASA opened what is now known as the Kennedy Space Center. It is on Merritt Island. From there NASA was able to send larger rockets into space.

## Exploring Space

Space research has helped people in everyday life. For example, satellites can help people communicate. They are used for TV and some phones.

Many people have worked in the U.S. space program. The best-known are the astronauts. Astronauts are people who travel in space. Read about some of the people who are part of the history of the space program.



rockets at the Kennedy Space Center

Cape Canaveral and Merritt Island

In 1961, Alan Shepard became the first American in space.

In 1969, Neil Armstrong was the first person to step on the moon.

In 1983, Sally Ride became the first U.S. woman astronaut.

# Glossary

<b>constellation</b>	a star pattern
<b>eclipse</b>	an event in which one object in space gets between the sun and another object
<b>ellipse</b>	a shape that is like a circle that is stretched out
<b>lunar eclipse</b>	an event in which the moon passes through Earth's shadow
<b>NASA</b>	the government agency that runs the U.S. space program
<b>orbit</b>	the path an object follows as it revolves around another object
<b>revolution</b>	the movement of one object around another
<b>rotation</b>	the spinning of a planet, moon, or star around its axis
<b>solar eclipse</b>	an event in which the moon passes between the sun and Earth



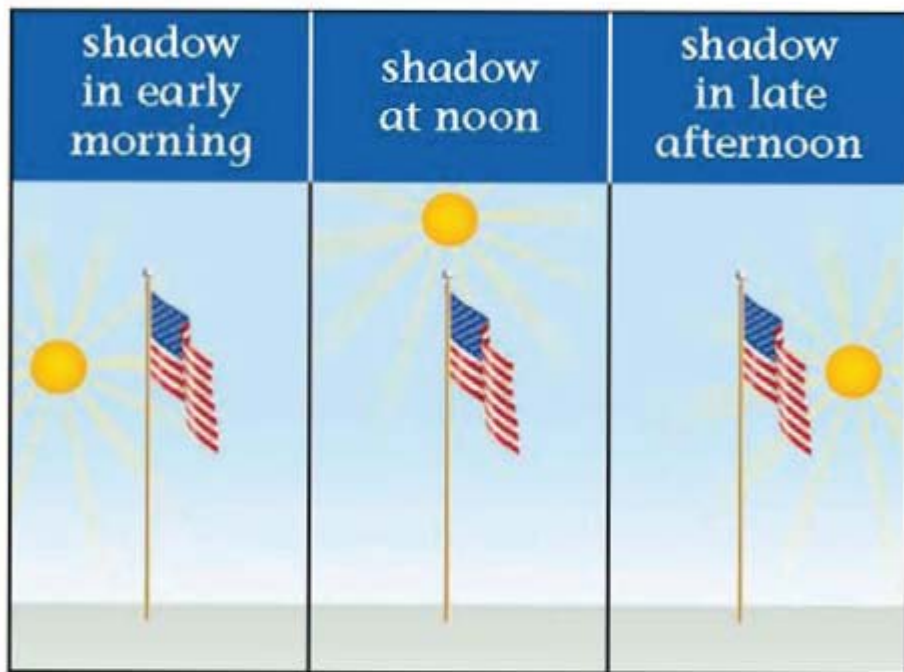


## After Reading

### Did you understand?

 **Write** and  **draw** your answers.

1. Copy each picture. **Draw** the shadow of the flagpole at each time of day.



2. **Write** a sentence to explain each drawing.
3. Work with a partner. Find a sunny place and look for shadows. Ask an adult for help.



**Talk** with a partner about what you saw.





## After Reading

# Solar Eclipse

Look at the picture. It shows a solar eclipse.

**Learn** when the next solar eclipse will happen. Find out where the best place to see it will be.

**Learn** about a safe way to see a solar eclipse.



**Tell** a partner what you learned.




## Hours of Daylight

Some places in the world have more daylight hours in winter than other places do.

Read the chart. It shows the number of daylight hours in different places during different months.


City, Country	Month	Daylight Hours
Chicago, USA	January	9.5
	June	15.2
Quito, Ecuador	January	12.1
	June	12.1
Rio de Janeiro, Brazil	January	13.4
	June	10.8

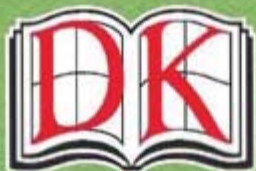
 **Write** your answers.

1. How many more hours of daylight does Chicago have than Rio de Janeiro in June?
2. Which city has fewer daylight hours in June than in January?
3. How is January in Chicago different from January in Quito?

Genre	Comprehension Skill	Text Features	Science Content
Nonfiction	Cause and Effect	<ul style="list-style-type: none"> <li>• Captions</li> <li>• Diagrams</li> <li>• Call Outs</li> <li>• Glossary</li> </ul>	Solar System

## Interactive Science 4


 ELL Reading Support

[pearsonschool.com](http://pearsonschool.com)


ISBN-13: 978-0-328-61734-0

ISBN-10: 0-328-61734-2



9 780328 617340

9 00000 &gt;