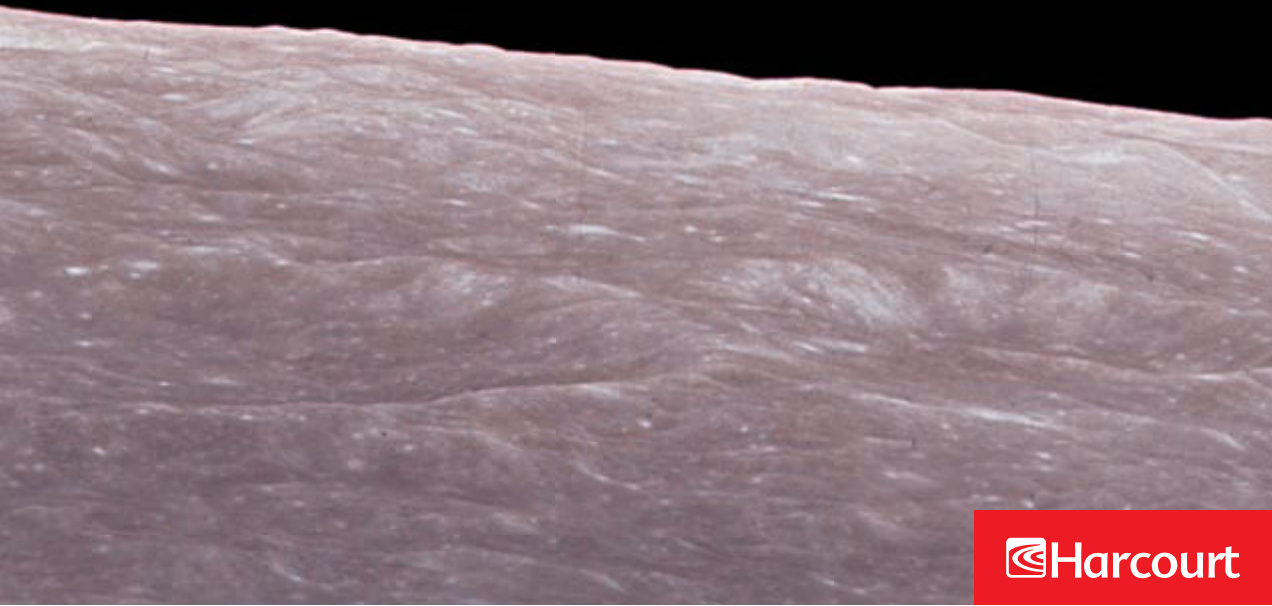


# Earth's Place in the Solar System





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# What Causes Earth's Seasons?



## VOCABULARY



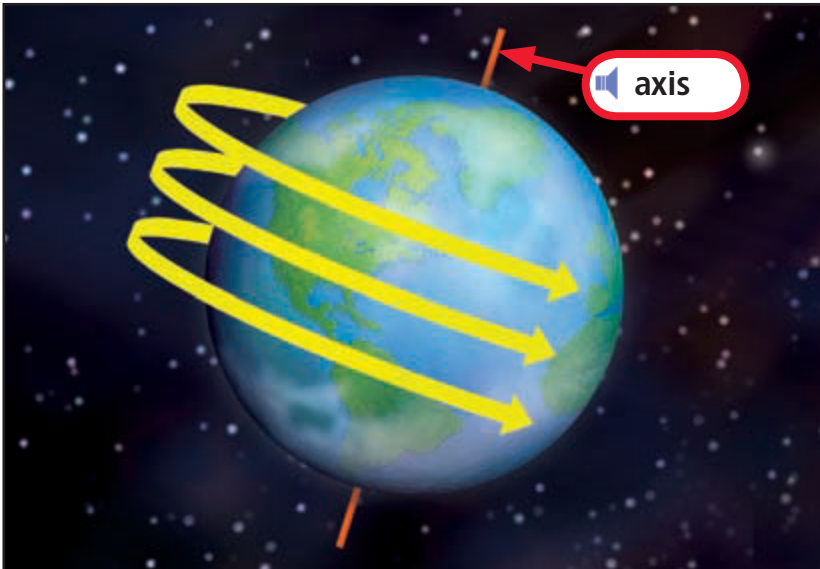
axis



rotation

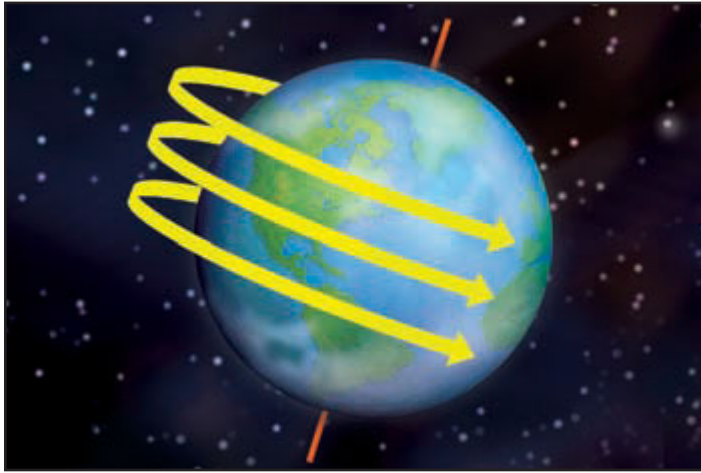


revolution

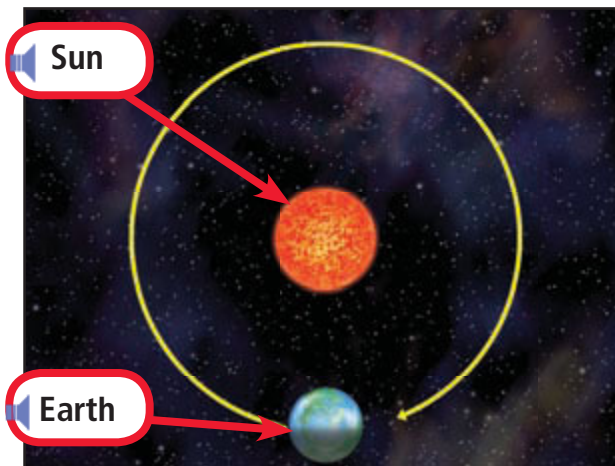


Earth's **axis** is an imaginary line that runs through the center of Earth from North Pole to South Pole.





▶ **Rotation** is the spinning of Earth on its axis. It takes Earth 24 hours to rotate once.



▶ A **revolution** is the movement of Earth around the sun. It takes one year for Earth to make one revolution around the sun.





## READING FOCUS SKILL

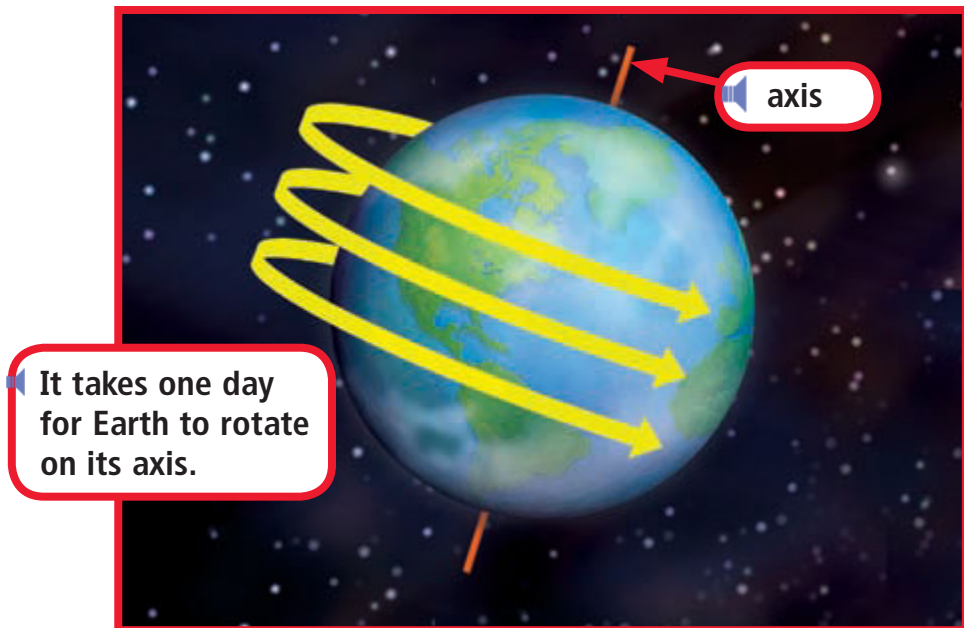
### MAIN IDEA AND DETAILS

The **main idea** is what the text is mostly about. **Details** tell more about the **main idea**.  
Look for **details** about how Earth moves.

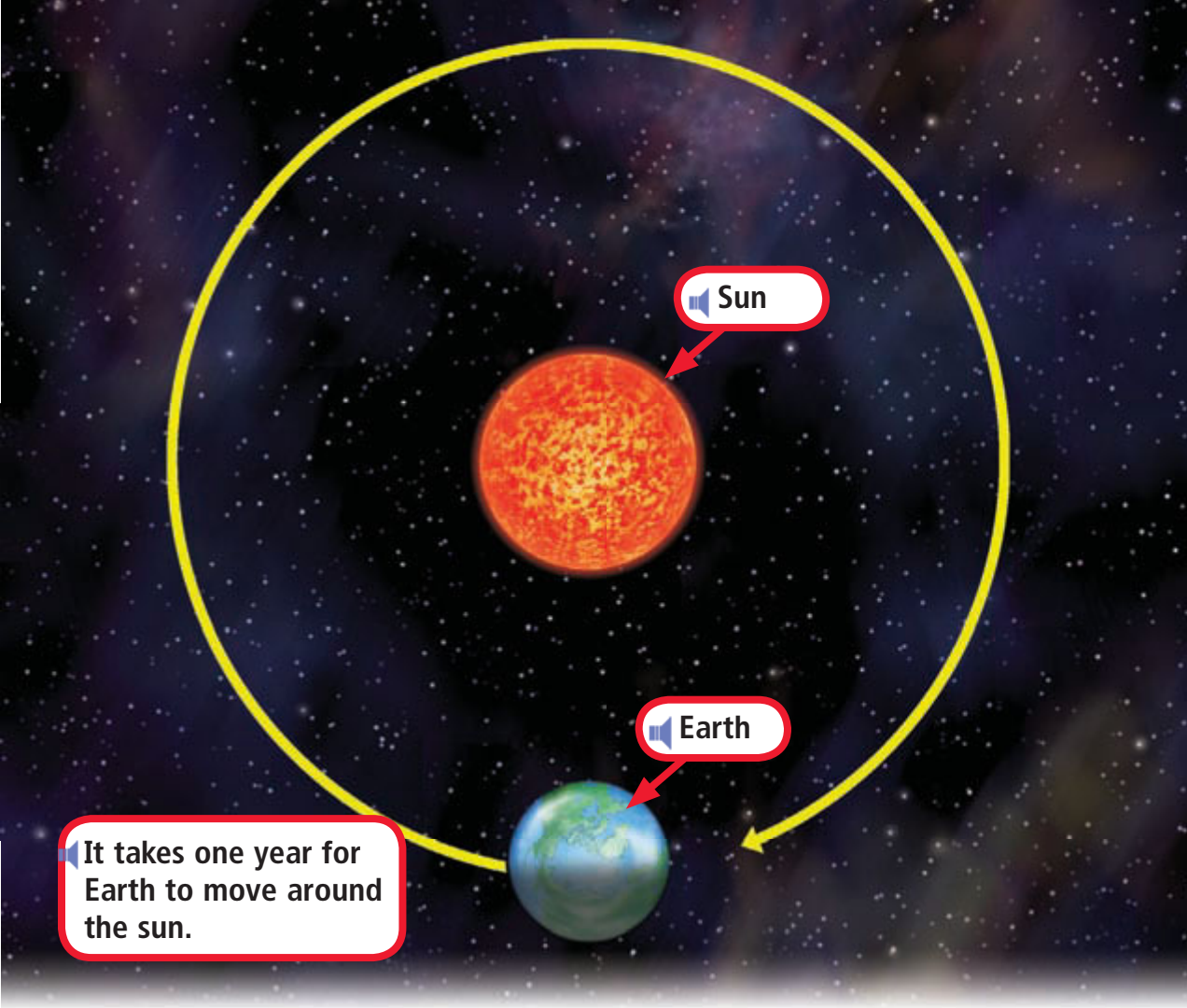
## How Earth Moves

Earth moves in two different ways. One way is that it spins around like a top.

Earth spins on its axis. The **axis** is an imaginary line through Earth. It goes from North Pole to South Pole. Earth's axis is tilted. You cannot see the axis. The spinning of Earth on its axis is called **rotation**.







Earth also moves around the sun. A **revolution** is one trip around the sun. Each revolution takes about 365 days. We use Earth's revolution to measure time. One revolution of Earth takes one year.



Tell the two ways that Earth moves.

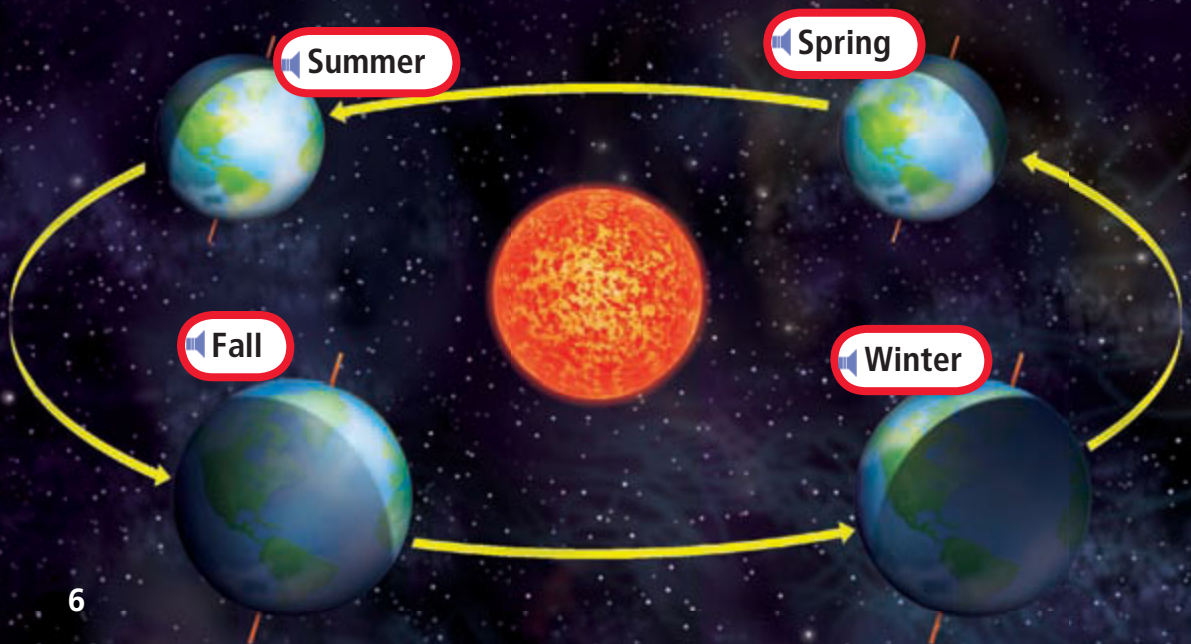


## 🔊 Seasons

Many places have four seasons during one year. These seasons are winter, spring, summer, and fall.

🔊 Each season has a different temperature. That is because the part of Earth that is tilted toward the sun changes as Earth moves around the sun. This causes the same part of Earth to be tilted toward the sun for part of the year and away from the sun for part of the year.

🔊 The seasons change as the part of Earth that is tilted toward the sun changes.







When sunlight hits Earth more directly, it is summer. When sunlight hits at a slant, it is winter

- When the part of Earth where we live is tilted toward the sun, we have summer. Sunlight hits that part of Earth directly. This makes it warmer.
- When the part of Earth where we live is tilted away from the sun, we have winter. Sunlight hits that part of Earth at a slant. This makes it cooler.



**Tell what causes the seasons to change.**



## 🔊 Day and Night

Earth takes one year to move around the sun. But Earth takes only one day to rotate all the way around.

🔊 As Earth rotates, one side faces the sun. This side has day. The other side of Earth faces away from the sun. This side has night.







Columbus,  
Ohio



Paris,  
France



Some places have day while other places have night. This means that it cannot be the same time everywhere. When it is day in Columbus, Ohio, it may be night in Paris, France.



What causes day and night?

## Review



Complete this **main idea** statement.

1. Earth moves in \_\_\_\_\_ different ways.

Complete these **detail** statements.

2. Earth's \_\_\_\_\_ causes day and night.

3. It takes one \_\_\_\_\_ for Earth to revolve around the sun.

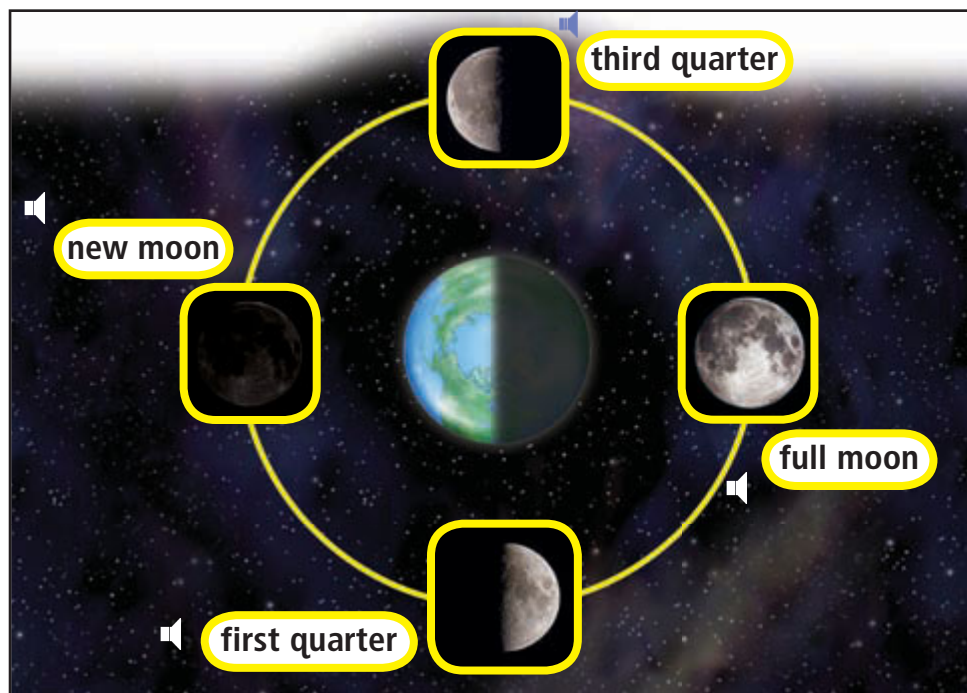
4. The \_\_\_\_\_ of Earth's axis causes the seasons.



# How Do Earth and the Moon Interact?

## VOCABULARY

- moon phases
- lunar cycle
- lunar eclipse
- solar eclipse



- Moon phases** are the different shapes that the moon seems to have. The moon's shapes follow a pattern that repeats about every 29 days. This pattern is called a **lunar cycle**.





A **lunar eclipse** happens when Earth blocks sunlight from reaching the moon. The moon gets darker when this happens.



A **solar eclipse** happens when the moon blocks sunlight from reaching Earth, and the moon's shadow falls on Earth.





## READING FOCUS SKILL

### SEQUENCE

A **sequence** is the order in which things happen.

- Look for the **sequences** of the moon's phases and eclipses.

## Phases of the Moon

The moon does not always look the same. From Earth, its shape seems to change. The different shapes we see are called **moon phases**.



Sun

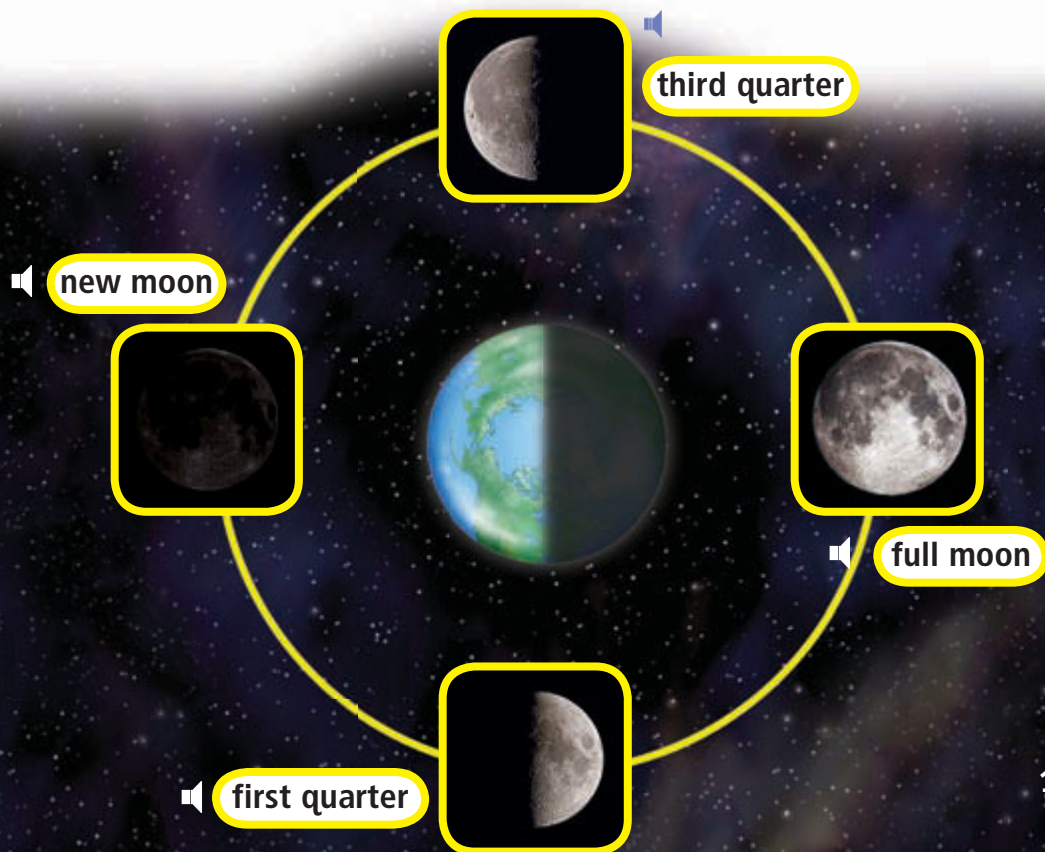


■ In fact, the moon's shape does not change. It is the moon's movement around Earth that makes the moon's shape seem to change. The shape of the moon you see each night depends on how much of the moon's sunlit side faces Earth.

■ The moon's shape changes in the same order every 29 days. This pattern of changes is called the **lunar cycle**.




■ Tell what phase comes after the new moon phase.





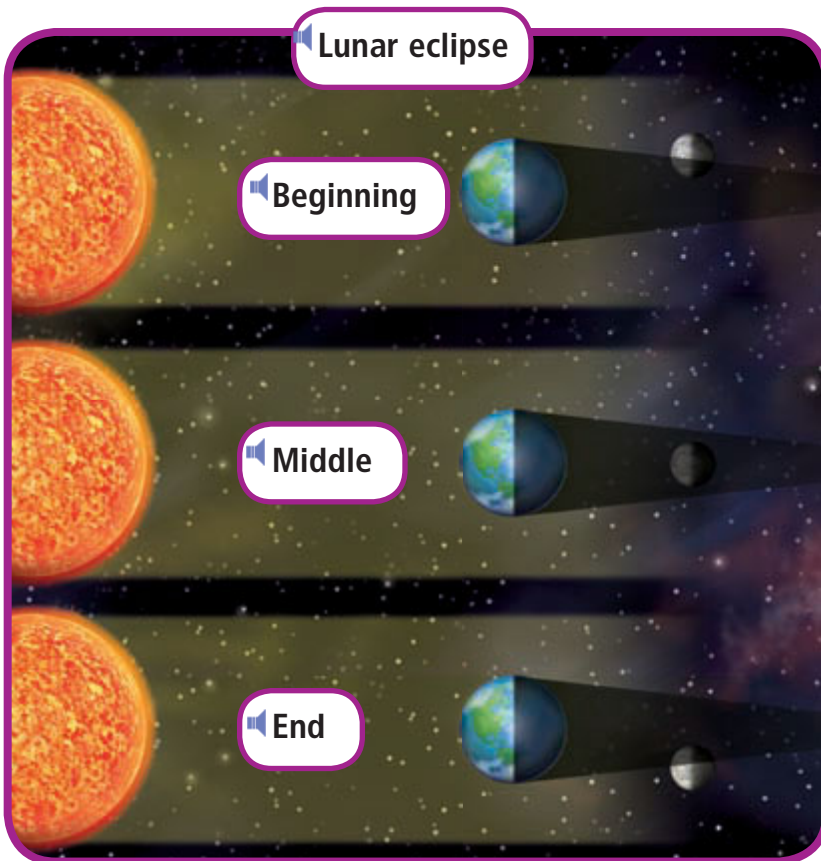
## **Eclipses of the Moon**

Sometimes the moon moves into Earth's shadow. This causes a lunar eclipse. A **lunar eclipse** happens when Earth blocks sunlight from reaching the moon.

 During a lunar eclipse, the moon first gets dark. This happens when the moon moves into Earth's shadow. Then the moon gets bright again. This happens when the moon moves out of Earth's shadow.



**Tell how a lunar eclipse happens.**





## Eclipses of the Sun

The moon can block sunlight from reaching Earth. This causes a solar eclipse. A **solar eclipse** happens when the moon's shadow falls on Earth.

During a solar eclipse, the moon moves between the sun and Earth. This makes the sky get dark. As the moon moves on, daylight returns.



Tell how a solar eclipse happens.



## Review



Complete these **sequence** statements.

1. A \_\_\_\_\_ happens when Earth blocks sunlight from reaching the moon.
2. A \_\_\_\_\_ happens when the moon blocks sunlight from reaching Earth.



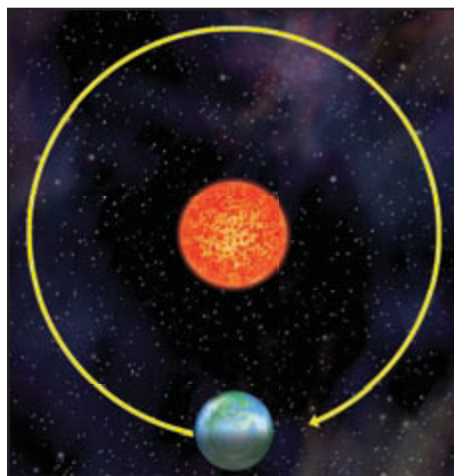
# What Is the Solar System?

## VOCABULARY

- stars
- planet
- orbit
- solar system
- constellation



- Stars** are hot balls of gases that give off energy. Our sun is a star.



- A **planet** is a large body of rock or gases in space. An **orbit** is a path that each planet travels around the sun.





▶ The **solar system** is made up of the sun, the planets and their moons, and other small objects.



▶ A **constellation** is a group of stars that forms a shape. The shape could be of a person, animal, or thing.





## READING FOCUS SKILL

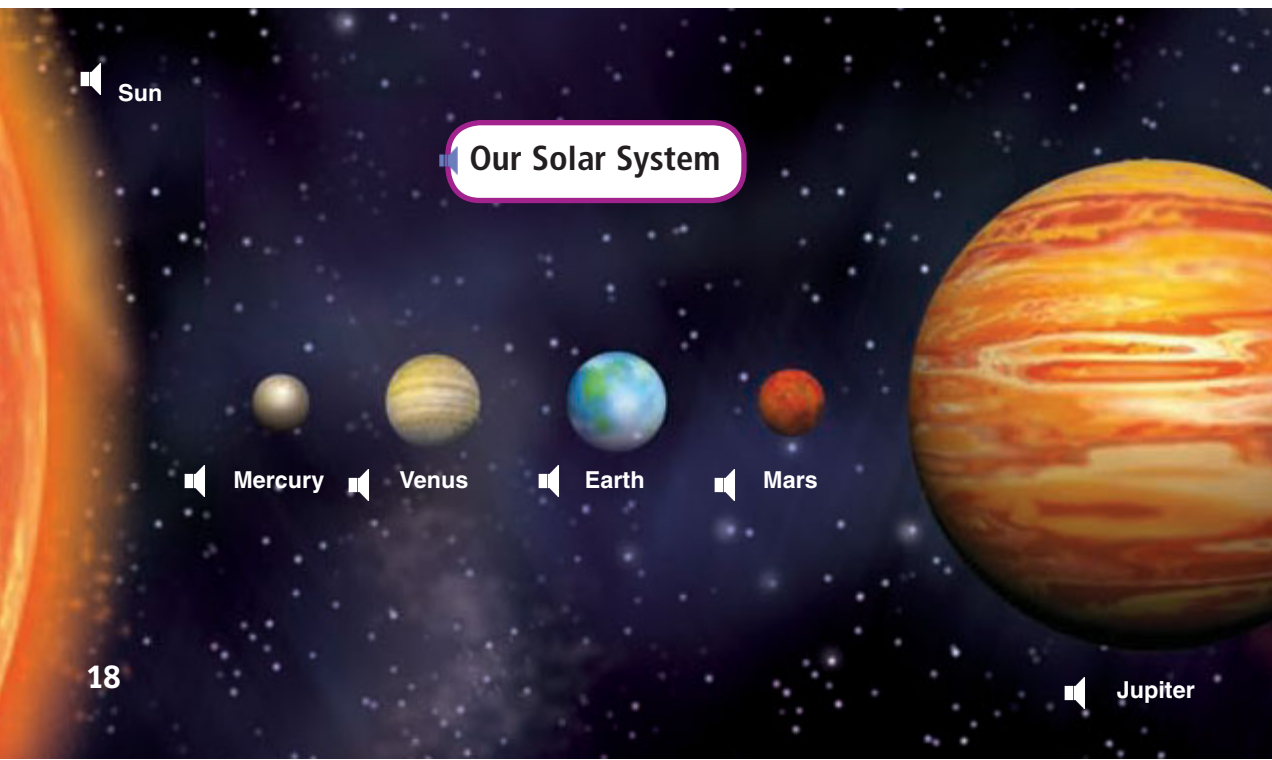
### COMPARE AND CONTRAST

When you **compare and contrast**, you tell how things are alike and different.

- Look for ways to **compare and contrast** planets in the solar system.

## ▶ The Sun and the Solar System

The sun is a star. A **star** is a ball of burning gases. These gases give off energy. The sun's energy helps plants grow. It keeps Earth warm.



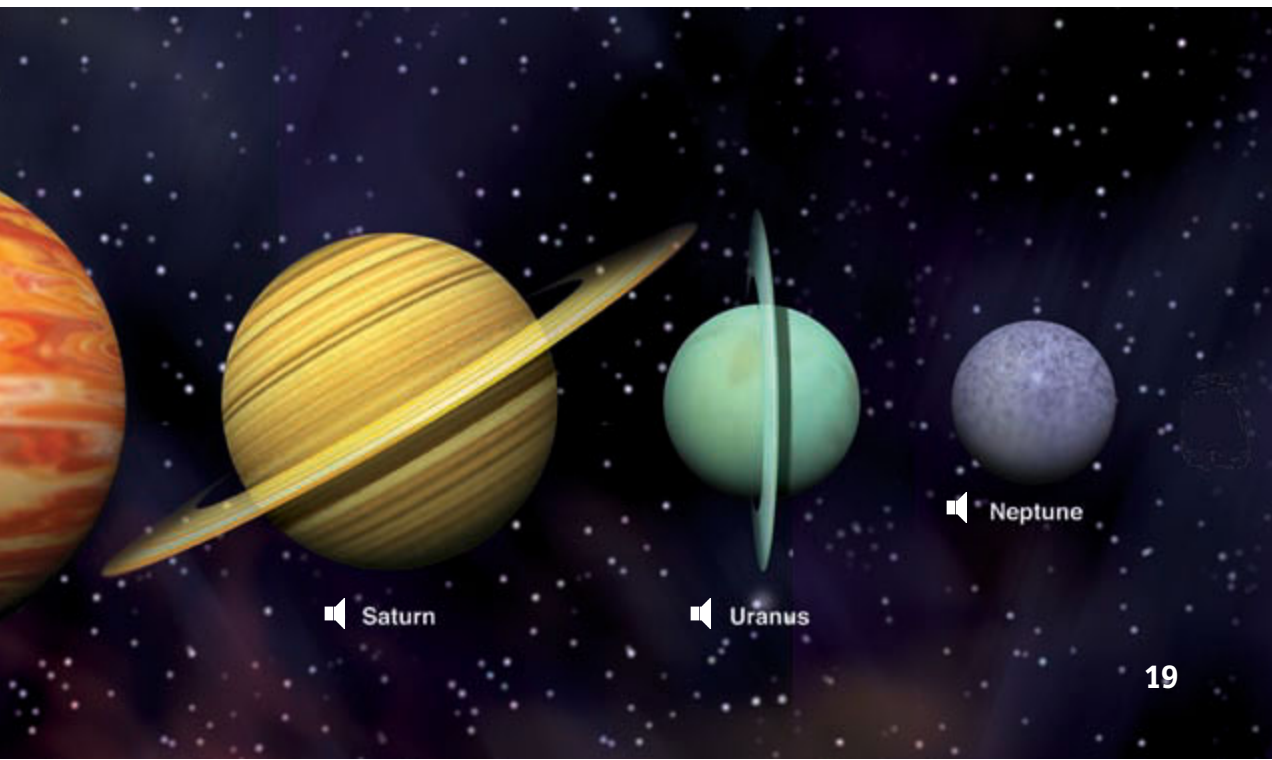


Earth moves around the sun. The other planets do this, too. A **planet** is a large body of rock or gases. Each planet travels in an **orbit**, or path, around the sun.

The **solar system** is made up of the sun, the planets, and other small things that orbit the sun.



**Tell how all planets are alike.**





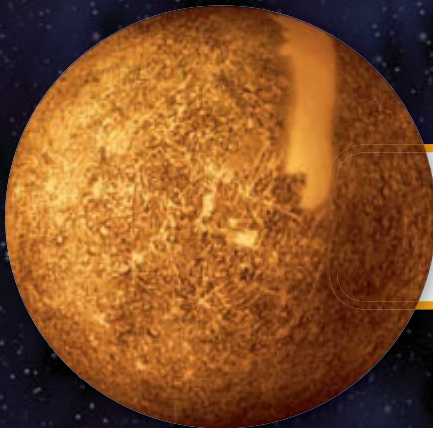
## 🔊 The Inner Planets

The four planets that are closest to the sun are called the inner planets. These planets are Mercury, Venus, Earth, and Mars.

🔊 You can sometimes see Venus and Mars at night. They look like stars. But they do not twinkle.



🔊 **Venus**  
Moons: none  
Surface: rocky



🔊 **Mercury**  
Moons: none  
Surface: rocky



🔊 All the inner planets have rocky surfaces. They are smaller than the other planets. The inner planets are warmer than the other planets, too. This is because they are closer to the sun.

🔊  **How are the inner planets different from the other planets?**



**Earth**

**Moons: 1**

**Surface: mostly water, with some land**



**Mars**

**Moons: 2**


**Surface: rocky, with red dust and no water**





## **The Outer Planets**

There are four outer planets. They are farthest from the sun. The outer planets are Jupiter, Saturn, Uranus, and Neptune.

 The outer planets are made mostly of frozen gases. Most are large and have many moons.



**Tell how most outer planets are alike.**



**Jupiter**

**Moons: more than 60**

**Surface: no solid surface**

 **Uranus**

**Moons: more than 25**

**Surface: frozen gases**



**Saturn**

**Moons: more than 55**

**Surface: no solid surface**



**Neptune**

**Moons: more than 10**

**Surface: frozen gases**



## Patterns of Stars

How do people tell one star from another?  
One way is to use constellations. A **constellation** is a group of stars. The stars appear to make a picture in the sky.



 Compare how people group stars with how they group planets.

 ▼ Big Bear constellation





## Different Seasons, Some Different Stars

In spring and summer, you can see some constellations that you cannot see in fall and winter. You can see other constellations all year long.



spring



summer



In winter, you can see one set of stars. As Earth orbits the sun, the season changes. In summer at the same place on Earth, some of the stars you can see will be different from those you saw in winter. The stars you see in winter are on the other side of the sun in summer.



**How would the night sky be different in summer and in winter?**



fall



winter



## Stars Move at Night

You know that the sun appears to move across the sky during the day. At night, the stars appear to move, too. The rotation of Earth causes stars to seem to move in the nighttime sky.

Like the sun and the moon, most stars seem to rise in the east and set in the west. Stars in the sky near the poles seem to move in a circle.



- ▲ The student watches the stars at different times at night. They seem to move across the sky.



The shapes of the constellations we see in the sky do not change. The Big Dipper is part of a constellation called Ursa Major, or Big Bear. It always looks like the Big Dipper, even though it isn't always in the same place in the sky.



**How are the moon, the sun, and the stars alike?**

## Review



Complete these **compare and contrast** statements.

1. All of the planets in the solar system \_\_\_\_\_ the sun.
2. The four inner planets are smaller than most of the \_\_\_\_\_.
3. Most of the outer planets have many more \_\_\_\_\_ than the inner planets.
4. All of the outer planets are farther from the \_\_\_\_\_ than the inner planets.





## ▶ **GLOSSARY**

- ▶ **axis** (AK•sis) an imaginary line through the center of the Earth
- ▶ **constellation** (kahn•stuh•LAY•shuhn) a group of stars that appear to form the shape of an animal, a person, or an object
- ▶ **lunar cycle** (LOON•er CY•kuhl) the pattern of phases of the moon
- ▶ **lunar eclipse** (LOON•er ih•KLIPS) an event in which Earth blocks sunlight from reaching the moon
- ▶ **moon phases** (MOON FAYZ•uhz) the different shapes that the moon seems to have in the sky when the moon is observed from Earth
- ▶ **orbit** (AWR•bit) the path that a planet takes as it revolves around the sun
- ▶ **planet** (PLAN•it) a large body of rock or gas in space
- ▶ **revolution** (rev•uh•LOO•shuhn) the movement of Earth around the sun
- ▶ **rotation** (roh•TAY•shuhn) the spinning of Earth on its axis
- ▶ **solar eclipse** (SOH•ler ih•KLIPS) an event in which the moon blocks sunlight from reaching Earth and the moon's shadow falls on Earth
- ▶ **solar system** (SOH•ler SIS•tuhm) the sun, the planets and their moons, and the small objects that orbit the sun
- ▶ **star** (STAR) a hot ball of glowing gases that gives off energy





## **Think About the Reading**

-  **1.** Explain how Earth's tilt and movement cause the seasons, and day and night.
-  **2.** Describe the phases of the moon. Explain why the moon appears to change shape during a lunar cycle.

## **Hands-On Activity**

Use clay to make a model of the planets in the solar system.

-  **1.** Label the planets and put them in order from the sun.
-  **2.** Use your model to show how Earth revolves and how it orbits the sun.

## **School-Home Connection**

Observe the night sky with a family member for several evenings. Look for the moon and constellations and draw your observations. Discuss why the moon appears to change shape.



**GRADE 3**

Book 10

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