

Earth, Moon, and Sun Interactions

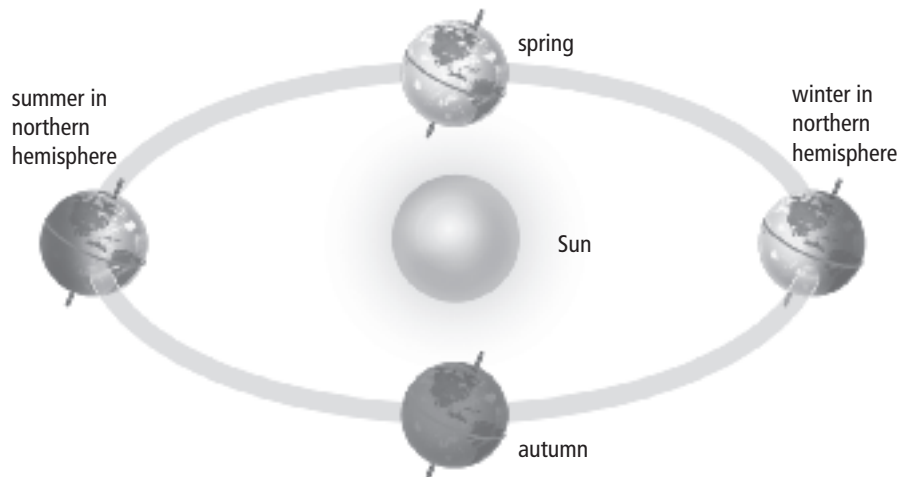
Textbook pages 410–425

Before You Read

For thousands of years, people believed that the Sun travelled around Earth. What observation did they base this on? Record your ideas on the lines below.

State the Main Ideas

As you read this section, stop after each paragraph and put what you have just read into your own words.



✓ Reading Check

1. How does the tilt of Earth's axis affect the way sunlight falls on Earth's surface?

What causes the seasons?

Earth's axis is tilted on an angle of 23.5° . This **axis tilt** causes light from the Sun to strike Earth at different angles during its orbit around the Sun. As Earth orbits the Sun, Earth's axis always points in the same direction. However, the amount of sunlight that falls on Earth's surface at different points in its journey is different. This difference is what causes the seasons. ✓

How did the Moon form?

Scientists think that long ago, as Earth and other inner planets were forming, a huge, planet-sized object slammed into Earth. The intense impact ejected large and small pieces of the young planet. These pieces went into orbit around Earth and, over time, built up into the object that we know today as the Moon.

What is an eclipse?

An eclipse is the total or partial blocking of sunlight that occurs when one object in space passes in front of another. There are two kinds: solar eclipses and lunar eclipses. Both types involve the interaction of the Sun, Earth, and Moon. ✓

In a **solar eclipse**, the Moon passes between the Sun and Earth, briefly blocking our view of the Sun. People who observe where the full shadow of the Moon falls on Earth's surface see a total solar eclipse. People who observe where only part of the Moon's shadow falls see a partial solar eclipse.

In a **lunar eclipse**, Earth passes between the Sun and the Moon, briefly plunging the Moon into darkness as Earth's shadow moves across it. When the Moon lies fully in Earth's shadow, people see a total lunar eclipse.

What are constellations?

As viewed from Earth, stars seem to make unchanging patterns in the night sky. These patterns look like familiar objects, which people long ago grouped and named. These groupings of stars into familiar patterns and shapes are called **constellations**. Stars in the night sky all look as if they are close to one another and equal distances from Earth. In reality, all stars are separated from one another and from us by hundreds, thousands, or millions of light-years.

Because stars and other sky objects look as if they move around Earth, Greek astronomer **Ptolemy** and many other people several thousand years ago thought that Earth was at the centre of the universe. In the early 1500s, a Polish astronomer named **Copernicus** proposed a model of the heavens in which planets, including a rotating Earth, revolved around the Sun. Italian astronomer **Galileo** confirmed Copernicus' model. In the early 1600s, a German mathematician named **Kepler** predicted that the planets revolved around the Sun in elliptical orbits, not circles as was thought. An ellipse is the shape of a flattened circle.



Reading Check

2. What is an eclipse?

Use with textbook pages 410–420.

How do Earth, the Sun, and the Moon interact?

Vocabulary

axis	partial
constellations	Ptolemy
Copernicus	seasons
eclipse	solar
Galileo	total
Kepler	years
lunar	

Use the terms in the vocabulary box to fill in the blanks. Each term may be used more than once. You will not need to use every term.

1. Earth's _____ is tilted on an angle of 23.5° , which causes light from the Sun to strike Earth at different angles during its orbit around the Sun.
2. A(n) _____ is the total or partial blocking of sunlight that occurs when one object in space passes in front of another.
3. In a _____ eclipse, the Moon passes between the Sun and Earth, briefly blocking our view of the Sun.
4. People who observe where the full shadow of the Moon falls on Earth's surface see a _____ solar _____. People who observe where only part of the Moon's shadow falls see a _____ solar _____.
5. In a _____ eclipse, Earth passes between the Sun and the Moon, briefly plunging the Moon into darkness as Earth's shadow moves across it.
6. When the Moon lies fully in Earth's shadow, people see a _____ lunar _____.
7. Groupings of stars that look like familiar patterns are called _____.
8. Greek astronomer _____ thought that Earth was at the centre of the universe.
9. In the early 1500s, a Polish astronomer named _____ proposed a model of the heavens in which planets, including Earth, revolved around the Sun. Italian astronomer _____ confirmed his model.
10. In the early 1600s, a German mathematician named _____ predicted that the planets revolved around the Sun in elliptical orbits.

Use with textbook pages 413–418.

Eclipses

Show what you know about eclipses. Draw diagrams as directed below.

1. Draw a diagram that shows what happens during a solar eclipse. Be sure to label the Sun, Moon, and Earth.
2. Draw a diagram that shows what happens during a lunar eclipse. Be sure to label the Sun, Moon, and Earth.

Name _____

Date _____

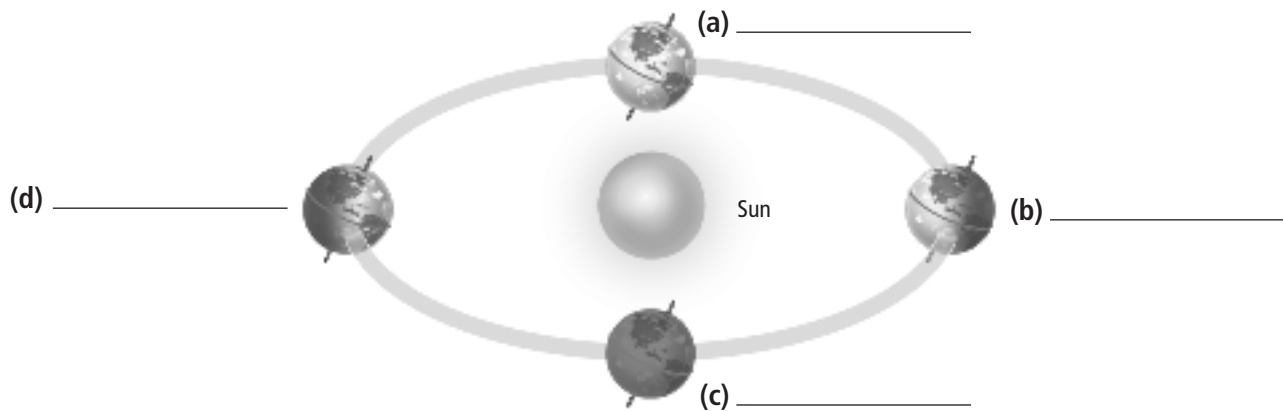
Use with textbook pages 410–420.

Seasons

Label the diagram, and then answer the question.

1. Label the diagram below according to the seasons for the northern hemisphere.

- spring
- summer
- autumn
- winter



2. Why do we have different seasons? Write a paragraph to explain. Be sure to mention axis tilt and revolution in your answer.

Use with textbook pages 410–420.

Earth, Moon, and Sun interactions

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ axis tilt	A. distinctive patterns formed by groups of stars
2. _____ constellations	B. occurs when the Moon passes between the Sun and Earth
3. _____ Copernicus	C. occurs when the Sun passes between the Moon and Earth
4. _____ Galileo	D. occurs when Earth passes between the Moon and the Sun
5. _____ Kepler	E. Earth's is 23.5°
6. _____ lunar eclipse	F. proposed that the Sun was the centre of the solar system
7. _____ Ptolemy	G. Greek astronomer who supported that Earth was the centre of the solar system
8. _____ solar eclipse	H. confirmed Copernicus's model of a solar system
	I. determined that the planets orbit the Sun in elliptical paths

Circle the letter of the best answer.

9. A total solar eclipse occurs when the
- A.** full shadow of the Moon falls on Earth
 - B.** full shadow of the Sun falls on Earth
 - C.** full shadow of Earth falls on the Moon
 - D.** full shadow of the Moon falls on the Sun

10. How do scientists think the Moon might have formed?

I.	from pieces of Earth knocked off by a large object
II.	from pieces of Earth in Earth's orbit
III.	from an explosion beneath Earth's surface
IV.	from pieces of other planets passing through space

- A.** I and II only
- B.** II and III only
- C.** III only
- D.** IV only

11. What causes the seasons?

I.	Earth's axis tilt changes and this causes light from the Sun to strike Earth at different angles during its orbit around the Sun.
II.	Earth's axis tilt changes and this causes light from the Sun to strike Earth at different times during its orbit around the Sun.
III.	Earth's axis tilt causes light from the Sun to strike Earth at different angles during its orbit around the Sun.
IV.	Earth's axis tilt causes light from the Sun to strike Earth at different times during its orbit around the Sun.

- A.** I
- B.** II
- C.** III
- D.** IV