

Mission 4: Galaxies and Stars (SC.5.E.5.1, SC.5.E.5.2, SC.5.E.5.3)

LEARNING GOAL: The student will recognize that a galaxy consists of gas, dust, and many stars, including any objects orbiting the stars. Identify our home galaxy as the Milky Way, and distinguish among the following objects of the Solar System—Sun, planets, moons, asteroids, comets—and identify Earth's position in it.

Video - Planets & Stars

In the video you watched, you were able to see several stars including Sirius and Pollux. The star named Sirius appears as the brightest star in our nighttime sky, even though a star named Pollux actually gives off more light. Why does Sirius appear brighter than Pollux in our nighttime sky? _____

DEMO - Stars - Read the text in your group and answer the two questions with evidence from the text to support your answer.

WHAT I NEED TO KNOW

Have you ever been told not to look directly at the **sun** because it may hurt your eyes? The sun is very bright! We often wear sunglasses to protect our eyes on sunny days.

The sun is a **star**, which means it is made mostly of hydrogen and helium gases and gives off its own light. The sun is at the center of our solar system and is the only star in our solar system. It is the closest star to Earth. The planets move in a path around the sun called an **orbit**. The sun is just one of the billions of stars in the universe! There are so many stars scattered throughout the universe that scientists cannot possibly count them all.

How often do you use the word "bright" when you describe how sunny it is outside? Scientists use this term a little differently. **Brightness** is used to describe the amount of light coming from objects in the sky such as the sun. **Luminosity** is the built-in brightness of the object. No matter how close or far away you are from an object, it will always have the same luminosity. **Apparent brightness** is the brightness of an object in the sky, such as a star, observed from Earth. The closer the object is to Earth, the brighter it appears. Even though stars look small, they are actually much larger than Earth. They look small because they are so far away.

What star seems to be brighter and why?

All stars, including our Sun, emit energy. How does a star's size, brightness, and distance from Earth affect how it appears in the night sky?

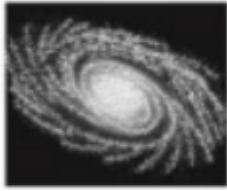
Planet Data

Planet	Gas Or Solid	Atmosphere	Size	Relative Position To The Sun	Moons	Temperature	Length Of Year (revolve around the sun)	Rings
Mercury		Thin atmosphere; no weather	4,880 km	Closer to the Sun 58 million km		The average is 67 degrees Celsius (hot)	88 days	
Venus		Thick cloud cover with strong greenhouse effect	12,104 km	Closer to the Sun 108 million km		The average is 480 degrees Celsius (hot)	225 days	
Earth		Carbon dioxide and water vapor greenhouse effect	12,756 km	150 million km		The average is 15 degrees Celsius (cool)	365 days	
Mars		Water vapor, thin atmosphere	6,794 km	Farther from the Sun 228 million km		The average is -63 degrees Celsius (very cold)	2 earth years	

Planet	Gas Or Solid	Atmosphere	Size	Relative Position To The Sun	Moons	Temperature	Length Of Year (revolve around the sun)	Rings
Jupiter		Great red spot (a huge storm), violent storms	142,700 km	Farther from the Sun 778 million km		Very cold above clouds to very hot in the center	12 earth years	
Saturn		Violent storms	120,000 km	Farther from the Sun 1427 million km		Very cold above clouds to very hot in center	29 earth years	
Uranus		Hydrogen, helium, methane	50,800 km	Farther from the Sun 2869 million km		Very cold above clouds to very hot in center	84 earth years	
Neptune		Hydrogen, helium, methane and ammonia ices	48,600 km	Farther from the Sun 4486 million km		Very cold above clouds to very hot in center	165 earth years	

MULTIPLE CHOICE:

1. In space, there are many different objects. The picture below shows a group of stars, gas, and dust that an astronomer would see with a telescope.



- What is the correct term for this grouping of stars, gas, and dust?
- A. planet
 - B. galaxy
 - C. universe
 - D. solar system
2. On a field trip to a science museum, Lee saw photographs of asteroids and comets that astronomers took using telescopes. What could Lee look for in the photographs to tell a comet from an asteroid?
- A. a long tail
 - B. a small size
 - C. a rocky surface
 - D. an irregular shape
3. Jacob is doing a report on the galaxy in which Earth is found. Which of the following is the galaxy that Jacob should research for his report?
- A. Andromeda
 - B. Milky Way
 - C. Maffei 1
 - D. Ursa Minor
4. All visible stars in the night sky are many times larger than Earth. Why do they look like tiny points of light?
- A. They are moving very fast.
 - B. The atmosphere blocks most of their light.
 - C. The stars visible at night are located very far from Earth.
 - D. Most of the light from stars is absorbed by galaxies, so it does not reach Earth.
5. Earth and Saturn are both planets orbiting the sun. Which of these other features do the two planets have in common?
- A. They have a thin atmosphere.
 - B. They rotate about an axis.
 - C. Their orbits are the same length.
 - D. They have about the same mass.

Mission 5: Earth, Moon, and Sun (SC.5.E.5.1, SC.5.E.5.2, SC.5.E.5.3)

LEARNING GOAL: The student will relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected.

Moon Video/Picture Questions:

1. Kashvi likes to look out the window at the moon. She observes that it seems to change every week. Which sentence **best** explains why this happens?
 - A. The moon moves between Earth and the sun.
 - B. The moon rotates only once in about a month.
 - C. The same side of the moon always faces Earth.
 - D. The amount of the lighted part of the moon that faces Earth changes.
2. The moon looks different as it orbits Earth in different phases. One phase is called a full moon. During a full moon, the entire surface of the moon as seen from Earth is in sunlight. How are Earth, the moon, and sun arranged during a full moon?
 - A. The sun is between Earth and the moon.
 - B. The moon is between Earth and the sun.
 - C. Earth is on the side of the moon in darkness.
 - D. Earth is located between the sun and the moon.

Quick Draw: Moon Phases ‘

Quick Draw: Rotation and Revolution (on next page, use pic to help)

- The Earth **ROTATES** on its **axis**
- **ROTATION** mean to “spin”
- An **axis** is an imaginary line that goes through the center of the planet
- The earth is **TILTED 23.5°** from the vertical position of the axis



- The Earth **REVOLVES** (revolution) around the sun
- **REVOLUTION** means to “move around an object”
- One revolution takes approximately 365 days (1 year)

Quick Draw: Rotation and Revolution

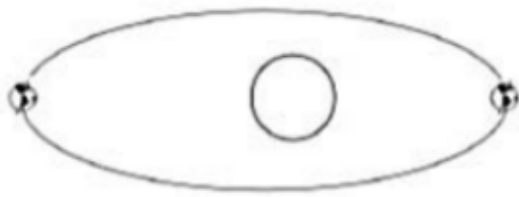
WRITING: Use vocab: axis day night revolution rotation

A student was absent in your class. Write them a letter explaining how the rotation of Earth (day and night) and movements of the Sun, Moon, and stars are all connected. Be sure to use vocabulary from the list provided above.

MULTIPLE CHOICE:

1. Some constellations are visible from different places on Earth only during a part of the year. Why are certain constellations not visible everywhere on Earth all year long?
 - A. the Sun's rotation
 - B. Earth's rotation
 - C. the Sun's revolution
 - D. Earth's revolution
2. Earth orbits the sun. Yet the sun appears to move through the sky. For example, the sun always appears to rise in the east and set in the west. What is responsible for this apparent motion of the sun?
 - A. Earth's size
 - B. Earth's orbit
 - C. Earth's rotation
 - D. Earth's revolution
3. If you look up at the night sky long enough, the stars will appear to move across the sky. What is responsible for making the stars appear to move across the sky at night?
 - A. Earth's revolution
 - B. Earth's rotation on its axis
 - C. Earth's position in its orbit
 - D. Earth's distance from the sun

4. Earth revolves around the sun. Look closely at the illustration below, which shows Earth revolving around the sun at two different moments in time.



How long will it take for Earth to travel between the two points shown in this illustration?

- A. one week
B. one month
C. six months
D. twelve months
5. The moon orbits Earth. This orbit causes the moon to look different over the course of about a month. These differences are called phases. One phase is called a full moon. Look closely at the table below.

Moon Phases—Summer 2005				
Month	New Moon	First Quarter	Full Moon	Third Quarter
June	6	15	22	28
July	6	14	21	28
August	5	13	19	26
September	4	11	18	25

What can you conclude about a full moon?

- A. A full moon always occurs after a first quarter moon.
B. A full moon always occurs on the 5th day of the month.
C. A full moon always occurs before the first quarter moon.
D. A full moon only occurs in the summer months.