

Sun, Moon, Earth

Thinking Notebook

Name _____ # _____

Illustrations to Show My Thinking

Please date your illustrations.

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Please date your illustrations.

Sun, Moon, and Earth Notes

- Identify common objects in the sky such as the sun and moon.
- Compare and contrast the characteristics of the sun, moon, and earth including relative distances and abilities to support life.
- Describe the orbit of the earth around the sun as it defines a year.
- Explain that the spin of the earth creates day and night.
- Describe the motion of the moon around the earth.
- Explain how the visible shape of the moon follows a predictable cycle that takes approximately one month.
- Describe the apparent movement of the sun and moon across the sky through day/night and the seasons.

universe- Everything that exists anywhere in space. It includes all the galaxies, stars, planets, and other bodies that they may contain.

star- A huge ball of glowing gas that appears as a bright point in the night sky. Astronomers think there are more than 200 billion stars in the universe.

sun- The sun is a **star** that provides earth with most of its **heat and light energy**. The earth, moon, and other planets in our solar system **revolve** around the sun.

planet- A large body that travels in orbit around a star. They are usually smaller than stars and they do not give off heat or light.

moon- A body that revolves in orbit around a planet or is a satellite to a planet due to the planet's gravity. Our moon is Earth's only natural satellite and our nearest neighbor in space.

sphere- A figure shaped like a globe or a round ball. The stars, planets, and moons are sphere-shaped (not circle-shaped).

space- The giant, near-empty region in which the planets, stars, and galaxies are found. Outer space begins about 60 miles above earth where the atmosphere is very thin.

solar system- The sun and planets, moons, **asteroids, comets**, and dust particles that are in orbit around the sun.

orbit- The path of one heavenly body around another. The orbit of the earth around the sun is an ellipse. The planets orbit the sun. Latin meaning "the track of a wheel".

Day and night are caused by the Earth's **spin** or **rotation** on its axis. When we face the sun it is day. When we face away from the sun it is night. The sun appears to move across the sky, but the earth is what is actually moving. (Imagine us as a toy top spinning.)

axis- An imaginary line that passes through the center of an object (planet) and around which the object spins. The axis of Earth passes between the North and South poles.

eclipse- A temporary blotting out of the light of a heavenly body. A **solar eclipse** is when the moon passes between earth and sun.

A **lunar eclipse** is when the moon passes through earth's shadow.

month- A month is based on the movement of our moon making a revolution around planet.

year- A year is one **revolution** around the sun. Earth travels in an ellipse (oval shape) and when it gets back to where it started, one year has passed.

Our **calendar** is based on our planet's movement in space.

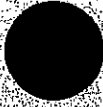








The **temperature** of a location is partially due to the distance from the sun. The **equator** is closer to the sun, therefore, the temperature is usually warmer closer to the equator. The poles are the furthest distance from the sun, therefore, it is cooler at the poles. The earth has a **slight tilt** and this causes the **four seasons** in areas between the equator and poles.

11-8-10

Name _____

Phases of the Moon

Read the passage that explains the phases of the moon. Then fill in the circle for the best answer to each statement or question.

Day 0	Day 4	Day 7	Day 10	Day 14	Day 17	Day 21	Day 25	Day 28
								
New Moon	Waxing Crescent	First Quarter	Waxing Gibbous	Full Moon	Waning Gibbous	Last Quarter	Waning Crescent	New Moon

How Does the Moon Change Shape?

The moon is the brightest object in the night sky. However, it does not have any of its own light. Moonlight is simply the sun's light reflected off the moon's dusty surface.

The moon travels around Earth in an orbit that takes 28 days. The moon appears to change shape. Those shapes are called **phases**. What we are actually seeing is the moon lit up by the light from the sun in different ways on different days. During a new moon, the moon's dark side is facing Earth, and the moon is not visible.

When the moon is **waxing**, or growing in intensity, it changes from a crescent to a first quarter to a gibbous. We see more and more of the moon every night until it becomes a full moon. During a full moon, the moon's lit-up side is facing Earth. The moon we see is very bright from the sunlight reflecting off it.

When the moon is **waning**, or decreasing in intensity, it changes from a gibbous to a last quarter to a crescent. We see less and less of the moon every night until it becomes a new moon.

- When the moon waxes, it _____.
 - decreases in intensity
 - increases in intensity
 - changes location
- How many days pass from a new moon to a full moon?
 - 28
 - 21
 - 14
- During which phase is the moon not visible?
 - first quarter
 - full moon
 - new moon
- How many days pass from a first-quarter moon to a last-quarter moon?
 - 28
 - 14
 - 7
- Moonlight is created when light from _____ reflects off the lunar surface.
 - Mars
 - Earth
 - the sun



HOME This photo of Earth was taken from the moon during the Apollo 11 mission.

MOON WALK

2009
This July marks the 40th anniversary of a major milestone in space exploration—people landing on the moon.

One million people watched at the Kennedy Space Center in Florida as the engines fired, and smoke and flames filled the sky. At 9:32 a.m., on July 16, 1969, *Apollo 11* lifted off.

Three astronauts, Neil Armstrong, Edwin “Buzz” Aldrin, and Michael Collins, were onboard—and on their way into history. Two of them would become the first people to set foot on the moon.

On Their Way

After blastoff, Armstrong, Aldrin, and Collins worked, ate, and slept while floating freely in the weightless environment. On July 19, three days and 240,000 miles after liftoff, the three astronauts saw the moon for the first time. They said its very roundness reminded them of Earth and made them feel welcome.

Apollo 11 was made up of two parts, *Columbia* and the *Eagle*. *Columbia* was the command ship and the *Eagle* was the lunar module. Armstrong and Aldrin climbed into the *Eagle*, the part that would travel to the moon. As the two parts separated, Armstrong radioed: “The *Eagle* has wings.” Collins remained behind to pilot *Columbia*.

Final Approach

Soon, Armstrong and Aldrin got a view of where they were supposed to land. They were surprised to see that it was full of large rocks and craters.

They had to quickly find a better landing site or

they would have run out of fuel.

With only 30 seconds to spare, the astronauts touched down. Armstrong was the first to descend the ladder. It’s estimated that 600 million people worldwide watched on television as he stepped onto the moon. Armstrong’s words would be echoed long into the future: “That’s one small step for a man, one giant leap for mankind.”

Moon Trek

Aldrin soon joined Armstrong on the moon. On its surface, they found a dark gray-and-black powdery material—some of it was as fine as flour and some was as coarse as sand. The astronauts took photographs and set up scientific experiments.

They spent 2 hours and 14 minutes on the moon and gathered 47 pounds of rocks to take back to Earth. They left behind an American flag and a plaque that read “We came in peace for all mankind.”

Boarding the *Eagle*, they took one last look at the moon’s Sea of Tranquility. They soon reconnected with Collins at *Columbia* and headed back to Earth. On July 24, *Columbia* splashed down in the Pacific Ocean, returning everyone safely.

Words to Know

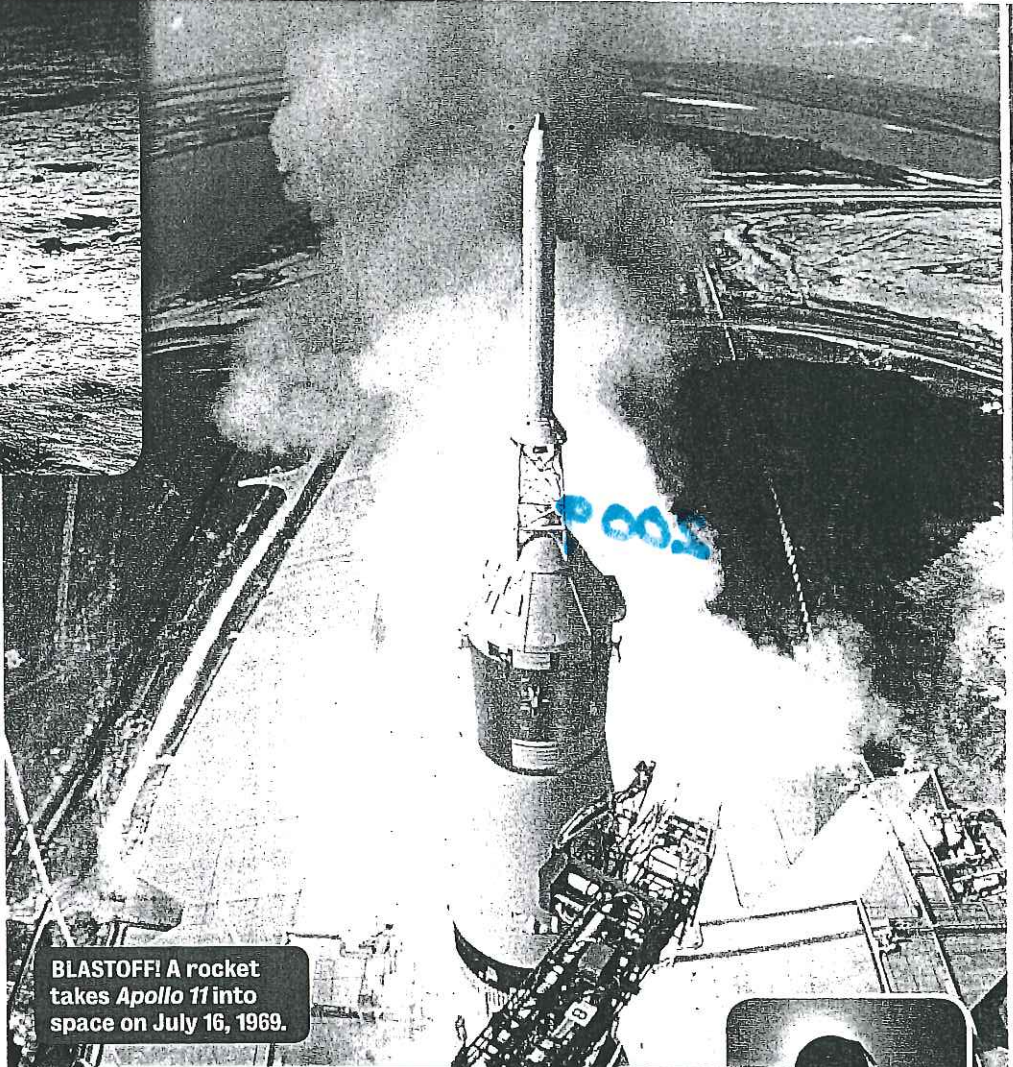
module: (moj-ool) *noun*. A separate, independent section that can be linked to other parts to make something larger.

tranquility: (tran-kwi-luh-tee) *noun*. The quality of being quiet and peaceful.

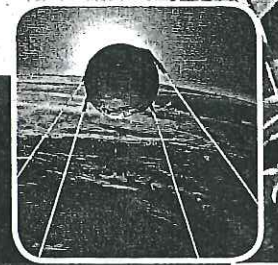
COMMANDER Neil Armstrong on the way to the launchpad for the *Apollo 11* mission.



MAN ON THE MOON
Buzz Aldrin on the lunar surface.



BLASTOFF! A rocket takes *Apollo 11* into space on July 16, 1969.



Everyone's Success

Landing people on the moon was a huge feat for America—proof of what courage and know-how can do. The success of *Apollo 11* also increased our knowledge of the moon, sun, and Earth, and helped pave the way for future human space exploration—for all humanity. Aldrin says that's the point. He told *Scholastic News*, "The ultimate goal of human and robotic activity in space is to benefit mankind."

The astronauts were greeted as heroes, but they knew their mission was a result of teamwork. More than 400,000 people played a role, from flight directors to space-suit designers.

Chris Kraft and Gene Kranz supervised the flight from Mission Control in Houston, Texas. They look forward to the day when nations will band together to build a permanent station on the moon and send people to Mars. To make this possible, Kranz offers three pieces of advice: "Dream. Aim high. Never surrender." —*Kem Knapp Sawyer*

BLASTING OFF!

History can be out of this world! Check out this space-exploration timeline:

October 4, 1957—
The Soviet Union launches the first artificial satellite, *Sputnik* (right), into space.

April 12, 1961—
Yuri Gagarin, a cosmonaut (Russian astronaut), becomes the first person to fly into space.

February 20, 1962—
American John Glenn becomes the first person to orbit the Earth in a space capsule.

July 20, 1969—
Neil Armstrong and Edwin "Buzz" Aldrin become the first people to walk on the moon.

April 12, 1981—
The U.S. launches the first piloted space shuttle.

November 20, 1998—
The first pieces of the International Space Station (ISS) are launched into space. The ISS is scheduled to be completed in 2010.

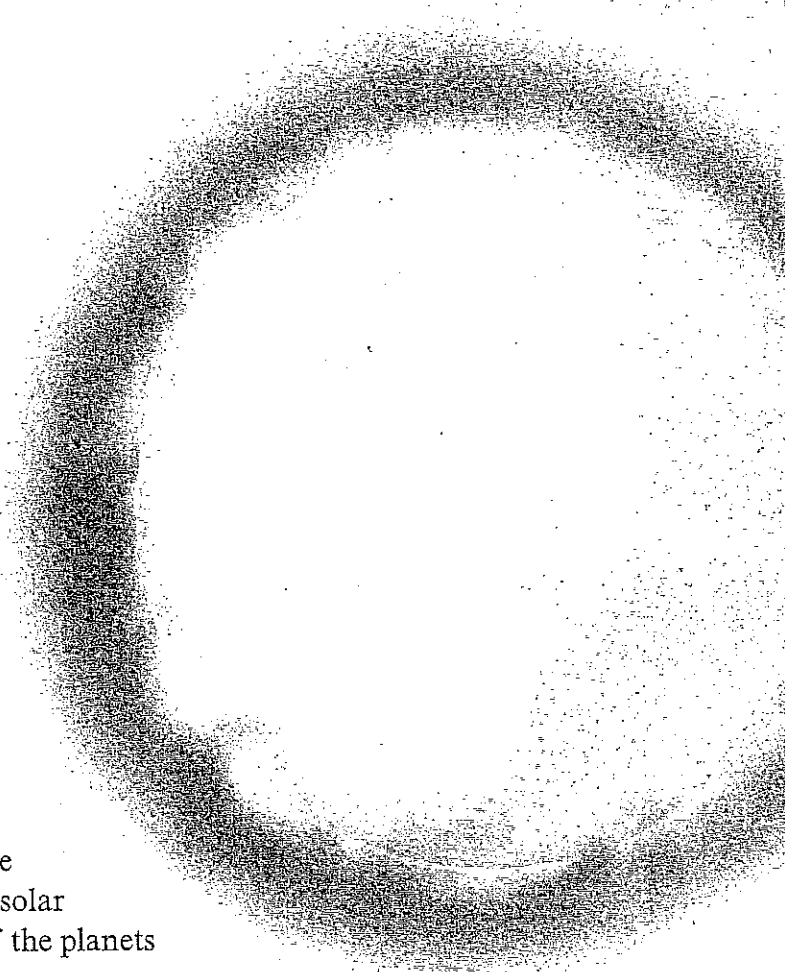
BACK TO YOU

• Would you want to be a future space explorer? Why or why not?

Our Place in Space

Have you ever looked into the night sky and wondered what was out there? Throughout time, people have gazed to the heavens. They are hoping to find clues about our place in the universe.

Long ago, people thought that Earth was the center of the solar system. They thought that the sun, moon, stars, and other planets revolved around it. Scientists finally learned that Earth is one of at least eight planets in our solar system. They found that all of the planets travel around the sun.



the Sun

Our Sun

The sun is a star at the center of the solar system. It isn't the biggest or brightest star in our galaxy, but it is the star closest to Earth. It is the largest body in our solar system. In fact, it contains 99.8 percent of all of the mass in our solar system.

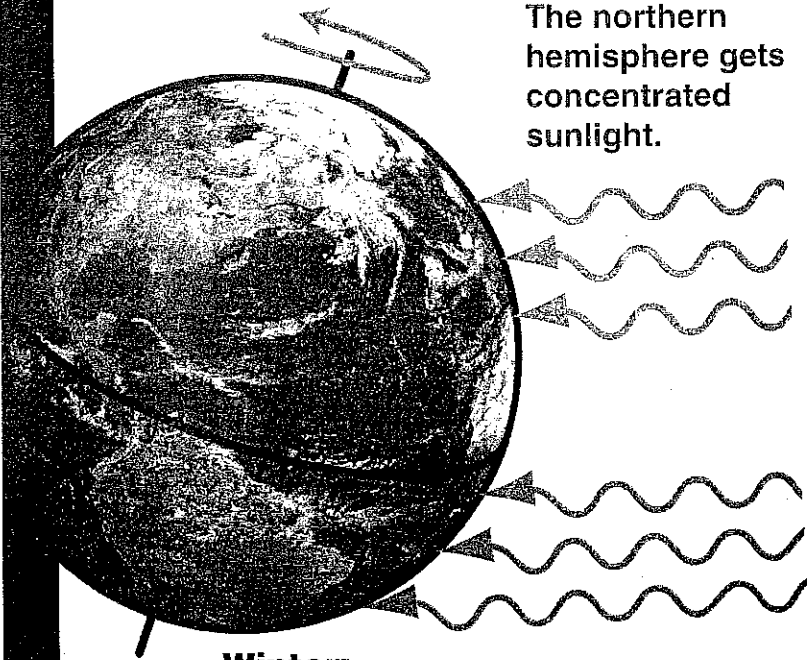
The sun is the major source of energy on Earth. It gives us light and heat. It's responsible for the growth of plants, winds, ocean currents, and the water cycle.

Without the sun, Earth would be very cold. It would be so cold that no living thing could survive.

Like other stars, the sun is made up of hot hydrogen and helium gases. The temperature in its center is about 15 million degrees Celsius (27 million degrees Fahrenheit). The sun also creates gravity. The force of gravity between the sun and planets keeps Earth and other planets of the solar system in place and orbiting around the sun.

Four Seasons

The way Earth is tilted causes the seasons. For part of the year, the northern half of Earth leans toward the sun and gets direct sunlight. So, it's summer there. At the same time, the southern half leans away from the sun and gets less sunlight. So, it's winter there.



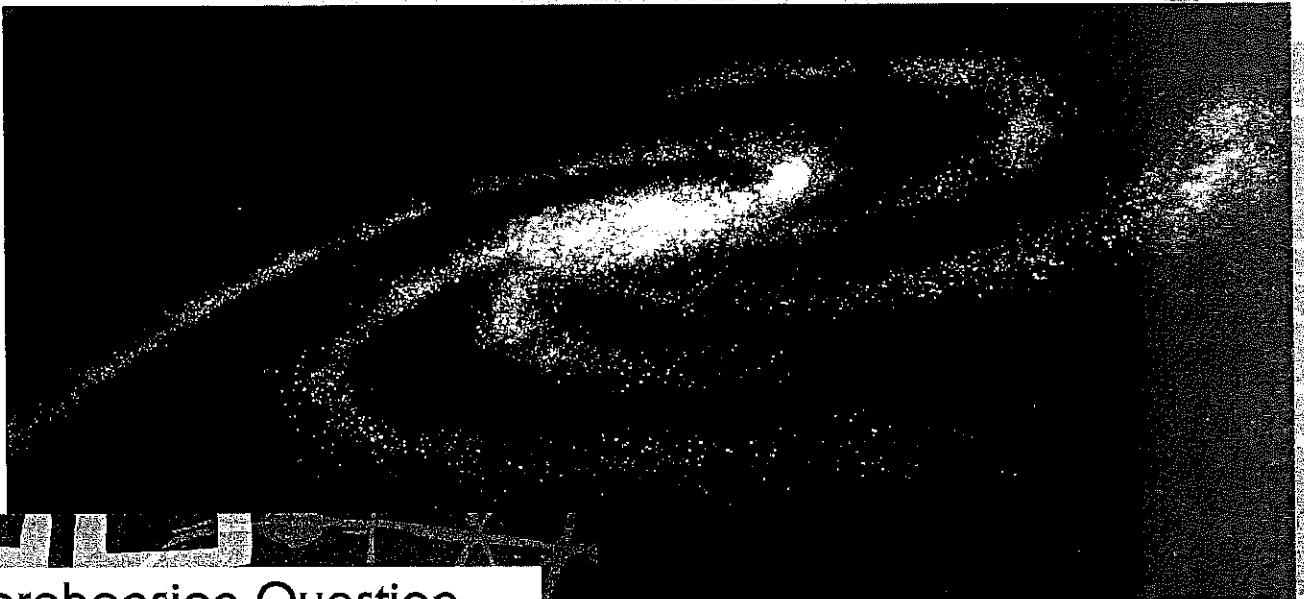
Summer:
The northern hemisphere gets concentrated sunlight.

Winter:
The southern hemisphere gets sunlight spread out.

The tilt doesn't change. It is the position of the planet around the sun that changes. As Earth goes around the sun, different parts get more sunlight. That makes the seasons.

Astronomers also now know that our solar system is almost 5 billion years old. It is located at the edge of the Milky Way galaxy. It is one of at least 100 billion galaxies in the universe. Each one of them has billions of stars! Our galaxy alone has about 200 billion stars.

The Milky Way is a spiral galaxy. It can be seen on a very dark night as a bright band in the sky. It is so wide that light would take 100,000 years to travel across it.



Comprehension Question

People used to think that Earth was the center of everything. How were they wrong?

Name _____

Date _____

Our Place in Space

Please answer the following using complete, restated sentences.

1. What would earth be like if we didn't have the sun?

2. Explain how the tilt of the Earth causes us to have seasons.

3. What is our galaxy called and how old is it?

4. People used to think that the Earth was the center of everything. How were they wrong?

Name _____

Date _____

The Earth, Moon, and Sun

Read The Sun, Earth, and Moon. Please answer the following using complete, restated sentences. You may also draw a diagram to help you explain.

1. What do all planets do that causes them to be called a planet?

2. What do all moons do that causes them to be called a moon?

3. Rotation is the Earth spinning around on an imaginary line called an axis. How long does it take Earth to make one rotation?

4. What does rotation cause us to have?

5. Revolution is the path the Earth takes as it makes a full circle around the Sun. What do we call one full revolution and how long does one revolution take?

6. On Earth, we have seasons that can be felt as you travel away from the Equator? What causes these seasons?

7. The moon revolves and rotates around the Earth. How long does one full revolution and one full rotation of the moon take?

8. How does the moon's gravitational pull affect us here on Earth?

9. If you had the chance to travel to the moon would you go? Why or why not?

Plan your presentation in this space.

Plan your presentation in this space.

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Plan your presentation in this space.

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Plan your presentation in this space.

Name _____ Date _____
4Science Studies Weekly: Earth's Place in the Universe 3rd quarter **Week 17**

True/False (1 point each)

- _____ 1. Scientists use giant radio telescopes to listen for signs of alien life forms.
 _____ 2. Copernicus was a German astronomer.
 _____ 3. Galaxies are usually about one hundred light years across.
 _____ 4. The Hubble Telescope is an orbiting telescope that takes pictures of the universe.
 _____ 5. Galileo wrote six books called *On the Revolutions of the Celestial Spheres*.

Matching (1 point each) Tell what type of resource each item is by writing the correct letter next to the each item.

- | | |
|--|------------|
| _____ 6. the force that keeps things on Earth | a. nebulae |
| _____ 7. a tool that helped sailors in the 1700s find their way | b. galaxy |
| _____ 8. huge clouds of gas and vapors that light up space | c. orbit |
| _____ 9. the path made by a celestial object around another object | d. sextant |
| _____ 10. a giant cluster of stars | e. gravity |

Multiple Choice (2 points each)

11. The _____ effect makes it look as if something moved when you look at it with alternating eyes.
 a. parallax
 b. nebulous
 c. galactic
 d. gravitational
12. _____ was the scientist who first proposed that the Earth revolves around the sun.
 a. Galileo
 b. Copernicus
 c. Hopkins
 d. Newton
13. The _____ of the Earth causes different seasons on different parts of the planet.
 a. gravity
 b. tilt
 c. magnetism
 d. landforms
14. Which of the following does the Earth's tilt not influence?
 a. temperature
 b. weather
 c. length of day and night
 d. length of a year

Short Answer (2 points each)

15. Name two things that might run on solar cells.
 _____ and _____
16. What does GPS stand for? _____
17. What does a GPS device do? _____

Sun, Moon, Earth Study Guide

Main Ideas

- Identify common objects in the sky such as the sun and moon.
- Compare and contrast the characteristics of the sun, moon, and earth including relative distances and abilities to support life.
- Describe the orbit of the earth around the sun as it defines a year.
- Explain that the spin of the earth creates day and night.
- Describe the motion of the moon around the earth.
- Explain how the visible shape of the moon follows a predictable cycle that takes approximately one month.
- Describe the apparent movement of the sun and moon across the sky through day/night and the seasons.

1. The sun is a _____.
2. The earth is a _____.
3. The moon is _____ a star or planet.
4. Our moon revolves around our planet because of the earth's _____.
5. The sun, moon, and earth all have the _____ shape.
6. The earth _____ or revolves around the _____.
7. A _____ has passed when the earth makes one full revolution.
8. A _____ has passed when the earth makes one full rotation.
9. About a month has passed when the _____ makes one full revolution.

10. The half of the earth that is facing the sun is having _____.
11. The hemisphere that is tilted closest to the sun is having the season of _____.
12. Why is it possible for the moon to seem to disappear from the sky (even when there are no clouds) every month?
13. Why do the sun and moon appear to be the same size? Which is closer to earth?
14. List 3 reasons why earth can support life.
15. Why isn't the moon able to support life?

Name _____ Number _____ Due _____

Sun, Moon, Earth Presentations

You must include the following information in your presentation. All group members must participate. You will be graded on speaking skills as well as knowledge presented. Be creative and interesting!

- Identify the sun and moon. (What are they?)

- Compare and contrast the characteristics of the sun, moon, and earth including relative distances and abilities to support life.

- Describe the orbit of the earth around the sun as it defines a year.

- Explain that the spin of the earth creates day and night.

- Describe the motion of the moon around the earth.

- Explain how the visible shape of the moon follows a predictable cycle that takes approximately one month. (phases of the moon)

- Describe the apparent movement of the sun and moon across the sky through day/night (east to west) and the seasons.

- Sun _____

- Sun _____

- Moon _____

- Moon _____

- Earth _____

- Earth _____

Name _____

SME Reflection

I used to think

but now I think
