

**SECOND GRADE  
OCTOBER  
SUN AND MOON**

TOTAL TIME: 60 Minutes (ca 20 minutes per station).

You will need to turn the light on and off several times.

Even though there are three stations, this box needs to be done with the entire class, one station at the time.

If you have more than one volunteer, you can divide the material into presentations, presenting one station after the other. The rest of the volunteers who are not presenting can assist the children by distributing the material, assisting the kids at their desk with the stapling of the booklets and the assembly of the moon phase wheel and the sun dial, etc.

STATION 1: WHAT MAKES DAY AND NIGHT AND THE SEASSONS?

STATION 2: MOON PHASES

STATION 3: SUNDIAL

**MATERIALS**

Station 1: What Makes Day and Night and The Seasons?

- One copy of the booklet "When the Earth Moves" per child.
- Stapler (supplied by teacher).
- Scissors (supplied by teacher).
- Flashlight
- Small cutout of a person (inside the bag together with the flashlight)
- Tape (supplied by teacher).
- Globe (supplied by teacher).

Station 2: Moon Phases

- Aluminum mirror
- Flashlight
- A copy of the image of the moon reflecting the sun's light. (This is taped behind the aluminum mirror)
- One copy of the front sheet of the wheel called: Moon Phases per child.
- One copy of the back sheet of the wheel. The one with 8 phases of the moon on it.
- One pair of scissors per child (supplied by teacher).
- A paper fastener per child.
- The provided moon lamp.
- A plastic ball (This will be the moon)
- The laminated Moon phases poster

Station 3: Make a portable Sundial.

- A paper plate per child
- A copy of the hour line markings
- A Straw per child
- Glue
- Tape
- A sunny day

## Station 1: What Makes Day and Night and the Seasons?

### Materials:

- A Flashlight
- Small cutout of a person. (placed inside a plastic bag, together with flashlight)
- Tape (supplied by teacher).
- Globe (supplied by teacher).
- One copy of the booklet "When the Earth Moves" per child.
- Stapler (supplied by teacher).
- Scissors (supplied by teacher).

### Activity:

#### **How are Day and Night Different?**

Engage students in a discussion of how day and night are different.

**As the Earth turns, the sun seems to disappear and reappear, making day and night. Help students visualize what really happens with the following demonstration.**

1. Tape the small cutout of a person to the South East of the United States on the globe.



2. Position the globe six feet from the flashlight. Have the cutout facing the light source.
3. Turn out the lights.
4. Slowly rotate the globe to the right until a full circle has been made. Explain to them that this represents one day.
5. Rotate the globe several more times, having students say "day" and "night" as the cutout moves in and out of the light.

Follow Up:

Questions students about what happened.

"What did you see when the cutout was facing the light?"

(The light was shining on the cutout. It looked like daytime)

"What did you see when the cutout turned away from the light?"

(It was in the dark. It looked like night time).

Why did it happen?

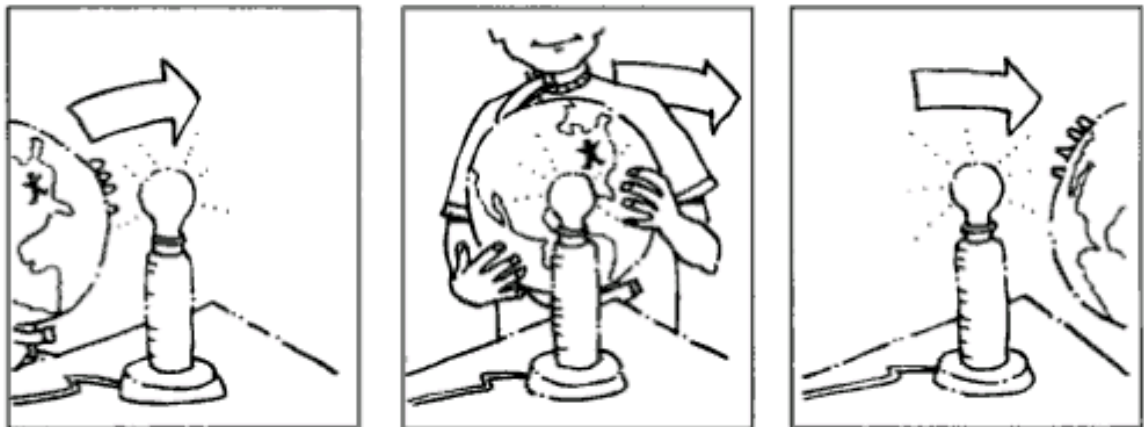
(The globe turned. It moved the cutout around.)

"How is this like what happens to us?"

(As part of the Earth turns away from the sun it gets dark. When it turns back to the sun it gets light again.)

**Now explain to them that the earth moves around the sun.**

6. Set the flashlight on the middle of a table. Explain to them that this represents the sun.
7. Hold the globe in the light from the lamp.
8. Now the students will be 'astronomers' studying the Earth and sun.
9. Slowly move the globe around the lamp, always keeping it tilted in the same position. The easiest way to do this is to keep the top of the axis pointing at an object on the wall.



Have the observers watch to see when the North Pole is tilted toward the "sun" or away from the "sun" as you move the globe around. Explain that it is colder where you live when the axis is further away from the sun (winter). It is warmer when the axis is closer the sun (summer).

10. Make the booklet *When the Earth Moves* with the children and read it all together.

## Station 2: Moon Phases.

### Materials:

- Aluminum Mirror
- Flashlight
- A copy of the image of the moon reflecting the sun's light
- One copy of the front sheet of the wheel called: Moon Phases per child.
- One copy of the back sheet of the wheel. The one with 8 phases of the moon on it.
- One pair of scissors per child (supplied by teacher).
- A paper fastener per child.
- The provided moon lamp.
- A plastic ball (This will be the moon)
- The laminated Moon phases poster

### Activity:

Generate interest in the moon by asking the students to answer a riddle about Earth's moon.

Give the clues one at a time, calling on a student to try to give an answer after each clue. Continue giving clues until you receive the answer "moon"

### WHAT IS IT?

"This object is part of the solar system"

"It is smaller than Earth"

"It is usually seen at night"

"It has holes called craters on its surface"

"It goes around the Earth"

"It seems to change shapes on different nights"

"If you look up at night, you will probably see it"

Ask students to think about **"WHERE DOES THE MOON'S LIGHT COME FROM?"**

Then do the following demonstration with their assistance.

Tell the students that the flash light represents the sun and the mirror represents the moon.

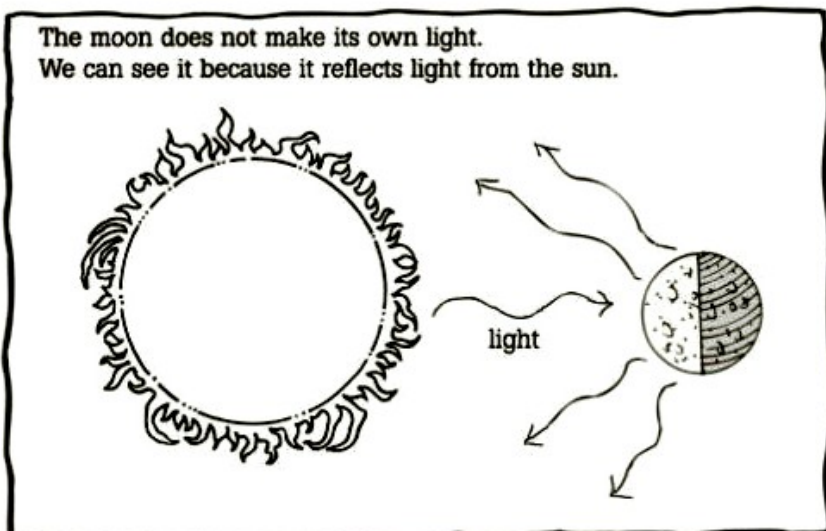
1. Turn off the lights.
2. Turn on the flashlight. Point the light at a wall and observe what is happening to the light
3. Now point the flashlight at the mirror and observe what happens to the light.

**WHAT DID HAPPEN TO THE LIGHT WHEN THE FLASHLIGHT POINTED AT THE WALL?** (We just saw the wall. )

**WHAT DID HAPPEN TO THE LIGHT WHEN THE FLASHLIGHT POINTED AT THE MIRROR?** (The light bounced off, and we could see other things in the classroom).

This is called reflected light. This is what happened when the sunlight shines on the moon. The sunlight is reflected by the moon. The moon does not produce the light just like the mirror did not produce the light. It came from the lamp. They both reflect light.

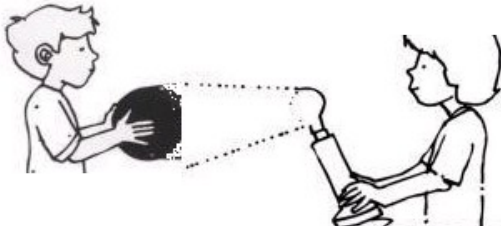
Show the kids the copy of the picture below so that they understand. (This is behind the aluminum mirror)



Explain to the students that the part of the moon that is facing the sun is the part that reflects the light and that is the part that we see.

We do not see anything when the moon is between the earth and the sun. This is because the light is on the other side of the moon. That is the new moon.

To understand this, do the following **demonstration with the students**.



- Have one child hold the ball. Explain that the ball represents the Moon. The ball has a dot. Keep the dot facing you. Explain to the student that his/her head represents the Earth.
  - Have another child hold the flashlight. Turn it on, and turn off any other lights in the room. The lamp represents the Sun.
  - The student with the ball should stand several feet away from the light and face it.
  - Tell him/her to hold the ball at arm's length in front of his face. Remind everybody that his face is the earth. If you place the ball directly in front of you, you just created a solar eclipse.
  - Tell him/her to hold the ball above or below the light. Observe what happens. The light strikes the back of the ball and you don't see any light on the side that's facing you. This represents the new Moon phase or no Moon phase since you don't see the Moon at all.
  - Turn a bit to your left with the ball still holding at arm's length. You'll see a small crescent of light on the right side of the ball. This is the new crescent.
  - Turn until the ball is half lit up. This is the first quarter Moon. It's called the first quarter since the Moon has traveled one-quarter of the way around the Earth.
  - Continue turning around the circle until you come 180 degrees (halfway around). At this point the whole ball should be lit. It's a full Moon. If your head's in the way, you just created a lunar eclipse. Raise the ball up some to see a full Moon.
4. Have the students **make the Moon Phase wheel**. You will need the two pieces of paper with the moon phases and the paper fastener. Cut out both circles and the window. Put the paper fastener through the center circles.

By turning the bottom wheel to the right, the phases of the moon will appear in the correct order in the window.

Ask questions:

**Does the moon really change its shape each day?**

(No. It just seems to change because of the light that is reflected on it)

**How long is from one full moon until you see the full moon again?**

(It takes 29 1/2 days the Moon to revolve around the Earth. During this time it will have different amounts of sunlight striking its surface every day.)

5. Use the laminated Moon Phases chart to show how the moon looks like from the earth in 8 different phases.
6. Take the moons apart. They have velcro on the back so they can be attached and removed and they are numerated so that you can not make a mistake.

**Ask the students when is new moon?**

IT IS NEW MOON:

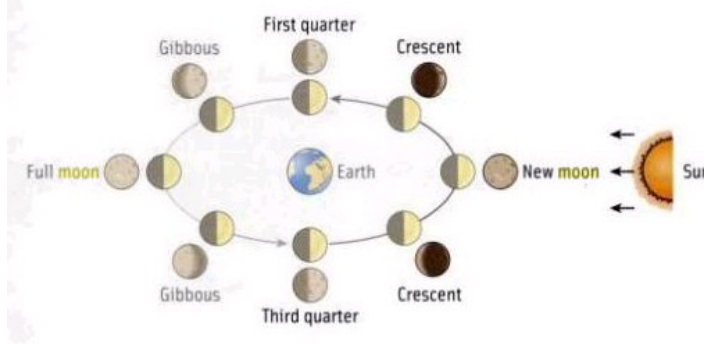
When the Moon is between the Sun and Earth, it blocks the sunlight and appears dark.

Then **ask them do you now when is full moon?**

IT IS FULL MOON:

When the Moon is on the opposite side of Earth from the Sun, the Moon appears fully lit. Let them turn their wheels to see which moon come next.

WAXING CRESCENT COMES AFTER NEW MOON, ETC. The image below is just for you to better understand. You will find it in the back of the poster.



7. Finally, have students turn their wheel at the same time that you light the moon lamp, naming each phase as it turns up on the wheel.

### Station 3: Make a portable Sundial.

#### Materials:

- A paper plate per child
- A copy of the hour line markings
- A flexible straw per child
- Glue
- Tape
- A sunny day

You learned about making shadows in the first grade. Do you remember what causes the changes in shadows?

(THE ROTATION OF THE EARTH CAUSES THE SUN TO APPEAR TO MOVE ACROSS THE SKY. So shadows change because of the earth rotation and the sun's apparent movement.)

The earth acts like a clock as it spins on its axis and orbits the sun. Before we had clocks and watches, people could tell the time by reading shadows. They made use of sundials to tell the time. A sundial works only during the day when the sun is shining. The time is told by where the shadow of the sun falls.

#### Activity:

(THERE IS A READY SAMPLE INSIDE THE BOX)

1. Glue the copy of the hour line markings to the paper plate.
2. Cut out the circle.
3. Make a hole in the middle.
4. Push the longer side of the straw through the plate and bend it to 45 degrees.
5. Cut the straw to a height of 2 inches. This is the part of the sundial that casts the shadow to tell the time.
6. Tape the back of the straw to the back of the plate.
7. Make a hole on the top of it.
8. Put a string to it
9. If you have time go outside and measure the time, otherwise let them do it with their teachers another day. The pointer should be facing north. The shadow tells the time.