

Phases of the Moon

Summary

Using a softball and a light source, students model and observe the reason for and pattern of the phases of the moon.

Time Frame

1 class periods of 45 minutes each

Group Size

Large Groups

Materials

Softball or Styrofoam ball (1 per student)

If using softballs, they need to be white. Use new ones or clean old ones with shoepolish or paint.

If using Styrofoam balls, mount them on pencils or craft sticks to provide students with a handle.

Light source (lamp or overhead projector with lens assembly removed)

Background for Teachers

The phases of the moon are caused by the relative position of the Earth, sun, and moon. Most students (and adults) believe that the phases of the moon are caused by the shadow of the Earth on the moon or by the shadows cast on its surface by other objects in the solar system. The real cause of the phases of the moon is its position with respect to the Earth and sun.

What we see of the moon is the light reflected from it. Half of the moon's surface is always in sunlight. We see the moon going through phases because we see varying portions of the sunlit side as the moon revolves around the Earth.

Intended Learning Outcomes

Make observations.

Collect, record, and analyze data.

Weigh evidence before drawing conclusions.

Recognize relevance of science in everyday life.

Explain how parts of a system are interconnected.

Construct and use models.

Instructional Procedures

Place the light source in the middle of the room. Stand in a large circle around it.

Give each student a ball.

Turn out the classroom lights, to make the phases of the moon more visible.

The light represents the sun. The ball represents the moon. Your head will represent the Earth.

Hold the ball in your hand and turn so that the "moon" is between you and the "sun."

Slowly turn your body counterclockwise keeping the Earth facing the moon. Notice the edge of the shadow as it moves across the moon.

Stop once you have completed 1/4 of a revolution and notice the appearance of the moon.

Continue turning counterclockwise until you have completed 1/2 of a revolution and the sun is

behind your head. You will need to raise the moon slightly so that the shadow of your head does not fall on the moon. Notice the appearance of the moon.

Continue turning counterclockwise until you have completed $\frac{3}{4}$ of a revolution. Notice the appearance of the moon.

Continue turning counterclockwise until you have completed a full revolution. Notice the appearance of the moon.

Have students repeat the process as many times as needed to gain a clear understanding of the phases of the moon as well as positions of the Earth, moon, and sun during this process.

Discuss student observations being sure to cover the following.

- Relate observations to the actual phases of the moon.

- Explain that the moon completes one revolution approximately every 28 days (one month.)

- Help students describe the changes in the appearance of the moon during a month.

- Have students identify the predictable pattern of change in the moon's appearance.

Discuss that this activity is not to scale. The moon diameter is about one-fourth the diameter of the earth. (A softball as the moon and a basketball as the Earth are close to scale.) On that scale, the softball should be about three classroom lengths away.

Have students summarize their experience in their science journals. They should explain why the appearance of the moon changes in words as well as through illustrations that depict the positions of the Earth, moon, and sun.

Extensions

Phases of the Moon Chart:

- Fold 12x18 black construction paper into 32 squares.

- Cut off the bottom four squares to leave 28.

- Use white colored pencils to draw and shade circles depicting the phases of the moon during one complete cycle.

Assessment Plan

Assess student science journals using the Science Writing Rubric found below to assess their understanding of the phases of the moon.

Check for misconceptions in understanding why the phases occur.

Check for misconceptions in the relative positions of the Earth, moon, and sun.

Rubrics

[Science Writing Rubric](#)

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