

Misconceptions and the Moon

Summary

This lesson will address students' common misconceptions of what causes moon phases. It uses models to clearly demonstrate that moon phases are caused by the moon reflecting sunlight and its relative position to Earth.

Additional Core Ties

English Language Arts Grade 6

[Speaking and Listening Standard 5](#)

Time Frame

1 class periods of 45 minutes each

Group Size

Small Groups

Materials

- The Mystery of the Moon Pre-assessment (attached)
- Moon Phases Worksheet (attached)
- Black construction paper cut into 4ths (one piece per student)
- White chalk (one per student)
- Masking tape
- Large white ball
- Black garbage bag
- Black tape
- 8 - 36" hula hoops
- 8 - 2" smooth Styrofoam balls per hoop
- Hot glue/gun
- 8 -- LED flashlights
- Batteries
- Darkened room

Background for Teachers

MoonConnection.com

www.morehead.unc.edu

starryskies.com

Student Prior Knowledge

The moon appears to change shape.

Intended Learning Outcomes

1. Use Science Process and Thinking Skills
 - a. Observe simple objects, patterns, and events, and report their observations.

Instructional Procedures

Prior to this lesson, assemble materials. Inflate the large white ball and cover half with the black

garbage bag using the black tape. Glue the styrofoam balls evenly spaced out on the hoops. Hand out "The Mystery of the Moon" pre-assessment worksheet. Read to the class and give students a few minutes to answer. Go back and read the choices and have students raise their hand if that was the one they agreed with. Ask one or two students to share their explanation of why they agreed with that person. Do not give away the correct answer. You will come back to this at the end of the lesson.

Place a large ball ($\frac{1}{2}$ black and $\frac{1}{2}$ white) on a desk or chair in the middle of the room. Have the class form a circle around the outside of the room. Tell the class it is a model of the moon. Give each student $\frac{1}{4}$ sheet of black construction paper and a piece of white chalk. Have each student draw a large circle and put an X at the top of their paper. Then have them draw what the moon looks like from where they are standing (the white part is colored white and the black part is left black). Find the student who has all black or nearly all black (new moon). Have them tape their picture of the moon at the left edge of the white board (X is at the top). Then have each student (going counter-clockwise) in the order that they are standing come up and hang their picture and return to their place in the circle. You will see the moon phases, as they would change during a cycle, in order on the board.

Explain that as the moon revolves around the earth, we see a slight change in the appearance of the moon every day/night. Ask how much of the moon is always reflecting sunlight (half). Ask if everyone saw the same amount of that reflected sunlight (no). Tell them that the amount of the reflected sunlight depends on the position of the Earth, moon and the sun. Have the students walk counter-clockwise around the model of the moon noticing the change in the phases.

Explain that the hoop represents the moon's orbit and the balls represent the moon at each of the eight phases as it orbits the earth. The person in the hoop will use their head to model the earth. The flashlight will be the sun. Groups will form a circle around the outside of the room with "suns" facing the wall and "Earths" facing into the center of the room.

One student will be in the middle of the hoop, two students will hold the hoop, and one student will hold the flashlight. The student with the flashlight will shine their light toward the wall (directly toward the moon in front of the "earth". This should help from getting light from other groups). The person inside the hoop will face the person with the light. The two holding the hoop will stand to the sides of the person in the middle of the hoop.

Explain that the orbital path of the moon is tilted, so they will need to tilt the hoop so the phase at the back of the "earth" is raised so that we don't have an eclipse. The person in the middle of the hoop will complete their worksheet. Students will trade jobs when the "earth" finishes their worksheet, and continue trading jobs until each student has their worksheet filled out.

Divide the class into groups of 4. Give each group a flashlight, a moon hoop, and one "Moon Phases" worksheet per student. Separate the groups around the room in a circle. Darken room.

After the activity have students go back to their desk. Have them see if their moon phases look similar to the pattern on the board (reflecting more sunlight until full moon and then reflecting less until new moon).

Go back to the pre-assessment and read each of the choices and see if the class still agrees with each person and have a student explain why the answer choice is good or not based on what they just experienced with the activity. Have them put a star by the correct answer choice (Eric).

Strategies for Diverse Learners

Create diversity within groups.

Assessment Plan

Student worksheets. Class discussion about pre-assessment worksheet after completion of the hoop activity.

Bibliography

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