

Phases of the Moon

Strand	Earth’s Patterns, Cycles, and Change
Topic	Lunar phases
Primary SOL	3.8 The student will investigate and understand basic patterns and cycles occurring in nature. Key concepts include a) patterns of natural events such as day and night, seasonal changes, simple phases of the moon, and tides.
Related SOL	3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which d) natural events are sequenced chronologically; h) data are gathered, charted, graphed, and analyzed; k) data are communicated.

Background Information

Moon phases occur as the moon makes one revolution around Earth. The phases of the moon we see are due to the position of the sun, Earth, and moon. One side of the moon is always reflecting light; it is always a full moon. How much of the reflected surface we see of the moon depends on the positions of the sun, Earth, and moon. When the moon is between the Earth and the sun, the side reflecting light is away from the Earth, we see a new moon. When the moon is on the opposite side of Earth than the sun is, we see all of the reflecting light; we see a full moon. The visible portion of the moon that we see each night follows a pattern, first quarter, full, last [third] quarter, and then back to new.

Materials

- Science Journal
- Volley ball
- Flashlight
- Black paper
- Chalk
- Calendar grid

Vocabulary

phases of the moon, first quarter moon, full moon, last quarter moon, new moon

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Gather the class together and tell them that for the next month, they are going to be making nightly observations of the moon.
2. Give each student a copy of a calendar grid with the dates of the current month on it. Tell the students that they are going to use the calendar nightly to record the shape of the moon they observe.
3. Each morning, one student will share the shape of the moon that they drew the night before. Discuss the change from the previous shape, if any.

Procedure

1. When the month is over and the moon calendars are complete, discuss with the students about any ideas they might have about the changes in the shape of the moon that they have been observing. Lead the discussion toward the fact that the moon is always round but that we see different shapes because of the position of the sun, Earth, and moon.
2. Place a volley ball or other round object up at eye level in the middle of the room to represent the moon. A student will shine a flashlight (the sun) on the moon. An overhead projector also works well.
3. Have the other students form a circle around the moon. With the lights turned off, have the students draw what they see with chalk on black construction paper. If it is too dark to draw, have the students just look, and then draw what they observed when the lights have been turned back on.
4. Have the students include a small drawing showing the position of the sun, the moon, and Earth while they were standing in the circle.
5. Beginning with the student who saw no light on the moon, have the students display their pictures in order and discuss the differences.

Conclusion

1. Ask the students why all of the pictures do not look the same. “Why didn’t you all see the same thing? Is there a pattern to what you observed? How does it compare with the chart you made when you observed the real moon?”
2. Provide the names for full, first quarter, last (third) quarter and full moon as they are displayed with students’ drawings.
3. Have the students draw these four phases in order from new to full moon in their science journals.

Assessment

- **Questions**
 - Does the moon produce its own light? Why or why not?
 - What are the key factors in why the moon seems to change as we look at it each night?

- **Journal/writing prompts**
 - If you were the moon looking at the Earth, what do you think you would see? Why?
 - Would you miss the moon if it weren't in the sky? Why or why not?
- **Other**
 - Students will create a moon chart showing the four moon phases in the correct order from new to full.

Extensions and Connections (for all students)

- At the end of the month, the students can be given a strip of paper with five circles drawn. Have the students draw the phases – new moon, quarter moon, full moon, quarter moon, new moon and label the pictures.

Strategies for Differentiation

- For another “hands-on” activity, give each student a chocolate cookie with vanilla cream filling. With a plastic spoon or knife, they slowly remove the vanilla filling to show how the moon changes from a full moon to a new moon.
- Students can be given pictures of the phases of the moon to paste in order and label, or have the pictures and labels already cut and laminated to Velcro on a chart in order with their labels.
- At the end of the month, the students can be given a strip of paper with seven circles drawn. Have the students draw the phases – new moon, waxing crescent, waxing gibbous, full moon, waning gibbous, waning crescent, new moon and label the pictures.
- Divide students into small groups to explain the different phases of the moon.
- Have students develop a skit about the phases of the moon.
- Invite a local meteorologist to discuss moon phases.
- Use molding clay for students to create a model of the moon phases.
- Assign a different student each day of the month to research the phase of the moon for the assigned day. Have the student draw the moon phase on a calendar or a class chart.