

THE AMAZING MOON AND ITS PHASES

(MODIFIED FOR ADEED)



Science Concept:

The moon's orbit determines its phases.

Objectives:

The student will:

- describe and illustrate the phases of the moon;
- create a poster of a timeline of the month's phases; and
- keep a daily journal of moon observations.

GLEs Addressed:

Science

- [5] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [5] SD3.1 The student demonstrates an understanding of cycles influences by energy from the sun and by Earth's position and motion in our solar system by observing a model that shows how the regular and predictable motion of the Earth and moon determine the apparent shape (phases) of the moon over time.

Writing

- [5] W2.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptions, observations, or report writing).

Vocabulary:

full moon - the moon with its whole disk lighted

half moon - the moon when half its disk appears lighted

crescent - the time at which the moon appears as a narrow sliver

phase - a particular appearance or state in a repeating series of changes (phases of the moon)

new moon - the moon when it is not visible

Materials:

- Poster paper
- Ruler
- Pencil
- Markers
- Journals
- One lamp
- One 25-foot extension cord (optional)
- One 75-watt clear light-bulb
- Cup
- Styrofoam ball (one per student)

Other Resources:

Hopkins, L. (2006). *Got geography!* Harper Collins Publishers: New York. 2006.

Sneider, C. (1986). *Earth, Moon, and Stars*. A.W. Mellon Foundation and the Carnegie Corporation of New York: New York.

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Activity Preparation:

If necessary, make the room very dark, even taping black paper over the windows.

Activity Procedure:

Gear Up

Process Skill: communicating

1. Ask students how the moon changes its position.
2. Discuss what students know about outer space.

Explore

Process Skills: predicting, observing, communicating, and inferring

3. Plug the lamp into the extension cord that is plugged into an outlet, and place the lamp in the center of the room.
4. Give each student a Styrofoam ball and pencil and ask students to place the ball onto the pencil. Explain the class will model the phases of the moon. Explain about 2,000 years ago, the ancient Greeks used this method to model or demonstrate the moon's phases.
5. Turn on the lamp, and arrange students in a circle around the lamp. Explain their heads represent Earth, the Styrofoam ball represents the moon, and the light in the center represents the sun. Ask students to hold their moon at arm's length, in front of the sun, and move the ball a little to the left, until they can see a thin crescent lit up. Ask students if the bright curved side of their moon is facing toward the sun or away from it. (Toward the sun.)
6. Continue with this same motion until the students are able to see half of the moon lit. Ask students how they would make the moon appear fuller, by moving toward the sun or away from it? (Away from the sun.)
7. Continue with this same motion until the moon is fully lit (the Styrofoam ball will be above the shadow of their heads.) Ask students if the sun is between the moon and Earth (student), or on the opposite side of Earth when the moon is fully lit. (It is on the opposite side of you from the sun.)
8. Continue with this same motion until the moon is half-full again. Ask students if the moon appears to get fuller or thinner as it moves toward the sun. (Thinner.)
9. Instruct students to move their moons so that they are very thin crescents. Explain most of the time the moon does not pass directly in front of the sun, but just above or below the sun. When the moon is very close to the sun, we cannot see it in the day or night since the sun is so bright. When we cannot see the moon, this phase is called the new moon.
10. Allow students time to explore with their moons and practice moving until they fully understand why the moon goes through phases.
11. Instruct students to observe the moon for a month and keep a daily journal with descriptions and illustrations.

Generalize

Process Skills: inferring and communicating

12. After the explore activity:
 - a. Ask students to name the different shapes or phases of the moon.
 - b. Ask students why the moon has different phases.
13. After the month-long observation of the moon, invite students to share their data. Discuss how long it takes for the moon to go from full, to quarter, to half, to new.

Apply/Assess

Process Skills: measuring and communicating

14. Ask students to make a timeline that depicts the phases of the moon depending on the time of the month, using their journal entries as a guideline.

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Extension Idea:

Process Skill: communicating

Ask students to interview Elders and community members to see if and how they kept track of time without using clocks earlier in their lives.

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Objective	GLE	Emergent	Developing	Proficient	Advanced
The student keeps a daily journal of moon observations.	[5] SA1.1	The student does not keep a journal.	The student keeps a journal but does not make daily entries.	The student keeps a journal, and makes daily entries, but does not include both descriptions and illustrations.	The student keeps a daily journal of both descriptions and illustrations of the moon's phases.
The student describes and illustrates the phases of the moon.	[5] SD3.1	The student illustrates or describes some of the different moon phases using a timeline.	The student illustrates or describes most of the different moon phases using a timeline.	The student illustrates and describes all of the different moon phases using a timeline.	The student illustrates and describes in detail all of the different moon phases using a timeline.
The student creates a poster of a timeline of the moon's phases.	[5] W2.2.2	The timeline is messy and includes grammatical/mechanical errors.	The timeline has some grammatical/mechanical errors and is cluttered or disorganized.	The timeline has few or no grammatical/mechanical errors, and is uncluttered and attractive.	The timeline is flawless with no grammatical/mechanical errors and is clear, uncluttered, attractive, and shows a definite understanding of the moon's phases.