

**#9570**

## **BILL NYE THE SCIENCE GUY: THE MOON**

DISNEY EDUCATIONAL PRODUCTIONS, 1993  
Grade Levels: 4-8  
23 minutes

### **DESCRIPTION**

Bill Nye uses simple experiments to illustrate the moon's orbit of the earth, its phases, and its lunar and solar eclipses. Explains the moon's glow, its possible origin, and its gravity. Demonstrations clarify scientific facts and principles.

### **ACADEMIC STANDARDS**

#### **Subject Area: Science**

- ★ Standard: Understands the composition and structure of the universe and the Earth's place in it
  - Benchmark: Knows that night and day are caused by the Earth's rotation on its axis (See Instructional Goal #1.)
  - Benchmark: Knows that the Earth is one of several planets that orbit the Sun and that the Moon orbits the Earth (See Instructional Goals #1, 2, and 6.)
  - Benchmark: Knows how the regular and predictable motions of the Earth and Moon explain phenomena on Earth (e.g., the day, the year, phases of the Moon, eclipses, tides, shadows) (See Instructional Goals #4 and 5.)

### **INSTRUCTIONAL GOALS**

1. To describe the direction in which the moon orbits the Earth.
2. To explain what causes moonlight.
3. To discuss a theory of how the moon was formed.
4. To explain what causes tides.
5. To differentiate between solar and lunar eclipses.
6. To point out some myths about the moon.
7. To discuss two Apollo missions to the moon.

### **VOCABULARY**

- |              |                   |
|--------------|-------------------|
| 1. orbit     | 8. potassium      |
| 2. new moon  | 9. meteorite      |
| 3. half-moon | 10. revolution    |
| 4. full moon | 11. gravity       |
| 5. tilted    | 12. solar eclipse |
| 6. astronomy | 13. lunar eclipse |
| 7. reflects  |                   |

## BEFORE SHOWING

1. Compare the size and distance of the moon and earth.
  - a. Make two balls of clay, one 4 inches in diameter and one 1 inch in diameter. Place the two balls 120 inches apart. This provides a relative idea of the size of the moon and its distance from the Earth.
  - b. Point out that the moon seems so small because it is far away from the Earth.
2. Research early scientists' beliefs about the moon.
3. Review the events of Apollo 11 and Apollo 17.

## DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause at the scenes of the baseball diamond section and point out the shadows on the ball and Bill's face. Relate to the phases of the moon.
3. Pause at the scene in the play that demonstrates an eclipse. Using Styrofoam balls and a light source, demonstrate the difference between a solar and a lunar eclipse.

## AFTER SHOWING

### ► Discussion Items and Questions

1. In what direction does the moon orbit the Earth?
2. What are the four phases of the moon?
3. What is the significance of the moon's orbit being tilted?
4. Why can't the far (dark) side of the moon be seen from Earth?
5. What causes "moon glow"?
6. The moon does not have an ocean or an atmosphere. How does this affect moonlight?
7. What mineral is found in moon rocks?
8. Why are moon rocks and earth rocks similar?
9. What causes high and low tides?
10. What is the difference between a solar eclipse and a lunar eclipse?
11. How does the pull of gravity on the moon compare with that on the Earth?
12. What were some mobility challenges that Harrison Schmitt experienced when he walked on the moon?
13. What are some myths about the moon mentioned in the video?
14. How do scientists know there are moonquakes on the moon?

### ► Applications and Activities

1. As seen in the video, use a bar of soap to draw phases of the moon on a window. Do this every couple of days for a month. Draw the moon's phases according to altitude.
2. Make a list of unusual terms or idioms in the video.
  - a. Glow figure.
  - b. Time to break for home.
  - c. teeny sliver
  - d. Looked like a slice to me.
  - e. sunblock, Earth block, moon block, rock block
  - f. That would be a piece of cake.
  - g. Pretty loony, huh?

3. Create a "Facts About the Moon" worksheet. Include information such as size, volume, weight, pull of gravity, lack of atmosphere and water, temperature, description of surface, and length of lunar month.
4. Observe the surface of the moon through a telescope. Consult a map of the moon to help identify important craters, plains or seas, and mountains.
5. Demonstrate the Earth-moon system.
  - a. Use a basketball to represent the Earth and eight softballs to represent moons.
  - b. Put an X on all of the balls.
  - c. One student stands in the middle of the room with the Earth on his/her head. Other students form a circle with the moons on their heads. The X on all the moons will always face the X on the Earth.
  - d. Use a floodlight for the sun and stand behind the Earth. In seven Earth days, the system would make a quarter turn counter-clockwise.
6. Invent a charter tour of the moon. Design a brochure to go along with it.
7. Research why the moon seems to be larger when it is rising or setting than when it is higher in the sky.
8. Demonstrate how the moon causes tides on Earth.
  - a. Cut out a circle that is 6 inches in diameter from a piece of poster board. This represents the Earth.
  - b. Roll and shape some absorbent cotton until it looks like a doughnut 2 inches wide. Glue the cotton to the edges of the poster board circle.
  - c. Cut a paper circle 2 inches in diameter. This represents the moon.
  - d. Gently pull the cotton on the side of the Earth nearest the moon. A bulge representing a high tide will form. Pull the cotton on the side farthest from the moon to form a second high tide.
  - e. The top and bottom of the cotton circle will flatten to form two low tides.
9. The pull of gravity on the moon is about one-sixth of that of the Earth.
  - a. Calculate the weight of each student on the moon.
  - b. Calculate how high a high jumper would go on the moon if he jumps 6 feet on Earth. Discuss why the high jumper would not fall any harder from the greater height.
  - c. Calculate the distance a broad jumper will jump on the moon if he jumps 23 feet on Earth.
10. Research myths about the moon.
11. List songs that have been written about the moon. ("Moon River", "Fly Me to the Moon", "It's Only a Paper Moon", "Man on the Moon")

## RELATED RESOURCES



- [Sun, Earth, Moon #3301](#)



### World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

# LESSON PLANET™

- **LESSON PLANET**

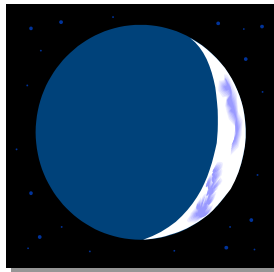
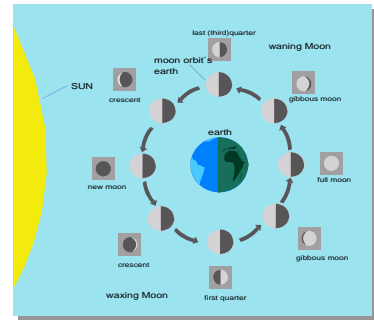
<http://lessonplanet.teacherwebtools.com/search/Science/Space/Moon/>

Includes lesson guides about phases of the moon, a trip to the moon, blue moon, and description of the moon.

- **LOWELL OBSERVATORY MOON CLOCK**

<http://www.lowell.edu/Public/Starlab/MoonClock.pdf>

Includes a list of materials needed and procedures to follow to construct a moon clock that will show the location of the moon in the sky once given its phase.



- **LUNAR PHASES WEB TOOL**

<http://www.calvin.edu/~lmolnar/moon/>

Gives background information about the moon and contains tutorials about the time of day, time of month, and the direction of the moon. Also includes a lunar phase quiz.

- **UPCOMING AND RECENT ECLIPSES OF THE SUN AND MOON**

<http://aa.usno.navy.mil/data/docs/UpcomingEclipses.html>

Includes a list dates of past and future solar and lunar eclipses with maps, predicted paths, and data sheets.

