Oreo Lunar Models

Target Grade: 6-8

Time Required: 15-20 minutes

Standards Covered:

> MS-ESS1-1: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

Central Focus:

> In this activity, students will have a hands-on experience that allows them to create visualizations of the phases of the Moon. They will be identifying not only what the moon likes like from earth, but also where each phase occurs relative to the Moon's position with the Earth and Sun.

Background Information:

> While the moon revolves around the Earth constantly, it is also rotating at a rate in which the same side of the moon is facing the Earth at all times. The phases that we see from Earth are apparently changing because the sun is lighting up a different half of the moon, based on its position relative to the Earth. From the Earth, we see a different portion of the lit side of the moon depending on the moon's position relative to the Earth. For example, on a New Moon, the moon is positioned in between the sun and Earth, so the lit portion of the moon is facing away from the Earth. On a Full Moon, the Earth is positioned between moon and sun, so the entire lit part of the moon is facing Earth and it appears to be totally lit. The lunar cycle is completed every 29.5 days.

Materials

- 8 Oreo cookies
- 1 butter knife or spoon
- 1 paper plate
- Markers

Instructions

1. Obtain a paper plate. Draw a model of Earth in the center of the plate, and a model of the Sun on the right-hand side of the plate (if the plate were a clock, the Sun would be positioned at about 3:00).

2. Twist off the top of one of the Oreo cookies. With a butter knife, scrape the icing completely off of one side and place it on the paper plate in between the Sun and Earth. With a marker, write "New Moon" underneath the cookie.

3. Twist off the top of another cookie. Scrape off all but about a quarter of the icing from the LEFT-HAND side of the cookie as shown below. Place it on the paper plate at around the "2:00 position," and write "Waxing Crescent" underneath the cookie.

4. Twist off the top of a third cookie and scrape half of the icing off of the LEFT-HAND side as shown in the picture below. Place it in the "12:00 position" on the paper plate, and write "Waxing Half, First Quarter" underneath the cookie.

5. Twist off the top of a fourth cookie and scrape about a quarter of the icing off of the LEFT-HAND side of it. Place the cookie at about the "10:00 position" on the paper plate, and write "Waxing Gibbous" underneath the cookie.

6. Twist off the top of a fifth cookie, but this time, don't scrape ANY of the icing off at all. Place the cookie at about the "9:00 position" on the paper plate, and write "Full Moon" underneath the cookie.

7. Twist off the top of a sixth cookie and scrape about a quarter of the icing off, this time from the RIGHT-HAND side. Place it at about the "7:00 position" on the paper plate, and write "Waning Gibbous" underneath it.

8. Twist off the top of a seventh cookie and scrape half off the icing off from the RIGHT-HAND side. Place it at the "6:00 position" on the paper plate, and write "Waning Half, Last Quarter" underneath it.

9. Finally, twist off the top of the last cookie and scrape about three-quarters of the icing off from the RIGHT-HAND side. Place it at about the "4:00 position" on the paper plate and write "Waning Crescent" underneath it.

10. The lunar models are now complete! Eat the other half taken off of each cookie and observe the model!

Closure

Have the students answer the following questions:

1. What does the icing on each cookie in the model represent?
   a. The icing represents the lit portion of the moon that we see from Earth.
2. What does the actual cookie part of the model represent?
   a. The cookie represents the unlit portion of the moon that is facing the Earth.
3. How are the waxing phases different than the waning phases?
   a. During the waxing phases, the lit portion of the moon seen from Earth is getting larger each night. During the waning phases, the lit portion of the moon seen from Earth is getting smaller each night.
4. How do moon phases relate to the Sun and to what we see on Earth?
   a. The portion of the moon that we see as lit from Earth is a reflection of the sun's light on the moon. While the moon is always half lit and half dark, the moon's position relative to the Earth is what causes us to see different phases from Earth.