

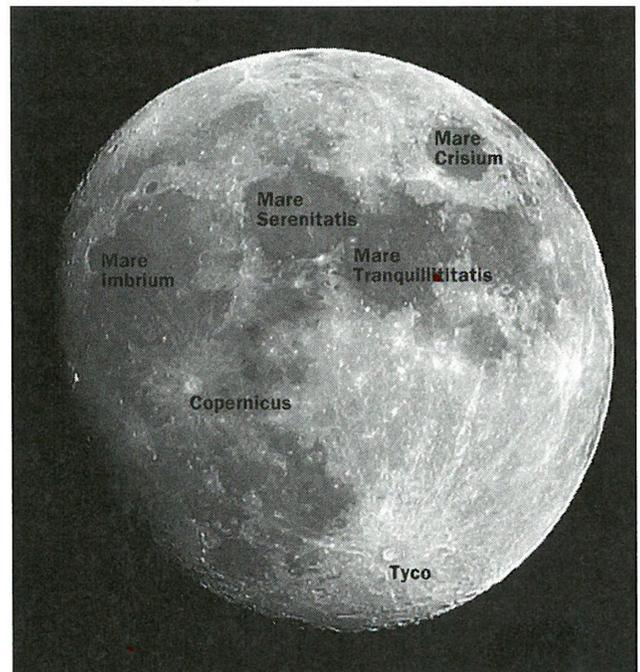
## Rotation of the Moon

You may have noticed that the same side of the Moon is always facing Earth. In fact, we never see the other side of the Moon, and we knew nothing about its nature until a spacecraft took pictures of it in 1959. In this activity, you will use a model made with a toothpick, a marshmallow, and a light bulb to investigate how the Moon rotates.

1. Make a marshmallow model of the Moon.
  - a. Place a toothpick through the center of the cylinder portion of a marshmallow. The toothpick will represent the rotational axis of the Moon.
  - b. On one of the round sides of the marshmallow, sketch a few of the major craters or maria that face Earth.
  - c. Draw an arrow pointing to the left next to the toothpick in your marshmallow Moon. (See figure on the right.)
2. Model the Moon's motion.
  - a. Stand facing the light source that is representing the Sun. Hold the marshmallow about 50 cm away from you with the marked face toward you. You are the observer from Earth looking at the Moon. (Note which side of the classroom the arrow on top of the marshmallow points.)
  - b. Move the  $90^\circ$  ( $1/4$  of a turn) in a counterclockwise direction, keeping the marked face toward you. You will have to rotate along with the Moon. (Note in which direction the arrow is now pointing.)
  - c. Continue rotating in a counterclockwise direction through  $180^\circ$ ,  $270^\circ$ , and  $360^\circ$  (or back to  $0^\circ$ ) from your starting point.
3. Did the arrow on top of the marshmallow always point to the same part of the room or did it point toward different parts of the room as it went around you?
4. Did your Moon (marshmallow) rotate on its toothpick axis as it went around you?
5. Does the Moon rotate on its axis?



**Figure 2-7:** Photograph of the marshmallow model of the moon



**Figure 2-8:** Labeled photograph of Earth's moon. Large flat areas of the moon are called maria, or "seas." Lighter gray highland areas separate the maria. The moon is almost entirely made of basalt, an igneous rock.

(If you successfully completed the front side, enjoy eating a marshmallow or two as you do this next part!)

6. Repeat the entire experiment with a partner taking the place of the marshmallow.
  - a. Have your partner stand between you and the light source, facing you. Your partner's face represents the side of the Moon that always faces Earth; you are the observer on Earth.
  - b. Have your partner move counterclockwise  $90^\circ$ , still facing Earth (you). Your partner should continue through a full circle until they reach their initial starting position.
  - c. Switch roles and repeat for another complete orbit.
7. Record your observations and discuss your results with your classmates.

*Pause and Reflect*

8. What is the rotation rate of the Moon?
9. Why do you think the same side of the Moon always faces Earth?

