NATIONAL SCIENCE EDUCATION STANDARDS

A. Science as Inquiry
Abilities necessary to do scientific inquiry
Understanding about scientific inquiry

D. Earth and Space Science
K–4
Objects in the sky
- The sun, moon, stars, clouds, birds, and airplanes all have properties, locations, and movements that can be observed and described.
- The sun provides the heat and light necessary to maintain the temperature of the earth.

Changes in earth and sky
- Objects in the sky have patterns of movement. The moon moves across the sky on a daily basis much like the sun. The observable shape of the moon changes from day to day in a cycle that lasts about a month.

5–8
Earth in the solar system
- Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.
- Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion of the solar system. Gravity alone holds us on the earth's surface and explains the phenomenon of the tides.

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The Big Whack Theory

Many scientists believe that our moon may have formed when a planet-sized object crashed into the earth about 4.5 billion years ago. Here's the **theory**.

1

A planet-sized object crashes into the earth, throwing up a huge amount of dust and rock.

2

This material is captured by the earth's gravity and begins orbiting the earth.

3

As it orbits, the moon forms.

If this is true, it helps to explain why the moon's surface is covered with **craters**. **Meteoroids** have been smashing into the moon's surface for millions and millions of years, creating craters—and there is no weather on the moon to blow or wash them away.

Does the Moon Revolve on Its Axis?

The moon orbits around the earth, but does it revolve on its axis while it is doing so, the way the earth revolves on its axis? After all, we always see the same side of the moon, so it doesn't *look* as if it's revolving.

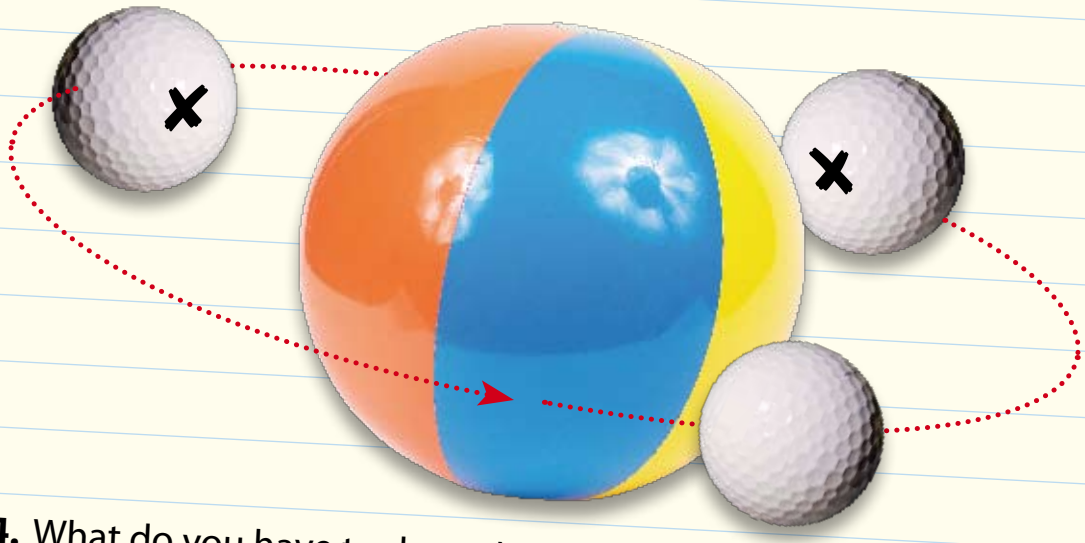
To find out, you will need:

- a big ball and a little ball
- a marker

In the time that it takes for the moon to revolve on its axis once, the earth revolves on its axis over 27 times. A day on the moon, measured in earth time, is 27 days, 7 hours, and 43 minutes. (Of course, measured in moon time, it's just one lunar day!)

What to do:

1. Imagine that the bigger ball is the earth. Put it on the floor.
2. Imagine that the smaller ball is the moon. Put an X on one side of it.
3. Now orbit the moon around the earth, *always* keeping the side with the X on it facing the earth.



4. What do you have to do to the moon to make sure that the same side—the side with the X on it—always faces the earth?

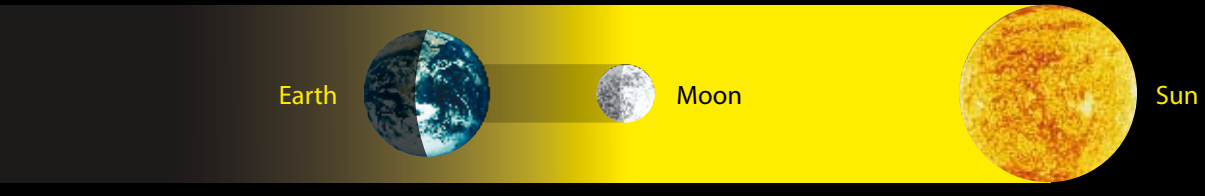
Show a friend:

Use your model to prove to a friend that the moon does in fact revolve on its axis.

ECLIPSES

Sometimes, the earth gets between the sun and the moon and casts a shadow over the moon. When the earth stops sunlight from reaching the moon, we call this a **lunar** eclipse.

At other times, the moon passes between the earth and the sun. The moon isn't big enough to block out sunlight all over the earth. It just casts a dark band of shadow across part of the earth. This is called a solar eclipse.



A solar eclipse seen from space

Warning! A solar eclipse is a strange thing to experience, but you must never look right at one. You could damage your eyes.