

Week 5

By now, your students should have seen the Moon in all its phases. They know that the Moon orbits the Earth. They are ready to make more sophisticated models of the Moon / Earth / Sun system. This will help improve their understanding of the phases of the Moon and of the occurrence of eclipses.

Having seen some of the components of the Solar System, and read about the rest, they are ready for a scale model of the entire system. This will give them a sense of the proportions of the various planets, and the vastness of the empty space between them.

The hands-on experiments are most effective if you allow each student to carry them out, as part of a small group. The materials in the Science Shelf kit are enough for one experimental setup. Small groups of students can take turns using it. If you want all of them to work on the experiments simultaneously, you may purchase the materials at dime or hardware stores, or order the Class Set, which includes twelve setups.

Now is a good time to review the spelling of the all the words learned so far.

Continue the activities started in the previous weeks:

* Daily: .Moon Calendar

.Moon position records (in relation to the Sun and/or the stars and planets)

* Once this week: .Sunset

.Noon shadow

* Research topic: Eclipses (before Lesson 14.) A good source is
ECLIPSE! by ...

Lesson 13

MOON MODEL

OBJECTIVES:

- * To explain the phases of the Moon with the help of a model.
- * To figure out in which direction the Moon orbits the Earth.

GRADES: 4 and up.

SCHEDULING:

This lesson takes one class period.

MATERIALS:

- * A bright light

For each student:

- * A 3" diameter styrofoam ball
- * A 9" long, 1/16" diameter dowel

DISCUSSION:

Have the students take out their Moon Calendars as a reference.

- * What have we learned about the Moon?
- * When was the First Quarter Moon? the Full Moon? The Last Quarter Moon?
- * How many days elapsed between them? (Approximately seven days from phase to phase.)

Make sure the students understand the sequence of the Moon's phases. In particular, make sure they can distinguish a First Quarter Moon from a Last Quarter Moon. (The Last Quarter Moon is the one that FOLLOWS the Full Moon. The First Quarter Moon precedes it. They are mirror images of each other, with

the First Quarter looking like a capital "D".)

ACTIVITY:

Place the bright light at the height of an average student's head. Make the room as dark as possible, and turn on the light. The light represents the Sun. Put the sphere on the dowel (it represents the Moon). Have a student hold the dowel at arm's length, standing as far as possible from the light. The student's head represents the Earth. Point out that the part of the "Moon" that is illuminated by the light, changes shape AS SEEN BY THE STUDENT as he turns and the relative positions of "Sun", "Moon" and "Earth" change. The changing shapes correspond to the phases of the Moon.

Discuss whether the student should turn clockwise or counterclockwise for a correct simulation. (This can be determined by noticing which direction yields a Last Quarter Moon after the Full Moon. Turning counterclockwise simulates the Moon's "right to left" motion.)

Of course, students will learn most by carrying out this activity themselves. Watching it demonstrated by someone else is not particularly helpful since you cannot see the "Moon" as they see it.

CONCLUSIONS:

The following conclusions should be possible at this stage:

- * The Moon's cycle is related to the Moon's motion around the Earth.
- * The Moon's phases are caused by the varying shape of the part

of the Moon that is illuminated by the Sun, as seen from Earth.

* The Moon moves from right to left in relation to the Sun.

COMMENTS:

* This activity was inspired by "Moons of the Solar System" a show at the Holt Planetarium, Lawrence Hall of Science, in Berkeley, California. The show, in turn, was inspired by Lawrence Moscotti of the Como Planetarium, St-Paul, Minnesota.