

## Phases of the Moon

In this activity we will find out why the Moon's appearance varies throughout the month.

We will be using a model of the **Moon** that is scaled down 34 *million* times! Model scale: 1 inch = 540 miles.

**MOON:** Scale Model Size = **4 in.** (Actual Size = **2160 miles**)  
**EARTH:** Scale Model Size = 14.7 in (Actual Size = 7926 miles)  
Earth-Moon distance: Scale Model Dist = \_\_\_\_\_ (Actual Dist = 240,000 miles)  
**SUN:** Scale Model Size = \_\_\_\_\_ (Actual Size = 7926 miles)  
Earth-Sun distance: Scale Model Dist = \_\_\_\_\_ (Actual Dist = 93,000,000 miles)

How long does it take Earth to spin once on its axis? \_\_\_\_\_  
(we will not simulate the Earth's spinning in the activity)

How long does it take the Earth to orbit the Sun once? \_\_\_\_\_  
(we will not simulate Earth's orbit in this activity)

How long does it take the Moon to orbit the Earth once? \_\_\_\_\_  
(we WILL simulate the Moon's orbit!)

### ----- Activity -----

Start out with the "Sun" on your right. Hold the Moon up in front of you and notice which part is in shadow and which in the light. On the real Moon, the sunlit part is the only part we can see from Earth.

- In the space at right, make a sketch of what this phase of the Moon looks like from Earth. Start with a border between light and shadow, then shade in the shadowed part. On your sketch, draw an arrow showing which direction the light is coming in.
  - Remember your head represents Earth. Roughly what time of day is it on your nose? In other words, what time would this phase of the Moon appear directly overhead as seen from Earth? (Earth spins right to left, or counterclockwise) \_\_\_\_\_
  - This phase is called the *First Quarter Moon*.
- Now turn ¼ turn to the LEFT – 1 week has passed. (Make sure the Moon is not in **your** shadow!) At right, sketch what the Moon looks like.
  - What time of day is this phase directly overhead? \_\_\_\_\_
  - What is this phase called? \_\_\_\_\_  
(Hint: you've definitely heard of it before!!)
- Make another ¼ turn LEFT – another week has passed. (the Sun should be on your left now) Sketch the Moon. Draw an arrow indicating the direction the light is shining.
  - What time of day is this phase directly overhead? \_\_\_\_\_

b. Guess what this phase is called? \_\_\_\_\_

4. Another  $\frac{1}{4}$  turn LEFT. Another week. Another sketch.

a. What time of day is this phase directly overhead? \_\_\_\_\_

b. This phase is called the New Moon.

5. Make a final  $\frac{1}{4}$  turn LEFT. 4 weeks total have elapsed. What phase do you see now? \_\_\_\_\_

..... Compare your results with other students. Make sure you find out what each phase is called. ....

6. Turn to the position between 1. and 2. above.  
Sketch the Moon at right.

a. What is this phase called? \_\_\_\_\_

7. Turn  $\frac{1}{4}$  turn LEFT, to the position between 2. and  
3. above. Sketch the Moon at right.

a. What is this phase called? \_\_\_\_\_

8. Turn another  $\frac{1}{4}$  turn LEFT, to the position between  
3. and 4. above. Sketch the Moon at right.

a. What is this phase called? \_\_\_\_\_

9. Turn another  $\frac{1}{4}$  turn LEFT, to the position between  
4. and 1. above. Sketch the Moon at right.

a. What is this phase called? \_\_\_\_\_

IF YOU HAVE EXTRA TIME.....

10. Is the Moon up every night? Why or why not?

11. Is the Moon up every day? Why or why not?

12. What happens in a total Solar eclipse?

13. In a total Lunar eclipse?

14. Why don't eclipses happen every month?