

# Scaling the Earth and the Moon (due Fri 1/2)

name \_\_\_\_\_ per \_\_\_\_\_

Like the sun and the planets, it can be hard for us to compare the sizes of the moon and Earth and the distance between the two. In this activity, we will scale both the size and the distance to get an idea of just how far the moon is from Earth and what their relative sizes are.

ESSENTIAL QUESTION: WHAT IS THE RELATIVE SIZE AND DISTANCE OF NEAR EARTH SPACE OBJECTS?

## PROCEDURE

1. Use the information in the table to figure out the scaled values.
2. Use a 1/4 piece of copy paper for your Earth. Cut out the Earth. You may be able to do the Earth straight on the register tape if it is thick enough.
3. Use a piece of register tape to show the distance of all the space objects. Measure from the center of the Earth for the moon, but from the surface for the other space objects. Figure out how much register tape you will need before you cut.
4. Draw a scaled moon at the correct distance.
5. Label and show the actual and scaled distances of the objects.

Scale 1.0 cm = 2,000 km	Earth	Moon	International Space Station	Medium Orbit Satellite	High Orbit Satellite
Actual diameter	12,742 km	3,474 km	---	---	---
Scaled diameter	cm	cm	---	---	---
Actual distance from Earth	---	238,900 km (center)	408 km (surface)	20,000km (surface)	100,000 km (surface)
Scaled distance	---	cm	cm	cm	cm

To find the scaled size and distance :  $scaled\ cm = \frac{actual\ size/distance}{scale\ (2,000\ km)}$

## HIGHLY PROFICIENT OPPORTUNITY

Now that we have an idea of the size and distance of the moon and the Earth, let's think about Earth's atmosphere.

Layer (in order)	Troposphere	Stratosphere	Mesosphere	Thermosphere	Exosphere
Thickness (km)	0-11km	12-48 km	49-95 km	96-550 km	Above 550 km

1. Using the values in the table above, create a scaled model of the Earth and the layers of its atmosphere. YOU DECIDE ON THE SCALE.
2. Limit your model to one piece of copy paper. You don't have to show the whole exosphere.
3. You don't have to show the whole Earth, but you should make the part you show as much to scale as possible.
4. The layers of the atmosphere (including thickness) should be clearly labeled.
5. Show any space objects that we find in the atmosphere.
6. Add color to your model (including the layers).
7. Attach your work to this page.

