Name: _____

Measuring the Solar System

BUILDING A SCALE MODEL OF THE SOLAR SYSTEM

Terms to Know

Solar System - the Sun and everything that orbits around it, such as planets, their satellites, asteroids and comets

Orbit - the path that one object, such as a planet, takes around a larger object, such as the sun

Rotation - the spinning of an object about its own axis (The Earth's rotation causes day and night.)

Revolution - the motion of an object around another object (The revolution of the Earth around the Sun causes the seasons.)

Astronomical Unit (AU) - the average distance between the Earth and the Sun (1 AU = 150,000,000 kilometers or 93,000,000 miles)

Research

Answer the following True or False questions about the Solar System:

True/False The Earth is at the center of the Solar System.

True/False The Earth is the only planet in the Solar System.

True/False All planets in the Solar System orbit the sun in circular orbits.

True/False The Earth rotates on its axis once a day.

True/False The Sun goes around the Earth.

True/False The moon goes around the Earth.

True/False The phases of the moon are caused by its motion around the Earth.

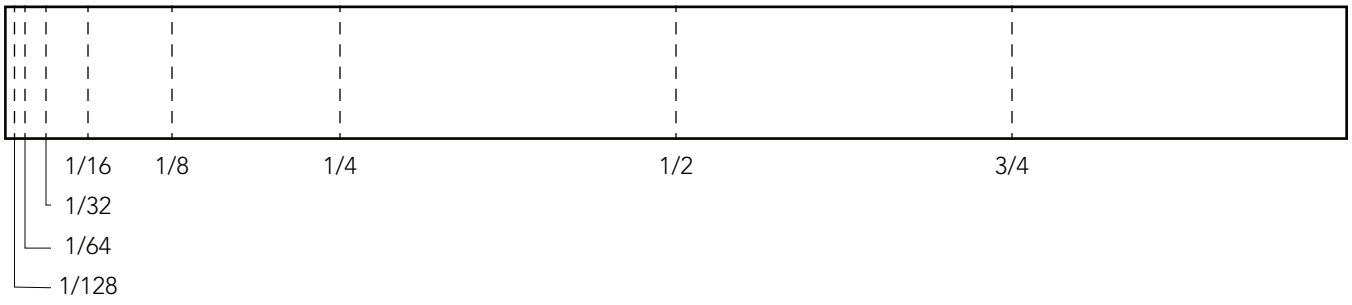
True/False You would weigh less on the surface of Mars than you do on the Earth.

Make the Scale...

Follow the instructions to properly space the planets (and Pluto!) on your model of the Solar System.

1. Get a piece of adding machine paper that's about one meter long.
2. Fold the adding machine paper in half twice. This will divide the length of the paper into quarters.
3. Unfold the paper.
4. Starting from the left, label the creases '1/4', '1/2' and '3/4'. You can make these labels small and out of the way, maybe along the bottom edge of the paper.
5. Fold the first quarter of the paper in half. Unfold the paper and label the new crease '1/8'.
6. Fold the first eighth of the paper in half. Unfold the paper and label the new crease '1/16'.
7. Fold the first sixteenth of the paper in half. Unfold the paper and label the new crease '1/32'.
8. Fold the first thirty-second of the paper in half. Unfold the paper and label the new crease '1/64'.
9. Extra credit! Fold the first sixty-fourth of the paper in half. If successful, unfold the paper and label the new crease '1/128'.

When you are done, your paper should look something like this:



Place the Planets...

Your teacher will lend you a stencil that has nine circles on it. The circles are labeled from largest (1) to smallest (9). Use the data on the table to identify which circle should be used for which planet (and Pluto!). Then, trace the correct circle, in the correct location, on your adding machine paper.

Solar System Objects

Object	Diameter	Surface Gravity	Distance from Sun	Location in Model	Stencil Number
Sun	1,391,400 km	28 g's	---	0	---
Mercury	4,880 km	0.38 g's	0.39 AU	1/128	
Venus	12,100 km	0.91 g's	0.72 AU	1/64	
Earth	12,760 km	1.00 g's	1.00 AU	3/128	
Mars	6,790 km	0.38 g's	1.52 AU	5/128	
Jupiter	143,000 km	2.14 g's	5.20 AU	1/8	
Saturn	120,500 km	0.74 g's	9.54 AU	1/4	
Uranus	51,100 km	0.86 g's	19.19 AU	1/2	
Neptune	49,500 km	1.10 g's	30.07 AU	3/4	
Pluto	2,300 km	0.08 g's	39.48 AU	1	

Questions to Think About

1. What are some things that are incorrect with this model?

2. We didn't draw a planet on the crease marked '1/16'. What belongs there?

3. Mercury is a much smaller planet than Mars, but they both have the same surface gravity. What could cause this?

4. In our model, where is the furthest space probe launched by humans?

5. In our model, Earth is drawn as a circle 5 mm in diameter. If we want to draw the Sun to the same scale, how big should it be?

6. In our model, Earth is drawn as a circle 5 mm in diameter. If we want to use the same scale for the distances between objects, how much space should there be between the Sun and the Earth?