

NAME \_\_\_\_\_

team # \_\_\_\_\_

Date \_\_\_\_\_

## 1000 Yard Solar System Model Worksheet

This activity involves the creation of a scale model of the solar system. You've probably seen scale model cars or trains. We're making a scale model of the solar system.

The scale of model is such that the distance from the Sun to Pluto is 1000 yards (3000 feet). In real life Pluto's average distance from the Sun is about 3,600,000,000 miles. So that means in our model one foot =  $3,600,000,000 / 3,000 = 1,200,000$  miles.

One yard therefore represents 3 times that or 3,600,000 (3.6 million) miles. When we build the model we'll approximate one yard as one long footstep (a "pace", as in "walk twenty paces").

team #	Object	Distance from sun (in millions of miles)	Distance from sun in our model (in feet)	Distance from sun in our model (in yards)	Distance in yards from prior object	Object Diameter (in miles)	Object Diameter in our model (in inches)
1	Sun					870,000	8.7
2	Mercury	36				3,032	
3	Venus	67				7,519	
4	Earth	93				7,926	
5	Mars	142				4,194	
6	Asteroid Belt:Ceres*	257				580	
7	Jupiter	484				88,736	
8	Saturn	887				74,978	
9	Uranus	1,784				32,193	
10	Neptune	2,796				30,775	
11	Pluto	3,600	3000	1000		1,423	
12	Kuiper Belt:Quaoar*	4,045				783	
13	Oort Cloud* (comets)	4,650,000				20	

\*Notes:

The Asteroid Belt, Kuiper Belt, and Oort cloud are not single objects but collections of 100s of thousands of objects of various sizes (or for the Oort cloud, probably billions). For the Asteroid Belt and Kuiper Belt two specific examples have been listed, but you can pick others. Some scientists consider Pluto to be a Kuiper belt object and distinct from the other 8 planets.

**Assignment:**

- 1) Convert the distance from the sun into the distance (in feet) of the model (remember the distance from the sun is in millions of miles. Use the Pluto row to check your math)
- 2) Convert the model distance in feet to yards and enter in the next column (Distance from sun in our model in yards).
- 3) We want to know how far each object is from the prior one - it will make it easier to pace out the distances. Calculate and fill in those values in the next column.
- 4) In the last column we'll calculate the size of the object at the scale of the model. Divide the object diameter by the scale factor (1,200,000). This is the size in \*feet\*. We want the size in inches. So multiply the answer by 12 to get inches. The Sun has been computed for you as a check of your math. (bonus: notice a pattern to the answers? how can you simplify this step?)
- 5) You will be assigned to a team. Each team should find an object that corresponds to the size you calculated in the last column. Pick objects that you will not miss as you may not get them back.
- 6) Attach the object to a 4"x6" white index card so that it won't get lost (except for the Sun).
- 7) Each team should prepare a 2 minute presentation about their object.

The presentation should not just recite "boring" facts. For example, don't say "*the rotation period of Jupiter is 10 hours*" yawn... Instead say something like "*Jupiter spins so fast (a day is 10 hours) that it makes it look like a squished ball*"

Nor do the presentations just need to talk about astronomy. History and anthropology are all relevant to consider in your presentation. (Astrology, however, is not, other than discussions that are relevant to "fake science"). For example, Mars was the Roman god of War. Why? The full answer could take an hour to explain...you have 2 minutes to pick something your classmates would be interested in.

Your team presentation can include visual aids, but you will need to be able to carry them for 2000 yards.

Be creative!

- 8) More information will be given to you by your teacher.