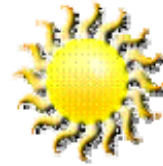


Name: _____

Section: _____

Creating a Scale Model - The Solar System

Directions: For this activity we will try to acquire a better idea of how large our solar system is and how far apart the planets are from the sun and each other. In order to achieve this goal, we will need to create a scale model. A scale model is "a model that is proportional in all respects to the object being modeled."



Pre-Activity Task

Using only your current knowledge of the solar system, label the line to the right with the planets (including Pluto), in order, while also considering the distances (spacing) between them.

Determining the Scaling Factor

A scaling factor is "the factor or proportion which, when multiplied by measurements of a scale model, gives the measurements of the object." Use the reference below to determine the scaling factor for this activity.

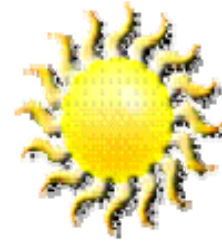
$$\frac{\text{Largest Usable Distance (m)}}{\text{Distance to Pluto (AU)}} = \text{Scaling Factor (m/AU)}$$

$$\underline{\hspace{2cm}} \text{ m} = 1 \text{ AU}$$

Celestial body	Distance from Sun (AU)	Distance to planet (km)	Scale distance from Sun (m)	Scale distance from previous body (m)
Sun	n.a.	n.a.	n.a.	n.a.
Mercury	0.39	58,000,000		
Venus	0.72	108,000,000		
Earth	1.00	150,000,000		
Mars	1.52	228,000,000		
Jupiter	5.20	778,000,000		
Saturn	9.54	1,430,000,000		
Uranus	19.2	2,870,000,000		
Neptune	30.1	4,500,000,000		
Pluto	39.4	5,900,000,000		

Conclusion/Questions:

1. Using the scaling factor for this activity, what is the distance between the sun and Pluto? What would that same distance be in AU, km, or miles?
2. Between which two consecutive objects will you find the greatest distance? Using the scaling factor for this activity, what would the distance be? What would that same distance be in AU, km, or miles?
3. Between which two consecutive objects will you find the smallest distance? Using the scaling factor for this activity, what would the distance be? What would that same distance be in AU, km, or miles?
4. Using the calculated scaling factor for this activity, how many meters away is the nearest star, Alpha Centauri, if it is 274,332 AU away? Show your work.
5. What is the most abundant thing found between all of the objects (sun, planets, etc.) in our solar system?



6. Now that we have created a scale model to help us better understand our solar system, use the gathered information to accurately (order and spacing) label the line to the right with the planets (including Pluto). This task will require you to fill in the chart below and to utilize a ruler.

Hint: to be most accurate, you should create a new scaling factor (in units of mm/AU) based on this line.

$$\frac{\text{Largest Usable Distance (mm)}}{\text{Distance to Pluto (AU)}} = \text{Scaling Factor (mm/AU)}$$

$$\underline{\hspace{2cm}} \text{ mm} = 1 \text{ AU}$$

Celestial body	Distance from Sun (AU)	Scale distance from Sun (mm)	Scale distance from previous body (mm)
Sun	n.a.	n.a.	n.a.
Mercury	0.39		
Venus	0.72		
Earth	1.00		
Mars	1.52		
Jupiter	5.20		
Saturn	9.54		
Uranus	19.2		
Neptune	30.1		
Pluto	39.4		

