

Scale of the Solar System

I. Objectives

1. Create a scale model of the solar system.
2. Practice calculations and unit conversions.

II. Resources and Readings

1. A Sense of Scale, <http://www.astronomynotes.com/chapter1/s2.htm>
2. A Sense of Time and Scale in the Universe,
<http://csep10.phys.utk.edu/astr161/lect/sense/sense.html>
3. Views of the Solar System, <http://www.solarviews.com/eng/solarsys.htm>
4. Schoolyard Solar System,
http://itss.raytheon.com/outreach/education/solar_system/school_ss.html
5. Calculator

III. Introduction

A model of the solar system can provide us with a visual representation that helps us to see the relationships among the planets' sizes and distances from the Sun. We will create a linear model, 100 m in length, with the Sun at one end and Pluto at the other. **Note that no credit will be given for this lab if you do not participate in the creation of our actual campus solar system model.**

Since Pluto is 39.44 AU from the Sun, the scale of our model will be based upon 40 AU in the real solar system, represented by a distance of 100 m in the scale model. This provides a scale of 2.5 m per AU

IV. Lab

Procedure

1. In the *Distances from the Sun and Radii of Solar System Objects* table below, convert column B, distance from the Sun in AU to column C, distance from the Sun in m in our scale model: $C = B \times 2.5$.
2. Convert column C, distance from the Sun in m in our scale model to column D, cm in our scale model: $D = C \times 100$.
3. Convert column E, radius in km to column F, diameter in km: $F = E \times 2$.
4. Convert column F, diameter in km to column G, cm in our scale model:
 $G = F \times 1.7 \times 10^8$.
5. Convert column G, diameter in m in our scale model to column H, diameter in mm in our scale model: $H = G \times 1,000$.
6. Follow additional instructions provided by your instructor for creating our scale model of the solar system.

Name:

Distances from the Sun and Radii of Solar System Objects

A	B	C	D	E	F	G	H
Solar system object	Distance from Sun in AU	Distance from Sun in m, scale model	Distance from Sun in cm, scale model	Radius in km	Diameter in km	Diameter in m, scale model	Diameter in mm, scale model
Sun	0.0			695,990			
Mercury	0.4			2,439			
Venus	0.7			6,052			
Earth	1.0			6,378			
Mars	1.5			3,398			
Asteroid Belt (Ceres)	2.8			450			
Jupiter	5.2			71,494			
Saturn	9.5			60,330			
Uranus	19.2			25,559			
Neptune	30.1			24,750			
Pluto	39.4			1,151			

Discussion

1. Using this scale, what items could we use to represent the Sun and the planets?
2. Given the layout of the campus and the area designated by your instructor, where are the planets located in our scale model? Why?
3. How does the creation of this model help us to understand the actual scale of our solar system? Explain your answer.
4. As an astronomy student why is it important to understand the scale of our solar system?