

# An Impossible Alignment: Building a Scale Model of the Solar System

Earth Science

Mr. Traeger

Name: \_\_\_\_\_

Period: \_\_\_\_

Date: \_\_\_\_\_

**Purpose**

The purpose of this assignment is to become familiar with the scale of the solar system. It shows visually the average distance of each planet from the sun if an impossible alignment of the planets were to occur. It also shows the relative diameters of the planets and their angle of tilt.

**Materials**

- 400 cm of 7.5 cm (3+) Adding Machine Tape
- Meter Stick
- Colored Pencils
- Drawing Compass
- Textbook
- Protractor

**Part 1: Drawing the distances from the sun in the solar system to scale**

1. Convert each of the following planetary distances into astronomical units (AU).
2. Once you have converted into AU's, then determine a **scaling factor** that will allow your farthest distance away from the sun to fit on to your 400 centimeter long tape.
3. Convert your distances into centimeters using the scaling factor.
4. Unroll your adding machine tape. Draw in the sun to its appropriate size. Measure the distance that each planet would be away from the sun. Mark these distances on your adding machine tape.

Planet	Average Distance from Sun in Km	Scaling Factor to convert to AU's	Average Distance from Sun in AU's	Scaling Factor to convert to cm	<u>Scale Average Distance from Sun in cm</u>
Mercury	58,000,000				
Venus	108,000,000				
Earth	150,000,000				
Earth's Moon at Full Phase	150,384,400				
Mars	228,000,000				
Asteroid Belt	400,000,000 to 600,000,000				
Jupiter	778,000,000				
Saturn	1,430,000,000				
Uranus	2,870, 000,000				
Neptune	4,500,000,000				
Pluto	5,900,000,000				

**Part 2: Drawing the diameters of each planet to scale**

1. We will need to make a separate scale to calculate the scale diameter of each of the planets. This is because the planets would appear extremely small if we were going to draw them according to the previous scale that we calculated.
2. We will convert the actual diameters into Earth diameters, or how each planet would compare to the Earth.
3. We want to determine another scaling factor that will allow our largest planet to fit within the confines of a 7.5 cm wide adding machine tape.
4. Once we scale down the diameter of our planets to fit on the adding machine tape, we will draw each planet (using a compass) on our tape. We will draw each planet at the exact location that was determined in Part 1.

