

How Big is the Solar System?

Introduction

Our Solar System is immense in size by normal standards. We think of the planets as revolving around the Sun, but rarely consider how far each planet is from the Sun. Furthermore, we fail to appreciate the even greater distances to the other stars. Astronomers use the distance from the Sun to the Earth as one “astronomical unit”. This unit provides an easy way to calculate the distances of the other planets from the Sun.

Vocabulary

Astronomical Unit - 1 AU = approximately 150 million kilometers (93 million miles)

Activity

You will construct a distance model of the Solar System to scale using colored beads as planets. The chart below shows the planets in order along with their distance from the Sun in astronomical units. First, complete the chart by multiplying each AU distance by the scale factor of 10 cm per astronomical unit. Next, use the new distance to construct a scale model of our Solar System. Start your model by cutting a 4.5 m piece of string. Use the distances in cm that you have calculated in the chart below to measure the distance from the Sun on the string to the appropriate planet and tie the colored bead in place. When you are finished, wrap your string Solar System around the cardboard holder.

<u>Planet</u>	<u>AU</u>	<u>Scale value (cm)</u>	<u>Color</u>
Sun	0.0 AU	_____cm	yellow
Mercury	0.4 AU	_____cm	solid red
Venus	0.7 AU	_____cm	cream
Earth	1.0 AU	_____cm	clear blue
Mars	1.5 AU	_____cm	clear red
Jupiter	5.0 AU	_____cm	orange
Saturn	10.0 AU	_____cm	clear gold
Uranus	19.0 AU	_____cm	dark blue
Neptune	30.0 AU	_____cm	light blue
Pluto	39.0 AU	_____cm	brown

Consider that if you were traveling at the speed of light, it would take 8 minutes to travel from the Sun to the Earth (1 AU). It would take 4.3 years (traveling at the speed of light - 300,000 kilometers per second) to reach the next nearest star, Alpha Centauri!