



## Creating Solar System Scale Models Scale Introduction to Extrasolar Planets

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### Introduction:

Scientists develop models to help them recreate something, such as a mathematical model to help them model the formation of the Solar System. A model can also be used to demonstrate/understand a phenomenon such as lunar phases or eclipses. A model can also be used to help one to visualize something small (an atom) or large (the Solar System or the whole Universe)—a scale model.

We have already seen a scale model of the Solar System, the orrery. Whenever we model something, there are some things that are modeled accurately and some things that may not be modeled accurately. As an example, if you wish to help a child learn what causes the phases of the Moon or the seasons, it may not be possible to do so without inaccurately modeling the distance between the Earth and the Moon or the Earth and the Sun.

Below is a table of the planets of the Solar System. We include Pluto, as some of us still consider Pluto to be a planet and it can also be used to represent the inner edge of the Kuiper belt. We would like you to create your own model of the scale of the Solar System (size and distance) from this information. Following this, we will create scale models of other planetary systems!

Planet, etc.	Dia. (km)	Model Dist (units?)	Dist. (km) (millions)	Dist. (AU)	Model Dist (units?)
Sun	1,392,000		0.00	0.00	
Mercury	4,878		57.9	0.39	
Venus	12,104		108.2	0.72	
Earth	12,756		149.6	1.00	
Moon	3,476		0.384	0.003	
Mars	6,794		228.0	1.52	
Jupiter	142,984		778.4	5.20	
Saturn	120,536		1,425.0	9.58	
Uranus	51,118		2,873.0	19.2	
Neptune	49,528		4,501.0	30.1	
Pluto	2,302		5,946.0	39.3	

### Discussion

Many years ago, we created a “macramé model of the Solar System” to model the relative distances between the planets. At the same time, we also created a scale model of the relative sizes of the planets. The scales of these two models are not the same. Why do you think we did this? What are the advantages and the disadvantages of having done this? In each case, there are things that can be modeled accurately and some things that cannot be modeled accurately. We will next use the macramé model to help you to create scale models for four extrasolar planetary systems.

