

Part I: Patterns in the Physical Properties of Objects in the Solar System

We can crudely classify objects in the solar system based on their size

- small (too small to be spherical, <400 km)
- medium (spherical [>400 km] up to the size of the Earth)
- large (larger than the Earth)

and their composition

- Gaseous
- Icy
- Rock or Metal

	Small (<400 km)	Medium	Large (Bigger than Earth)
Gaseous			
Icy			
Rock/Metal		Mercury	

- 1) Use the data from the table titled “Physical Properties of Objects in the Solar System” to fill in the “classification grid” above with the names of the objects fitting into each “box”. As an example, we show “Mercury” which is medium-sized and made of Rock and Metal in the appropriate box.
- 2) Are the objects within 4 AU of the Sun distributed differently in our classification grid than the objects farther than 4AU from the Sun? How so?

- 3) Are there any boxes that contain no objects? Why might this be the case?

Part II: Patterns in the Motions of Objects in the Solar System

Examine the graphic labeled “Orbits and Motions of Objects in the Solar System.” In that graphic there are arrows to indicate the direction of *revolution* of the planets around the Sun and the direction of *rotation* of the planets around their axes.












- 4) How many planets revolve around the Sun counter-clockwise versus clockwise in this view? Any trends?

- 5) How many planets rotate around their axes counter-clockwise versus clockwise in this view? Any trends?

Part III: Synthesis

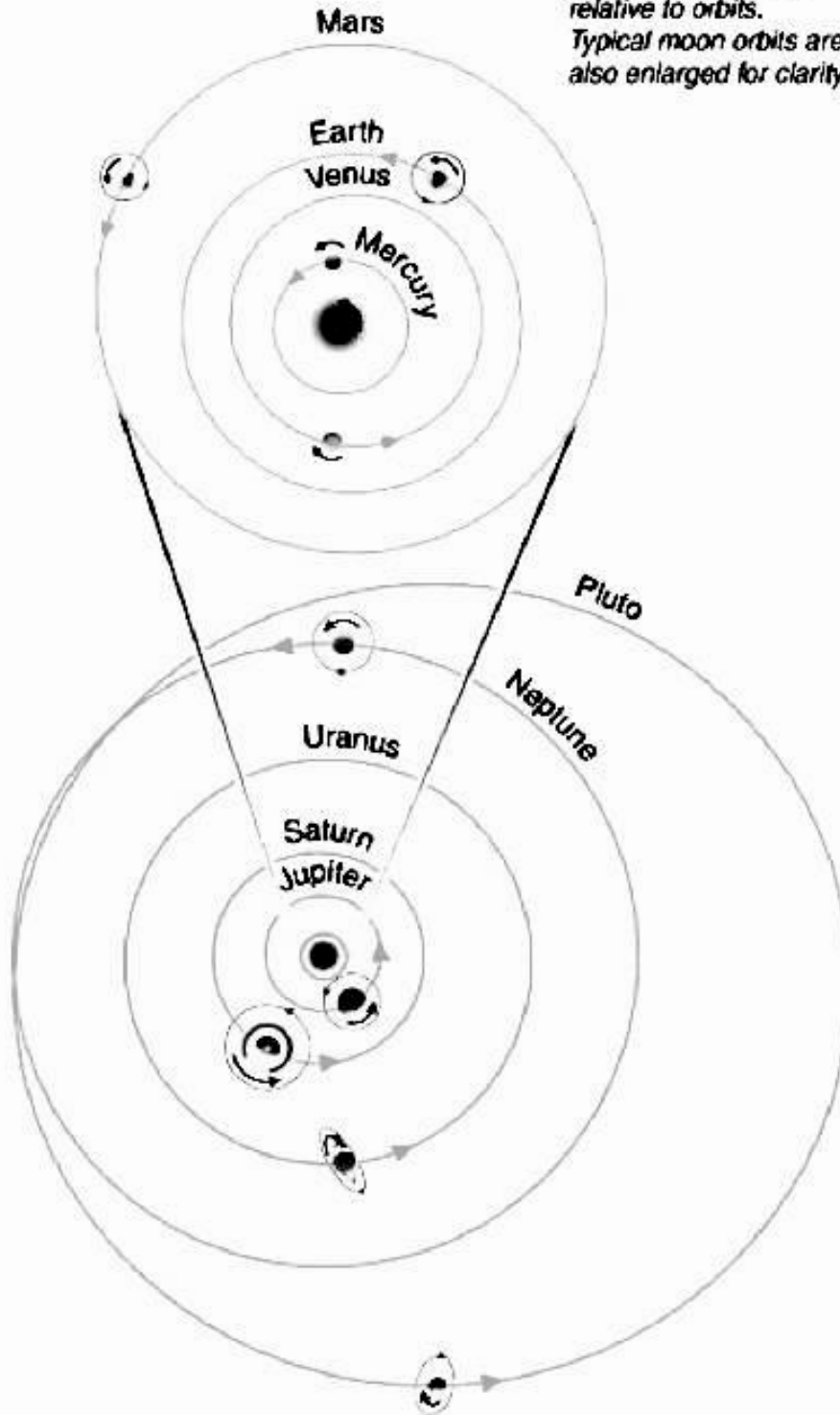
- 6) So you have gone through the trouble of looking for patterns in both the physical properties of objects in the solar system and their motions? Why do you think these patterns might be important from a scientific point of view?

Physical Properties of Objects in the Solar System

Object	Relative Size	Average Distance from the Sun (AU)	Radius (km)	Mass (Earth = 1)	Composition
Mercury		0.387	2440	0.055	Rocks, metals
Venus		0.723	6051	0.82	Rocks, metals
Earth		1	6378	1	Rocks, metals
Mars		1.52	3397	0.11	Rocks, metals
Jupiter		5.2	71492	318	H, He, hydrogen compounds
Saturn		9.54	60268	95.2	H, He, hydrogen compounds
Uranus		19.2	25559	14.5	H, He, hydrogen compounds
Neptune		30.1	24764	17.1	H, He, hydrogen compounds
Pluto		39.5	1160	0.0022	Ices, rock
Eris		67.7	1200	0.0028	Ices, rock
The Moon		1	1738	0.02	Rocks, metals
Typical Asteroid	Too tiny, Potato shaped	2 to 3.5	<3	1.4×10^{-9}	Rocks, metals
Typical Comet	Too tiny, Potato shaped	0.0 to 20,000	<3	2×10^{-11}	Ices, rock

Orbits and Motions of Objects in the Solar System

Orbits to scale; planet sizes exaggerated about 1 million times relative to orbits. Typical moon orbits are also enlarged for clarity.



(This is a modified version of Figure 7.2 from *The Cosmic Perspective: The Solar System, 5e* by Bennet, Donahue, Schneider, and Voit. Copyright © 2008 Addison Wesley)