Table 7.1

TABLE 7.1 The Planetary Data[a]

Photo	Planet	Relative Size	Average Distance from Sun (AU)	Average Equatorial Radius (km)	Mass (Earth = 1)	Average Density (g/cm^3)	Orbital Period	Rotation Period	Axis Tilt	Average Surface (or Cloud-Top) Temperature[b]	Composition	Known Moons (2012)	Rings?
	Mercury	·	0.387	2440	0.055	5.43	87.9 days	58.6 days	0.0°	700 K (day) 100 K (night)	Rocks, metals	0	No
	Venus	•	0.723	6051	0.82	5.24	225 days	243 days	177.3°	740 K	Rocks, metals	0	No
	Earth	•	1.00	6378	1.00	5.52	1.00 year	23.93 hours	23.5°	290 K	Rocks, metals	1	No
	Mars	·	1.52	3397	0.11	3.93	1.88 years	24.6 hours	25.2°	220 K	Rocks, metals	2	No
	Jupiter	●	5.20	71,492	318	1.33	11.9 years	9.93 hours	3.1°	125 K	H, He, hydrogen compounds[c]	67	Yes
	Saturn	●	9.54	60,268	95.2	0.70	29.5 years	10.6 hours	26.7°	95 K	H, He, hydrogen compounds[c]	62	Yes
	Uranus	●	19.2	25,559	14.5	1.32	83.8 years	17.2 hours	97.9°	60 K	H, He, hydrogen compounds[c]	27	Yes
	Neptune	●	30.1	24,764	17.1	1.64	165 years	16.1 hours	29.6°	60 K	H, He, hydrogen compounds[c]	13	Yes
	Pluto	·	39.5	1160	0.0022	2.0	248 years	6.39 days	112.5°	44 K	Ices, rock	5	No
	Eris	·	67.7	1200	0.0028	2.3	557 years	1.08 days	78°	43 K	Ices, rock	1	No

[a]Including the dwarf planets Pluto and Eris; Appendix E gives a more complete list of planetary properties.
[b]Surface temperatures for all objects except Jupiter, Saturn, Uranus, and Neptune, for which cloud-top temperatures are listed.
[c]Include water (H_2O), methane (CH_4), and ammonia (NH_3).

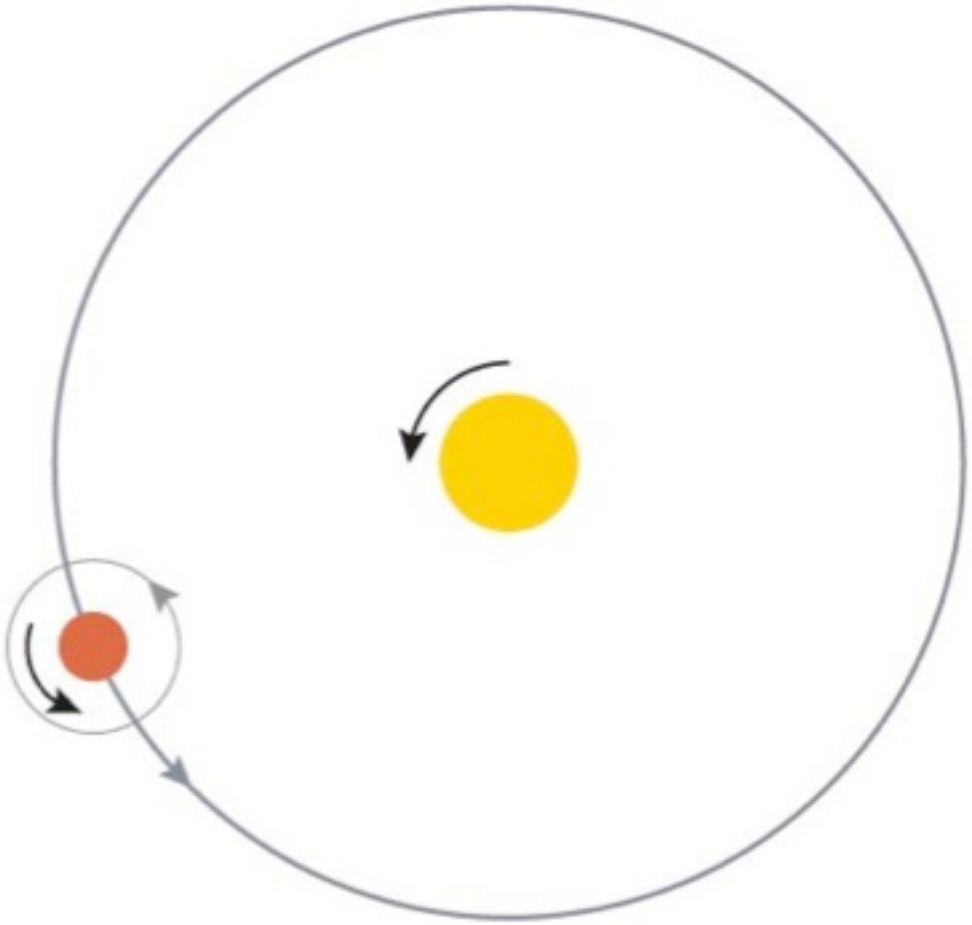
What have we learned?

- **What does the solar system look like?**
  - Planets orbit Sun in the same direction and in nearly the same plane.
- **What can we learn by comparing the planets to one another?**
  - Comparative planetology looks for patterns among the planets.
  - Those patterns give us insight into the general processes that govern planets.
  - Studying other worlds in this way tells us about our own planet.

7.2 Patterns in the Solar System

- Our goals for learning:
  - **What features of our solar system provide clues to how it formed?**

Motion of Large Bodies

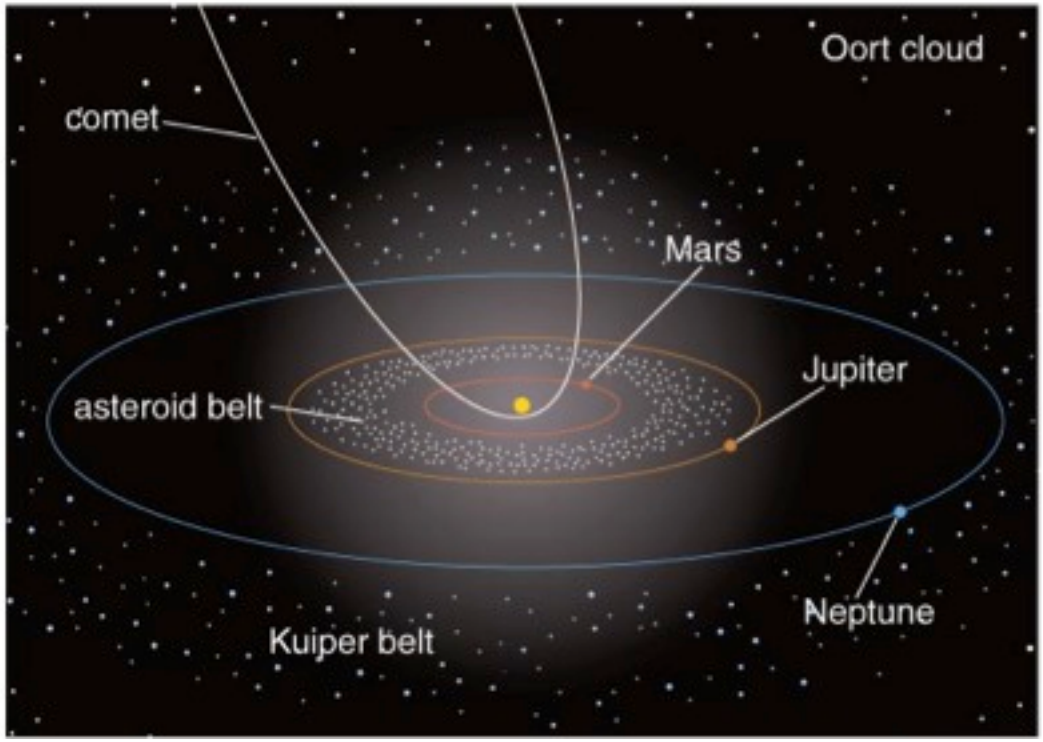


- All large bodies in the solar system orbit in the same direction and in nearly the same plane.
- Most also rotate in that direction.

Two Major Planet Types

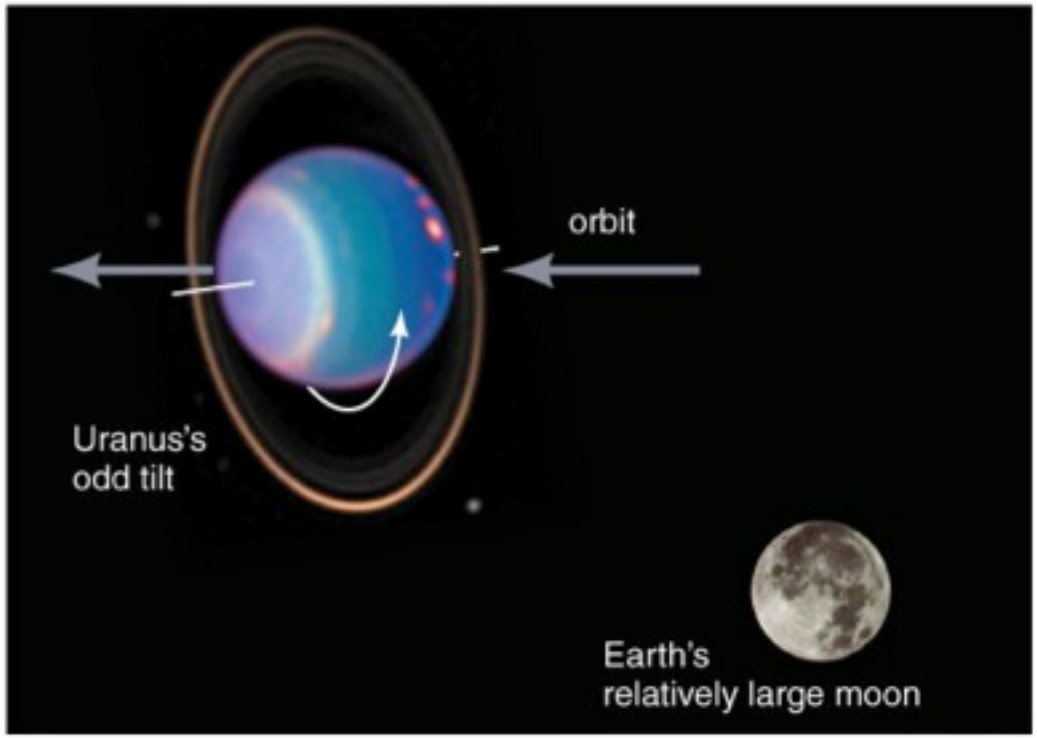
- Terrestrial planets are rocky, relatively small, and close to the Sun.
- Jovian planets are gaseous, larger, and farther from the Sun.

Swarms of Smaller Bodies



- Many rocky asteroids and icy comets populate the solar system.

Notable Exceptions



Several exceptions to the normal patterns need to be explained, such as:

- *Uranus spinning on its side, or*
- *The Earth having a moon that is large, relative to its host planet.*

What have we learned?

- **What features of the solar system provide clues to how it formed?**
  - Motions of large bodies: all in same direction and plane
  - Two main planet types: terrestrial and jovian.
  - Swarms of small bodies: asteroids and comets
  - Notable exceptions: rotation of Uranus, Earth's large moon