

# Chapter 23 Touring Our Solar System

## Summary

### 23.1 The Solar System

☛ **Size is the most obvious difference between the terrestrial and the Jovian planets.**

- The **terrestrial planets**—Mercury, Venus, Earth, and Mars—are relatively small and rocky.
- The **Jovian planets**—Jupiter, Saturn, Uranus, and Neptune—are huge gas giants.

☛ **Density, chemical makeup, and rate of rotation are other ways in which the two groups of planets differ.**

☛ **According to the nebular theory, the sun and planets formed from a rotating disk of dust and gases.**

- A cloud of dust and gas in space is called a **nebula**.
- As solid bits of matter began to clump together, they formed small, irregularly shaped bodies called **planetesimals**.

### 23.2 The Terrestrial Planets

☛ **Mercury has the greatest temperature extremes of any planet.**

- Mercury is only slightly larger than our moon, has cratered highlands and smooth terrains like maria. It's very dense, with a large iron core.

☛ **Data have confirmed that basaltic volcanism and tectonic activity shape Venus's surface.**

- Venus is similar to Earth in size, mass, and density. It is covered by thick clouds, and has a surface temperature of 475° C.

☛ **Although the atmosphere of Mars is very thin, extensive dust storms occur and may cause the color changes observed from Earth.**

- The surface features on Mars, including volcanoes and canyons, are 1–4.5 billion years old. Recent evidence points to the possibility that liquid water once existed on the surface.

### 23.3 The Outer Planets (and Pluto)

☛ **Jupiter has a mass that is  $2\frac{1}{2}$  times greater than the mass of all the other planets and moons combined.**

- Although called a gas giant, Jupiter is believed to be an ocean of liquid hydrogen. Jupiter has a ring system, large storms, and 63 moons.

☛ **The most prominent feature of Saturn is its system of rings.**

**Chapter 23 Touring Our Solar System**

- Saturn's atmosphere is very active with winds of 1500 kilometers per hour. It has 56 moons, the largest of which, Titan, has its own atmosphere.
- **Instead of being generally perpendicular to the plane of its orbit like the other planets, Uranus's axis of rotation lies nearly parallel with the plane of its orbit.**
- **Winds exceeding 1000 kilometers per hour encircle Neptune, making it one of the windiest places in the solar system.**
- **Pluto is considered a dwarf planet because it has not cleared the neighborhood around its orbit.**
  - A **dwarf planet** is a round object that orbits the sun but has not cleared the neighborhood around its orbit.

**23.4 Minor Members of the Solar System**

- **Most asteroids lie in the asteroid belt between the orbits of Mars and Jupiter. They have orbital periods of three to six years.**
  - **Asteroids** are small rocky bodies that orbit the sun.
  - **Comets** are pieces of rocky and metallic materials held together by frozen water, ammonia, methane, carbon dioxide, and carbon monoxide.
  - The glowing head of a comet, called a **coma**, is caused by vaporized frozen gases.
- **A small glowing nucleus with a diameter of only a few kilometers can sometimes be detected within a coma. As comets approach the sun, some, but not all, develop a tail that extends for millions of kilometers.**
  - Comets originate in two regions of the outer solar system. Those with short orbital periods come from the Kuiper belt, and those with long orbital periods come from the Oort cloud.
- **Most meteoroids originate from any one of the following three sources: (1) interplanetary debris that was not gravitationally swept up by the planets during the formation of the solar system, (2) material from the asteroid belt, or (3) the solid remains of comets that once traveled near Earth's orbit.**
  - A **meteoroid** is a small solid particle that travels through space.
  - Meteoroids that enter Earth's atmosphere and burn up are called **meteors**.
  - A meteoroid that actually reaches Earth's surface is called a **meteorite**.
  - Scientists used evidence from meteorites, moon rocks, and Earth rocks to determine the age of the solar system.