A planet is an object that:

* Pulls itself into a round shape
* Clears the area around its orbit

Dwarf planets fail to meet definition #2

* Five large planetesimals left over from the formation of the Solar System
* Four reside in the Kuiper Belt beyond Neptune’s orbit: Pluto, Haumea, Makemake, and Eris
  + One is in the main asteroid belt: Ceres

The four giant planets have several large moon

* Many are as large as Earth’s Moon
* Some are geologically active; others used to be
* Io (Jupiter) is the most volcanically active object in the Solar System
  + Eruptions of silicate magmas
  + Has no craters and a very young surface
* Triton is a captured moon of Neptune
  + Cantaloupe-like surface is a clue to its activity
  + Its cryovolcanic activity
* Europa: Jupiter’s tidal heating should be too low for volcanism, but should keep a subsurface sea liquid
  + Broken slabs of ice that appear to have floated
* Titan is Saturn’s largest moon
  + It has a thick, dense, nitrogen-rich atmosphere
  + Huygens lander revealed icy “rocks” and a soil rich with organic compounds
* Ganymede (Jupiter) shows signs of gradually filled in craters
  + Bright terrain from some unknown past tectonic processes
  + Some moons of Saturn and Uranus also appear this way

Asteroids

* Most asteroids are in the asteroid belt between Mars and Jupiter
* Near-Earth asteroids have orbits that cross that of Earth
* Asteroids are small, rocky relics of the early Solar System
  + Most are composed of rock or metal
  + It is possible for them to have moons
  + Spacecraft have visited several of them

Comets

* Icy planetesimals found beyond planets
* Located either in Kuiper Belt or …
* Short-period comets:
  + Periods <200 years
  + Near ecliptic plane
  + Prograde orbits, circular or somewhat elongated
  + Kuiper Belt
* Long-Period comets
  + Periods 200 to maybe 1 million years
  + Prograde or retrograde orbits, from Oort Cloud
  + Large tilts from the ecliptic, very elongated orbits
* When near the Sun, comets are “active”
  + Sun heats the icy nucleus, forming:
    - Coma (head)
    - Ion tail
      * Created by the solar wind interacting with ions of the nucleas
    - Dust tail
* Structure of comet
  + Nucleus is an ice/rock mix
  + “dirty snowballs”
  + Size of nucleus ranges from a few dozen meters to several hundred kilometers
* Some impact
  + Large collisions are not frequent, but they do occur
  + 1994: Comet Shoemaker-Levy 9 crashed into Jupiter, leaving a visible scar
  + Impacts are infrequent, but devastating
    - 1908: Tunguska event was possibly the high-altitude explosion of a comet
  + Comet nucleus disintegration and asteroid collisions make debris