Astronomy 161 -- Autumn 2007
In-Class Quiz 4 Study Guide

General Solar System

- Names of the 8 planets
- Dwarf Planets (names of the 3 initial dwarf planets)
- Order of planets in the Solar System
- Main types of planets & other bodies

Origin of the Solar System

- Clues to the formation in the present-day properties of the Solar System
  - clues from the orbital motions
  - clues from composition differences at different distances from the Sun
- Primordial Solar Nebula
  - Condensation of gases into solid grains as the Solar Nebula cools.
  - The "frost line"
- Formation of planetesimals from grains
- Formation of the Terrestrial Planets
- Formation of the Jovian Planets
- Formation of the Asteroids, Comets, and Kuiper Belt Objects

Terrestrial Planets

Mercury
- Rotation Period locked in 3:2 tidal resonance with Sun
- Mercury's surface
  - Impact craters
  - Caloris Impact Basin & jumbled terrain at the antipodes
- Mercury's atmosphere (such as it is)
  - How did it get that way?
- Mercury's interior
  - large iron core and its supposed origin in a head-on impact
  - weak magnetic field

Venus
- Slow, retrograde rotation
- Venus' atmosphere
  - composition
  - pressure and temperature
  - clouds
  - How did it get that way?
- Runaway Greenhouse Effect
- Venus' surface
  - radar mapping results
  - rolling plains, valleys, & highlands
  - extinct(?) volcanos & impact craters
  - lack of plate tectonics
  - upwelling & downwelling tectonism
- Contrast with the Earth

Mars
- 2 moons: Phobos & Deimos
- Martian Atmosphere
  - composition
  - pressure & temperature
  - dust storms
  - How did it get that way?
- Martian Surface Features
  - plains & cratered highlands
  - volcanos (Olympus Mons & Tharsis Region)
  - canyons & channels
  - polar caps
- Water on Mars

Comparison of the Terrestrial Planets
- Interiors & Surfaces (differences & similarities)
  - cratering as a way to determine terrain ages
  - relation of tectonism to internal heat
  - different forces that shaped the different surfaces
- Origin & evolution of terrestrial planet atmospheres
  - Probably started with similar compositions & evolved very differently
  - Role of the Greenhouse effect in atmosphere evolution
  - Runaway Greenhouse effect
- Atmospheric Retention
- The Habitable Zone

Jupiter & Saturn

- Gas Giants
- atmosphere composition
- internal structure
- internal heat
- atmospheric features
  - belts & zones
  - winds
  - Great Red Spot of Jupiter
  - differences between Jupiter & Saturn
- magnetic field of Jupiter

Uranus & Neptune

- Ice Giants
- Rocky cores and slushy icy mantles
- Extreme tilt and Extreme seasons of Uranus
- Lack of internal heat on Uranus and its effect on Uranus' weather
- Internal heat of Neptune and its effect on Neptune's weather

Comparison of the Jovian Planets

- Differences in internal structure
- Differences in amount of internal heat and its relation
  to the different "weather" on each of the Jovian planets.
- Differences in magnetic fields