# Astronomy 4 Exam #3 Major Topics

**Solar system formation**
- **Solar nebula**
- **Sequence of events**
- **Temperature distribution early on (i.e., first few billion years)**

**Planetary surfaces**
- **Cratering**
  - -what causes it
  - -which moons/planets show it
- **Erosion**
  - -what types are there
  - -what planets/moons have it
- **Ages**
  - -how to measure, both on a relative and an absolute scale

**Planetary atmospheres**
- **Definition**
  - -a layer of gas surrounding a planet/moon
- **Composition**
  - -what is an atmosphere made of
- **Greenhouse effect**
  - -know how it works
  - -what atoms/molecules play a role
  - -what wavelengths of light are involved
  - -what is are the results of this effect
- **Ozone depletion**
  - -what is it
  - -when/how is it a problem
  - -what wavelengths of light are involved
- **Weather**
  - -examples of weather in the solar system
  - -which planets have forms of weather?

**Magnetic fields**
- **Function (what do they do, esp. for Earth?)**
- **Where and how big**

**Ingredients:**
- -fast rotation
- -electrically conducting interior
- -convective overturn

**Planet interiors**
- -typical layers

**Comparative planetology**

**Terrestrial vs. Jovian planets**
- -magnetic fields
- -surfaces
- -atmospheres: their presence, composition and weather patterns
- -interior composition

**Inner planets & Earth's moon**
- -sizes
- -gravity differences
- -atmospheres
- -surfaces
- -tectonics

**Sizes/masses of solar system bodies**
- -largest vs. smallest
- -most/least massive
- -most/least dense

**Moons of the solar system**
- -how many
- -where are most of them
- -surfaces: features (craters, ice, etc) and diversity

**Galilean moons**
- -what and where are they
- -size
- -any special features at or under the surface

**Earth's moon**
- -formation scenario
- -lunar maria vs. highlands: differences in terrain, age
- -rotation rate

**Volcanism & Tectonics**

-Interaction of surface and interior layers of a body
-What causes the movement of material?
-Which solar system bodies have volcanism?
-Which solar system bodies have tectonics?

**Individual planets**

**Mercury**

-odd rotation→ huge temperature differences on day vs. night side
-no appreciable atmosphere

**Venus**

-thick atmosphere of mostly CO2
-runaway greenhouse effect

**Earth**

-what processes affect its surface
-what processes affect its atmosphere
-greenhouse effect
-climate change!
-ozone depletion

**Mars**

-search for water (and life!)
-major missions we've sent there past and present
-runaway refrigerator effect
-moons

**Jupiter**

-Great Red Spot
-many moons
-interior has liquid metallic hydrogen (what is that?!)

**Saturn**

-famous for its rings (though those aren't covered until post-exam)
-many moons
-another liquid hydrogen dominated interior

**Uranus**

-tilted nearly on its side!
-mostly "ice" (what does ice actually mean here?)

**Neptune**

-basically a twin of Uranus
-but it has a more interesting atmosphere, including a Great Dark Spot in the past