

# Astronomy 131    Review for Final Exam

## Asteroids and Meteorites:

Meteor, meteoroid, meteorite. Origins of meteoroids and their sizes. Three types: iron, stony, iron/stony. Chondrites vs. achondrites. Origin of iron type meteoroids. Chondrules and the solar nebula. Carbonaceous chondrites & the Murchison meteorite. HED achondrites & Vesta. Asteroids as planetesimals. Asteroid orbits. Range of sizes and masses. Shapes and surface appearance. Chemical Composition: C type, S type, M type, D & P types, V type.

## Astrobiology:

Prospects for finding life elsewhere in the solar system. Definitions of what life is, and our biases in this. Various extreme conditions in which life can be found on Earth. Other locations in the solar system in which similar conditions might be found.

## Extrasolar Planets

Pulsar planets. Doppler spectroscopy, astrometry, transit photometry – strengths and weaknesses of these methods. Masses and orbital distances of known exoplanets. Theories for how they formed. The Drake Equation.

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## Moons:

Formed in place, or else captured bodies. Mars – 2 captured asteroids as moons, not formed originally near Mars. Jupiter – 4 Galilean moons, icy bodies with variations in density and internal heat. Tidal Squeezing as heat source. Volcanoes on Io, liquid water in Europa. Ganymede and Callisto have less internal heat. Similarities and differences in their internal structures. Saturn's moon Titan: atmosphere, geology, rain, rivers, lakes. Cryovolcanoes. Enceladus and its geysers. Uranus' icy moons covered in “soot.” Moons orbit over Uranus' equator. Miranda has been shattered and reassembled. Neptune's moons have odd orbits. Triton is icy, has thin nitrogen atmosphere, and evidence of geological activity.

## Pluto:

Discovery in 1930. Weird orbit. Kuiper Belt and TNOs. Definition of a planet. Pluto's moons. Pluto's surface features. Sputnik Planum. crater counts and age of surface. Tombaugh Regio and chemical composition of surface. Mountains and possible cryovolcanoes. Cthulu Regio, tholins. Possible interior structure. Atmosphere.