Useful Things to Study (#2)

Topics appearing on the test may include, but are not limited to, these:

Moon phase questions

What produces a continuous spectrum, an emission line spectrum, an absorption spectum? What do these spectra look like?

Tides

difference between terrestrial and Jovian planets

the carbon dioxide cycle

What are the principal greenhouse gases?

What is a comet nucleus made of? How about the tail?

What are meteors?

What is the Titius-Bode Law (aka Bode's Law)?

What is a dwarf planet?

The destructive power of a collision with an asteroid or comet nucleus comes from the kinetic energy of the object hitting the Earth. Since kinetic energy is $1/2\ m\ v^2$, it goes up rapidly with the velocity of the impact.

What are the three most abundant elements in the Earth's crust?

What is the Kuiper belt?

What keeps the interior of the Earth molten these days?

What is an extra-solar planet?

What are the 3 principal ways of discovering extra-solar planets?

Approximately how many extra-solar planets have we discovered so far?

Different regions of the Sun's interior (core, radiative zone, convective zone)

Different regions of the Sun's atmosphere (photosphere, chromosphere, corona)

Fraction of mass that is converted to energy via $E = mc^2$ for proton-proton cycle in main sequence stars.

the nature of (electron) neutrinos that come from the Sun

How do we know that sunspots are cooler than the rest of the photosphere?

Magnetic fields in the Sun

Cause of the aurora borealis/australis in the Earth's atmosphere

Relationship between parallax of stars and their distances

What is a "parsec"?

What are stellar radial velocities? Proper motions?

Inverse square law of light intensity

What do we mean by the "absolute magnitude" of a star?

What does this mean? M = m + 5 - 5 log d? (The apparent magnitudes have to be corrected for any effects of interstellar dimming due to dust. Otherwise your distances aren't right.)

Hertzsprung-Russell Diagram. What's it a plot of? Where are the main sequence stars? White dwarfs, red giants, supergiants? What is the range of photospheric temperatures of stars? Luminosities? Sizes? Masses of main sequence stars?

What does this mean: T_{MS} is proportional to $M^{-2.5}$

How can we get observational confirmation from star clusters concerning the main sequence lifetimes of stars?

Spectroscopic binaries, eclipsing binaries - what good are they?

How does interstellar dust affect the light of stars along the line of sight?

What fraction (by mass) of the interstellar medium is in gas and what fraction in dust?

different components of the interstellar medium (cold atomic gas, even colder molecular clouds, gas near hot stars in star forming regions, intercloud medium) - typical densities and temperatures

How is 21 cm emission produced? What kind of telescope would you used to detect it?

How long do these stage's of the Sun's life last - intial collapse to protostar state, additional contraction to main sequence, main sequence, giant phase, lifetime of planetary nebula, white dwarf

What is the CNO cycle? It is the principal energy generation mechanism for which kind of stars?

What's the minimum temperature to run the proton-proton cycle in a star's core?

Why are Cepheids and RR Lyrae stars important? What is the period-luminosity relation?

How does the life of a 10 solar mass star differ from the Sun's life?

What is degenerate electron matter?

What is the maximum mass of a white dwarf star?

Stars less than 0.4 M_{Sun} are fully convective. What does this mean? How long do they last as main sequence stars? Do they become giant stars?

How is a star's evolution changed if it has a really close companion?

What is the structure of a 10 solar mass star prior to its explosion as a Type II supernova?

What do we mean by the term "standard candle"? What good are they?

Why are Type Ia supernovae better standard candles for galaxies more than 25 Megaparsecs distant (compared to, say, Cepheids)?

If a 1 solar mass black hole has a radius of 3 km, what's the size of a 10 solar mass black hole? Or a billion solar mass black hole?

What do we mean by the "density" of an object?

What are the mean densities of the Sun, a typical white dwarf star, a neutron star?

How massive is the black hole in the center of our Milky Way galaxy?