I expect that the topics listed below are ones you have encountered previously so I am going to assume that you are familiar with them at the level required for this course even though we did not discuss them in class. Even so I am pleased to answer during class any questions you might have about any of them. Don't just look at the list and say, "Oh yeah. I have heard of that." Can you tell someone how many neutrons a carbon 14 atom has or give its atomic number if given a periodic table to use?

- photon
  - wave equation
  - energy equation
- atoms
  - electrons
  - protons
  - neutrons
  - electric charge
  - elements (92 in nature)
  - atomic number
  - mass number
  - isotope
- states of matter: (See Figure 5.10)
  - solids: atoms, molecules of a single element, compounds (molecules of two or more elements
  - liquids
  - gases
    - molecular dissociation
    - ionization
  - plasma
  - new ones in astrophysics:
    - degenerate matter (electron)
    - neutron degenerate matter
    - quark matter (maybe)
- energy in atoms
  - mass-energy \((E = mc^2)\)
  - kinetic energy from motion \((KE = \frac{1}{2} mv^2)\)
  - temperature-a measure of average atomic \(KE\) or really velocity
  - energy stored by electrons in different energy levels
  - energy levels
    - regions an electron can occupy around an atom
    - predicted by the Schrödinger equation and quantum mechanics
    - spaced according to energy electron gains to get there
    - spacing is different for each atom (key idea)
    - electron in the lowest state has zero energy
    - electron movement between levels absorbs or emits light
    - this electron action puts lines in a spectrum
    - understanding energy levels is key to spectra in astronomy