***The following are the topics that will be covered on your mid-term exam.*** *You make have a large notecard prepared for the exam. (I will return notecards previously submitted with your test to you). You will be allowed to use your periodic table and all reference sheets previously provided to you.*

* ***Atomic Theory***
  + Recognize and identify the following atomic models
  + Dalton’s model
  + Thompsons’s Model
  + Rutherford’s Model
  + Bohr Model
  + Current Model
* ***Atomic Structure***
  + Determine atomic number
  + Determine atomic mass number
  + Determine atomic mass
  + Determine average atomic mass
  + Determine number of protons in an atom
  + Determine number of electrons in an atom
  + Determine number of neuutrons in an atom
  + ***Ions***
    - Cations
    - Anions
    - Number of Protons, neutrons, electrons
  + ***Isotopes***
    - Symbol
    - Number of protons & neutrons
* ***Bohr Model & Electromagnetic Spectrum***
  + Use the “Bohr Model for Hydrogen Atom” and “Electromagnetic Spectrum” diagrams from the Reference Tables to relate color, frequency, and wavelength of the light emitted to the energy of the photon.
* ***Electron Configuration***
  + Write electron configurations, including noble gas abbreviations (no exceptions to the general rules). Included here are extended arrangements showing electrons in orbitals.
  + Identify s, p, d, and f blocks on Periodic Table.
  + Identify an element based on its electron configuration. ( be able to identify elements which follow the general rules, not necessarily those which are exceptions.)
  + Determine the number of valence electrons from electron configurations.
* ***Periodic Table*** 
  + Identify groups/families as vertical columns on the periodic table
  + Identify periods as horizontal rows on the periodic table
  + Know that main group elements in the same family have similar properties, the same number of valence electrons, and the same oxidation number
  + Understand that reactivity increases down in a group of metals and decrease down in a group of nonmetals
  + Identify main group elements as A groups or as groups 1, 2, 13-18
  + Identify alkali metals, alkaline earth metals, halogens, and noble gases based on location on the periodic table
  + Identify transition metals as B groups or as groups 3-12
* ***Periodic Trends***
  + Define atomic radius and ionic radius
  + Know group and period general trends for atomic radius
  + Apply trends to arrange elements in order of increasing or decreasing atomic radius
  + Explain the reasoning for the trends
  + Compare cation radius to neutral ion
  + Compare anion radius to neutral ion
  + Define electronegativity
  + Know group and period general trends for electronegativity
  + Apply trends to arrange elements in order of increasing or decreasing electronegativity
  + Explain the reasoning for the trends
* **Ionic bonding**
  + Describe how ions are formed and which electron arrangements are stable
  + Use the term cation as a positively charged ion and anion as a negatively charged ion
  + Predict ionic charges for main group elements base on valence electrons
  + Describe an ionic bond as an electrostatic attraction
  + Know the characteristics of ionic bonds: high MP, high BP, brittle, and high electrical conductivity either in molten state or in aqueous solution
  + Write binary compounds of metal/nonmetal\*/Name these compounds if given formula
  + Write ternary compounds (polyatomic ions)\*/ Name these compounds if given formula
* **Covalent bonding**
  + Apply the concept that sharing electrons form a covalent compound that is a stable (inert gas) arrangement
  + Determine that a bond is predominately covalent by the location of the atoms on the periodic table (nonmetals combined with nonmetals) or when ΔEN < 1.7
  + Draw the Lewis Dot Structures (HONC rule/Bonding Table)
  + Write binary compounds of two nonmetals: use Greek prefixes (di-, tri-, tetra-, …)
  + Know what determines if a MOLECULE is polar or nonpolar, and identify which molecules are polar and which are nonpolar.