**Physical Science Chapter 7 Study Guide**

* Molecules—groups of two or more atoms linked by chemical bonds to form distinct units
* Molecular mass—the sum of the mass of the atoms in a molecule
* Isomers—molecules with the same number and types of atoms but in a different arrangement
* Elements—substances composed of a single type of atom
* Compounds—substances composed of different types of atoms bonded together
* Mixtures—different kinds of atoms that are physically mixed but not chemically united
  + Solution—a mixture in which the ingredients are uniformly mixed
    - Solute—that which is dissolved in a substance
    - Solvent—the substance into which something is dissolved
    - Solubility—the ability of one substance to dissolve in another substance
    - Precipitate—solid particles that come out of a solution
  + Heterogeneous mixture—substances which are mixed but not completely or uniformly mixed
  + Colloid—a mixture that contains tiny suspended clumps of particles
* Chemical bonds—the attraction between atoms making up a molecule
  + Covalent—a bond which results from a sharing of electrons
    - Single covalent bonds means sharing one pair of electrons; double means two pairs, etc.
    - Lewis structure—a diagram that shows all of the atoms in a molecule and the valence electrons around each atom
    - Polar vs. nonpolar covalent bonds
      * Polar bond—the one atom has a stronger pull on the electrons (this is called its electronegativity) and therefore “hogs” the electrons most of the time, creating a negative electrical force around it and leaving the other atom with a positive electrical force
      * Nonpolar bond—the atoms in the molecule have a basically equal pull on the electrons; therefore the charge remains balanced
  + Ionic bond—attraction between oppositely charged atoms; occurs when one atom transfers electrons to another atom
    - Formula unit--The simplest ratio of atoms in a nonmolecular compound
  + Metallic bond—occurs between metal elements and involves the sharing of electrons around many nuclei (think Hutterite colony)
* Chemical formulas
  + Molecular formula—shows the exact number and kind of atoms in a molecule
  + Structural formula—shows the general arrangement of atoms in a molecule
  + Empirical formula—shows only the simplest ratio of atoms in molecule
* Intermolecular forces—bonds between molecules
  + Dipole-dipole forces—occurs between polar molecules—the positive end of one molecule is attracted to the negative end of another molecule
  + London forces—occurs between *all* molecules due to the shifting cloud of electrons around the molecule
  + Hydrogen bonds—occurs only molecules that contain hydrogen; it is also an attraction between the positively charged ends of the molecule (always the end with the hydrogen atoms) and the negatively charged end of another molecule