Solutions Study Guide

* Recall the four categories of matter and know the definition/nature of each category
  + Pure substances include compounds and elements
  + Mixtures include homogenous mixtures and heterogeneous mixtures
* All solutions have a solvent and a solute
  + The solvent is the chemical in the greatest amount/quantity
  + The solute is the chemical dissolved in the solvent
* Define solubility as the amount of solute dissolved in a certain amount of solvent at a specific temperature
* Differentiate between saturated and unsaturated solutions
* Explain a saturated solution in terms of equilibrium (ie. equal rates of dissolving and crystallization)
* Identify the factors that affect solubility (ie. temperature and pressure for solids, liquids, and gases)
* Aqueous solutions have water as the solvent
* Explain dissolving as an endothermic or exothermic process with respect to bonds breaking and bonds making
  + Breaking bonds require energy and forming bonds release energy
  + All dissolving processes involve bonds breaking and reforming
  + Exothermic: energy from bonds forming > energy required for bond breaking
  + Endothermic: energy from bonds forming < energy required for bond breaking
* Differentiate between electrolytes and nonelectrolytes
  + Electrolytes can conduct electrical current and can be soluble ionic compounds or acids
  + Nonelectrolytes cannot conduct electrical current and include soluble molecular compounds (ie. sugar)
* Express concentrations in various ways
  + Molar concentration (moles per litre of solution)
  + Percent by mass
  + Parts per million
* Use the molar mass equation combined with the molar concentration equation
* Be able to write out dissociation and ionization equations and use these balanced equations to calculate the concentration of ions in solution
* Steps to calculate the concentration of ions in solution
  + Write out the balanced dissociation or ionization reaction
  + Calculate the concentration of the solution if not already given to you
  + Multiply the concentration of the solution by the “want over have” ratio
* Calculate the concentrations and /or volumes of diluted solutions given information about the original standard solutions
* Describe the procedures and calculations required for preparing and diluting solutions