**Required Skills for Success in DP Chemistry, Juniors**

**Math/Metrics**

1. Counting Significant Figures
2. Rounding to the appropriate number of significant figures
3. Understand the difference between accuracy and precision
4. Unit Conversions with Dimensional Analysis

**Atomic Structure**

1. Determining protons, neutrons, electrons, atomic number, mass number, charge
2. Know the difference between an atom, isotope, and ion
3. Writing electron configurations
4. Drawing orbital diagrams
5. Drawing Lewis Dot Structures and determining molecular geometries

**Chemical Nomenclature and Formula Writing**

1. Given a chemical’s name, write the formula or
2. Given a chemical’s formula, write its name for:
   1. Ionic compounds
   2. Covalent compounds
   3. Acids
   4. Organic Molecules

**Periodicity**

1. Compare atoms using periodic trends for
   1. Atomic Radius
   2. Ionization Energy
   3. Electronegativity

**Equations and Stoichiometry**

1. Balance chemical equations
2. Label a reaction as: synthesis, decomposition, single replacement, double replacement, neutralization, or combustion
3. Convert between grams, moles, Liters (of gases at STP), and/or atoms/molecules/formula units.
4. Perform stoichiometric calculations to
   1. Determine amount of product produced
   2. Determine limiting reactant

**Solutions**

1. Calculate molarity
2. Perform dilution problems
3. Recognize solutions that are saturated, supersaturated, and unsaturated

**Solids, Liquids, and Gases**

1. Perform calculations involving the following gas laws:
   1. Ideal
   2. Combined
   3. Boyle’s
   4. Charles’s
   5. Gay-Lussac’s
   6. Dalton’s
   7. Graham’s
2. Read a manometer
3. Read and interpret a heating curve
4. Read and interpret a phase diagram

**Thermochemistry**

1. Perform heat calculations using q = mc∆T
2. Understand the difference between endothermic and exothermic
3. Read and interpret a potential energy diagram
4. Calculate ∆Hrxn using ∆Hrxn = ∑∆Hproducts - ∑∆Hreactants­

**Acids/Bases/Equilibrium/Kinetics**

1. Calculate pH/pOH/[H+]/[OH-]
2. Determine conjugate acid/base pairs using Bronsted-Lowry concept of acids and bases
3. Use Le Chatelier’s Principle to determine shift in reactions to establish equilibrium
4. Understand factors that affect rate of chemical reaction (temperature, molarity, surface area, catalyst)