**A.P. Chemistry Outline Notes**

***Unit 4: Big Idea #4: Chemical Reactions and Their Rates***

*Corresponds to “Chapter 5: Electrons in Atoms” & “Chapter 6: The Periodic Table & Periodic Law” from textbook.*

### For the Unit:

1. Unit opening page
   1. Name of unit- Big Idea #4: Chemical Reactions and Their Rates
   2. Picture

### Each Week:

* Update your table of contents
* Number your pages
* Write neatly

1. I can use the collision model to describe reactions and factors that affect reaction rates
   1. Write I can statement
   2. Describe and draw the requirements for a reaction to be successful
   3. Explain how temperature affects rate of a reaction rate, including a Maxwell-Boltzmann distribution
   4. Define the variables in an Arrhenius equation
   5. Draw a graph that uses that can be used to determine activation energy
   6. Define catalyst
   7. Draw a picture illustrating how a catalyst can work
   8. Explain how a catalyst affects rate of a reaction, including a Maxwell-Boltzmann distribution
2. I can compare rates of change for reactants and products using stoichiometric coefficients
   1. Write I can statement
   2. Write the generic relationship between reactants and products for rate of reaction
   3. Do an example problem
3. I can show how concentration affects rate of reaction by determining and explaining a rate law (including orders, rate constants, and units)
   1. Write I can statement
   2. Define rate law
   3. Define rate order
   4. For zero, first, and second order reactions, explain how concentration affects rate
   5. Write the units of k for each order of reaction
   6. Explain how to determine the rate order for a reactant based on experimental data
   7. Do an example problem, solving for both order of reaction and for the rate constant.
4. I can determine half-life of a reaction given the appropriate data
   1. Write I can statement
   2. Define half-life
   3. Do an example problem and explain how to determine a half-life for a first-order reaction, given concentration or mass at different times
   4. Do an example problem and explain how to determine a half-life for a first-order reaction, given k
5. I can explain and interpret graphical data relating to rates, including reaction order and half-life
   1. Write I can statement
   2. For a zero-, first-, and second- order reaction
      1. Draw a graph of concentration v rate
      2. Draw a graph of concentration v time
      3. Show what a half-life is on each graph
      4. Draw a graph of rate v time
      5. Draw a graph with a straight line relating concentration and time, labeling the axes
6. I can use the Beer’s Law to determine the concentration of an unknown solution
   1. Write I can statement
   2. Describe Beer’s Law
   3. Draw a picture illustrating the idea behind Beer’s Law (light absorbance compared to concentration)
   4. Draw a graph showing concentration v light absorption
7. Determine the rate law of an elementary reaction based on a balanced equation
   1. Write I can statement
   2. Define elementary reaction.
   3. Define intermediate.
   4. Explain how to determine the rate law of an elementary reaction.
   5. Write an example mechanism and identify an intermediate within the mechanism.
   6. Show an example of determining the rate law of a reaction mechanism with at least 3 steps. Label the problem.
   7. Show how an intermediate differs from a catalyst.

**Review:**

* “Cracking the AP Chemistry Exam”-Chapter 6
  + Multiple Choice Questions
  + Free Response Questions
* PowerPoint Notes
* Entry Slip Questions
* Science Notebooks