**Study Guide: Chapter 16 & 17: Reaction Energy and Kinetics**

**Calculations:**

* Know and apply the specific heat relationship to calculate any quantity in the equation, given all the others. (Pay attention to the units!)
* Know the relationship used to calculate ΔG from ΔH, ΔS, and temperature (T is Kelvin!)
* Calculate ΔH for a reaction from heats of formation
* Calculate ΔH using Hess’s Law and given equations.
* Calculate concentration and reaction rate ratio
* Calculate the value of K and use its correct units

**Be sure to know and review the following:**

* Write the equation for calculating specific heat and explain what each quantity represents.
* Know the sign of ΔH for an exothermic reaction and an endothermic reaction
* Know the relative amounts of energy in reactants and products for exothermic and endothermic reactions.
* Know how the ΔH of formation of a compound relates to its stability
* Know the two parts of the equation for calculating ΔG – how does each affect the spontaneity of the reaction?
* Know the sign of ΔG that indicates a spontaneous reaction.
* Define ‘chemical kinetics’ and explain what must happen to reacting particles (atoms, molecules, ions) for a reaction to occur
* Explain the concept of a reaction mechanism
* Given a reaction mechanism, identify the rate determining step.
* Can draw and label a reaction profile diagram with activation energy and ΔH, reactants and products for forward and reverse reactions and activated complex
* Define activated complex
* Relate activation energy to enthalpy of reaction
* Discuss the factors that affect reaction rate.
* Define ‘catalyst’ and give examples of catalyzed reactions
* Explain the relationship between ‘rate’ and ‘time’
* Deduce a rate law from a table of simple experimental rate data
* Given a rate law, deduce what happens to the reaction rate when the reactant concentration(s) are changed (e.g. by a factor of 1, 2, or 4)

Review textbook pages 509-529 and 537-557. Look over the Chapter 16 and 17 summaries on textbook pages 530 & 557. Review all sample problems from the chapter. Review your notes, modeling and practice, science practice problems, lab, vocabulary words and definitions, practice problems, and review problems to help you study.

* Remember this is just a guide! We have practiced, read, discussed, and covered all concepts for test in a variety of ways in and out of class.