Advanced Placement Chemistry
Chapters 12 – 13 Syllabus and Reverse Classroom Video Links

As you work through the chapter, you should be able to:

Chapter 12 – Chemical Kinetics **Khan Academy Link: Kinetics**

1. Express the rate of a reaction in units of concentration/time.
2. Express the rate of a reaction with respect to a specific reactant or product.
3. Understand the order of a reaction with respect to a particular reactant or product describes the connection between rate and the concentration of that species.
4. Determine the overall reaction order of a reaction.
5. Understand rate laws can only be determined by experiment, not reaction stoichiometry.
6. Apply the method of initial rates to determine the rate law for a reaction.
7. Use differential and integrated rate laws for zero, first, and second order reactions.
8. Use half-life equations for zero, first, and second order reactions.
9. Understand for zero-order reactions, a plot of concentration vs. time will be linear. For first-order systems, a plot of the logarithm of the concentration vs. time will be linear. For second-order systems, a plot of the reciprocal concentration vs. time is linear.
10. Understand how Kinetic Molecular Theory applies to reaction energy diagrams.
11. Understand the role of activation energy and its connection to the average kinetic energy of the forward and reverse reactions.
12. Know the relationship between the rate-determining step and a mechanism.
13. Explain how a catalyst influences reaction rates.
14. Explain what factors affect the rate of a reaction and how each factor is interpreted in terms of collision theory.

Chapter 13 – Chemical Equilibrium **Khan Academy Link: Chemical Equilibrium**

1. Explain equilibrium in terms of forward and reverse reaction rates.
2. Write an equilibrium expression in terms of concentration or partial pressures using the law of mass action.
3. Understand the relationship between K_c and K_p.
4. Determine equilibrium constants for homogenous and heterogeneous systems.
5. Relate the reaction quotient, Q, to the equilibrium constant, K.
6. Use ICE method to determine equilibrium concentrations.
7. Understand when to apply the 5% rule to systems at equilibrium.
8. Describe what factors affect a system at equilibrium and which ones do not. (Notable non-effect changes: concentration, catalyst, inert gases)
9. Use Le Chatelier's principle to determine the change in equilibrium position when a system is disturbed.

Class assignments and homework

1. CH 12 Homework Packet
2. CH 13 Homework Packet

Tests and Quizzes:

1. CH 12 HW Quiz
2. CH 13 HW Quiz
3. CH 12 – 13 Exam

Lab Experience:

1. Rate of an Iodine Clock Reaction Lab
2. Determination of an equilibrium constant by spectrophotometric analysis

Proposed Schedule: Chapters 12 – 13 Chemical Kinetics and Equilibrium

Week of January 27th

Day	Concepts and Video Links	Class Activities	Homework
M 1 – 6	**No School: Teacher Work Day**		
T 1 – 6	CH 12 Goals 1 – 3 Reaction Rates	In Class: • Defining Rates • Graphing: M vs. T • Comparing Rates by Species	CH 12 Study Guide and HW Problems
1st Block	CH 12 Goals 4 – 6 Rate Law and Reaction Order Units of k	In Class: • Warm-up • Method of Initial Rates • Finding Rate Laws from Experimental Data	CH 12 Study Guide and HW Problems
2nd Block	CH 12 Goals 7 – 10 Experimental Rate Law Integrated Rate Laws (Check out the whole series – some includes calculus)	**Reaction Rates, Activation Energy and Catalysis Demos:** In Class • Integrated Rate Law Organization • Problems	CH 12 Study Guide and HW Problems

Week of February 3rd (Early Release Wednesday Week)

Day	Concepts	Class Activities	Homework
M 1 – 6	Lab: The Rate of an Iodine Clock Reaction Plotting 1st Order Reaction Data Plotting 2nd Order Reaction Data	**Iodine Clock Challenge Demo** In Class: • Integrated Rate Law Problems • Pre-Lab	**STAMP**: CH 12 HW 2
1st Block	Lab: The Rate of an Iodine Clock Reaction	**The Rate of an Iodine Clock Reaction** • Collect Data	The Rate of an Iodine Clock Reaction
R 1 – 6	CH 12 Goals 10 – 14 Introduction to Kinetics (Mechanisms) 2015 AP Free Response #5	In Class: • Reaction Mechanisms • Catalysts & Intermediates • Molecularity	The Rate of an Iodine Clock Reaction **STAMP:** CH 12 HW 3
F 1 – 6	CH 12 Formative Assessment	*CH 12 HW Quiz*	**Due:** CH 12 Homework Handout

Week of February 10th

Day	Concepts	Class Activities	Homework
M 1 – 6	CH 12 Formative Assessment CH 13	Correct CH 12 HW Quiz Handout CH 13: • Syllabus • Study Guide • Notes	CH 13 Study Guide and HW Problems
1st Block	CH 13 Goals 1 – 5 Reactions in Equilibrium Heterogeneous Equilibrium Equilibrium Constants	In Class: • Equilibrium Activity – Visualize Equilibrium • Equilibrium Constants • Problems	CH 13 Study Guide and HW Problems **Due:** The Rate of an Iodine Clock Reaction
2nd Block	CH 13 Goals 5 – 7 Reaction Quotient Q Solving Equilibrium Problems	In Class: • Reaction Quotient • Ice Tables - Problems • 5% Rule	CH 13 Study Guide and HW Problems
F 1 – 6	CH 13 Goals 8 – 9 LeChatelier's Principle Comparing K vs Q Example Good LeChatelier's Example (youtube)	In Class: • Le Châtelier's Principle • Problems	**STAMP**: CH 13 HW 2

Week of February 17th

Day	Concepts	Class Activities	Homework
M 1 – 6	**No School: Holiday**		
1st Block	Lab: Determination of an Equilibrium Constant by Spectrophotometric Analysis	**Determination of an Equilibrium Constant by Spectrophotometric Analysis:** • Discuss Pre-lab and Procedure • Practice pipetting and using the spectrophotometer	**STAMP**: CH 13 HW 3 Determination of an Equilibrium Constant by Spectrophotometric Analysis Pre-lab
2nd Block	Lab: Determination of an Equilibrium Constant by Spectrophotometric Analysis	**Determination of an Equilibrium Constant by Spectrophotometric Analysis:** • Collect Data	Determination of an Equilibrium Constant by Spectrophotometric Analysis Lab Report Due Next Tuesday
F 1 – 6	Chapter 13 Formative Assessment	CH 13 HW Quiz	**Due**: CH 13 Homework Handout

Week of February 24th

Day	Concepts	Class Activities	Homework
M 1 – 6	Lab: Determination of an Equilibrium Constant by Spectrophotometric Analysis	**Determination of an Equilibrium Constant by Spectrophotometric Analysis:** • Workday	
1st Block	CH 12-13 Summative Evaluation	CH 12 – 13 Exam	