Chemistry AP   Unit 5 Outline: Chemical Kinetics and Equilibria

Chapter 13: Chemical Kinetics

Classes	Topics	Suggested Reading	✔	Assignments	✔
1	Chemical Kinetics, Reaction Rate $\left(Rate = \dfrac{\Delta[A]}{\Delta t} \right)$, Average Rate and Instantaneous Rate, Determining Rates Using Pressure, Rate Constant (k), Relationship Between Molar Quantities and Reaction Rates	13.1: The Rate of a Reaction (pg. 546 to 553)		pg. 589 #1 to 3, 5 to 8	
2	Rate Law, Differential Rate Law ($Rate = k[A]^n$), Integrated Rate Law, Order (n), Overall Reaction Order, Initial Rates, Methods of Initial Rates	13.2: The Rate Law (pg. 553 to 557)		pg. 589−590 #9 to 22; pg. 593−594 #72 and 87	
3 & 4	Integrated Rate Laws, (1st, 2nd, and zero orders), First-Order Rate Laws ($\ln [A] = -kt + \ln [A]_0$ or $\ln \left(\dfrac{[A]_0}{[A]} \right) = kt$), Half Life of First Order Reaction $\left(t_{1/2} = \dfrac{\ln(2)}{k} \right)$, Second-Order Rate Laws $\left(\dfrac{1}{[A]} = kt + \dfrac{1}{[A]_0} \right)$, Half Life of Second Order Reaction $\left(t_{1/2} = \dfrac{1}{k[A]_0} \right)$, Zero Order Rate Laws ($[A] = -kt + [A]_0$), Half Life of Zero Rate Laws $\left(t_{1/2} = \dfrac{[A]_0}{2k} \right)$, Pseudo-First-Order Rate Law	13.3: The Relation Between Reactant Concentration and Time (Integrated Rate Law) (pg. 557 to 567)		pg. 590−591 #23 to 30; pg. 594−595 #88 and 94	
5	Collision Model, Activation Energy, Activated Complex (Transition State), Temperature and Collision Frequency, Molecular Orientations and Steric Factor, Arrhenius Equation	13.4: Activation Energy and Temperature Dependence of Rate Constants (pg. 568 to 575)		pg. 590−591 #31 to 42; pg. 596 #109, 110, 112	
6	Reaction Mechanism, Intermediate, Elementary Step, Molecularity, Unimolecular, Bimolecular, Termolecular Steps, Rate-Determining Step, Deduction & Conditions of Possible Reaction Mechanisms, Catalyst, Homogeneous Catalyst, Heterogeneous Catalyst, Adsorption, Desorption, Enzymes	13.5: Reaction Mechanisms (pg. 575 to 581) 13.6: Catalysis (pg. 581 to 588)		pg. 591−595 #43 to 49, 51 to 54, 68, 70, 73, 99 pg. 592−595 #55 to 58, 62, 64, 65, 80, 84, 92	
7	**Lab #6: Kinetics of Crystal Violet Fading (February 11, Friday)**			*Lab Report #6 Due: March 2, Wednesday*	
	Chapter 13 Take-Home Quiz (Assign February 11, Friday)	*Chapter 13 HW Due: February 16, Wed*		*Ch 13 T-H Quiz Due: February 14, Monday*	

Chapter 14: Chemical Equilibrium

Classes	Topics	Suggested Reading	✔	Assignments	✔
1	Chemical Equilibrium, Properties of Chemical Equilibrium, Law of Mass Action, Equilibrium Expression, Equilibrium Constant (K), Homogeneous Equilibria, Equilibrium Expressions of Partial Pressures (K_P), Equilibrium Position, Heterogeneous Equilibria, Multiple Equilibria, Reverse Equilibrium Reactions & Multiplying Equilibrium Reactions	14.1: The Concept of Equilibrium and the Equilibrium Constant (pg. 602 to 604) 14.2: Writing Equilibrium Constant Expressions (pg. 604 to 615)		pg. 633 #1 to 4 pg. 633−635 #5 to 11, 13. 14, 16, 18, 20, 22 to 24, 26 to 28, 30 to 32; pg. 639 #92	
2	Relationship Between Rate Constants and Equilibrium Constants and Expressions, Applications of Equilibrium (The Extent of a Reaction, Reaction Quotient, Q, Equilibrium Pressures & Concentrations – ICE Box)	14.3: The Relationship Between Chemical Kinetics and Chemical Equilibrium (pg. 616 to 617) 14.4: What Does the Equilibrium Constant Tell Us? (pg. 617 to 623)		pg. 635 #33 and 34 pg. 635−636 #37 to 48; pg. 637−641 #64, 70 to 78 (even), 82, 84, 108	
3	Le Châtelier's Principle (Effects of a Change in Concentration, Pressure, and Temperature)	14.5: Factors That Affect Chemical Equilibrium (pg. 623 to 630)		pg. 636−640 #49 to 52, 56 to 62 (even), 65 to 69, 90, 98, 106	
4	Free Energy and Pressures and Equilibrium ($\Delta G = \Delta G° + RT \ln (Q)$ and $\Delta G° = -RT \ln (K)$), $w_{\max} = \Delta G$, Reversible & Irreversible Processes	18.6: The Dependence of Free Energy on Pressure (pg. 803 to 807)		pg. 811−814 #21, 22, 24, 26 to 32, 49, 64, 66, 76, 80	
5	**Unit 5 Test (March 11, Friday)**	*Chapter 14 & 18.6 HW Due: March 9, Wednesday*			