

AP Chemistry (*Distant Learning*) Unit 6 Outline: Acids-Bases and Solubility Equilibria

*Green Fonts - *Synchronous*

*Blue Fonts - **Asynchronous Review Concepts (Students to watch Video Lessons on their own.)*

Chapter 15: Acids and Bases

Wk/Class	Topics	Suggested Reading	✓	Assignments	✓
<i>Before March 9, Tues</i>	Physical and Chemical Properties of Acids and Bases, Arrhenius Concept, Brønsted-Lowry Model, Hydronium Ion, Conjugate Acid, Conjugate Base, Conjugate Acid-Base Pair, Acid Dissociation Constant (K_a), Base Dissociation Constant (K_b), Autoionization of Water, pH and pOH Scales, $\text{pH} = -\log [\text{H}_3\text{O}^+]$, $\text{pOH} = -\log [\text{OH}^-]$, $K_w = [\text{H}_3\text{O}^+][\text{OH}^-]$, $\text{pH} + \text{pOH} = 14$	15.1: Brønsted Acids and Bases (pg. 646 to 647) 15.2: The Acid-Base Properties of Water (pg. 647 to 649) 15.3: pH-A Measure of Acidity (pg. 649 to 652)		pg. 686–687 #1 to 8 pg. 687 #9 to 11 pg. 687 #12 to 26	
<i>Before March 9, Tues</i>	Strong Acid, Weak Acid, Relative Strength of Acids and Conjugate Bases, Monoprotic Acids versus Diprotic Acids, Amphoteric Substances, Common Strong Acids, Major Species of Strong Acids, pH of Strong Acids, Oxoacids, Organic Acids, Carboxyl Group, Using Approximation to calculate $[\text{H}_3\text{O}^+]$ of Weak Acids, pH of Weak Acids, Percent Dissociation (Ionization) = $\frac{[\text{H}_3\text{O}^+]}{[\text{HA}]} \times 100\%$, K_a and % Dissociation,	15.4: Strength of Acids and Bases (pg. 652 to 656) 15.5: Weak Acids and Acid Ionization Constants (pg. 656 to 663)		pg. 687–688 #27, 28, 30 to 38; pg. 690–692 #96, 112, 126, 140 pg. 688 #39 to 50; pg. 690–691 #98 & 124	
<i>Before March 9, Tues</i>	Strong Bases, Slaked Lime, Lime-soda Process, Weak Bases, pH of Strong and Weak Bases, $K_w = K_a \times K_b$, Using Approximation to calculate $[\text{OH}^-]$ of Weak Bases,	15.6 & 15.7: Weak Bases and Base Ionization Constants & The Relationship Between the Ionization Constants of Acids and Their Conjugate Bases (pg. 663 to 666)		pg. 688–689 #51 to 58; pg. 691 #122	
March 8 / Day 1	Polyprotic Acids, Diprotic and Triprotic Acids, pH of Polyprotic Acid, Amphoteric Species of Weak Polyprotic Acids, Molecular Structural Effect on Acid Properties (Polarity and Hydrohalic Acids, Bond Strength, Electron Density of Oxoacids, Electronegativity, Resonance), Carboxylic Acids, Salt, Salt as Weak Bases, Hydrolysis and Percent Hydrolysis, Salts that produces Acidic Solutions, Acid-Base Properties of Salts	15.8: Diprotic and Polyprotic Acids (pg. 666 to 670) 15.9: Molecular Structure and the Strength of Acids (pg. 670 to 674) 15.10: Acid-Base Properties of Salts (pg. 674 to 679)		pg. 689 #59 to 64; pg. 691 #118 and 120 pg. 689 #67 to 70; pg. 691 #130 pg. 689 #75 to 82; pg. 691 #106 and 128	
March 8 / Day 2	Acidic and Basic Oxides, Properties of Acids-Base Oxides, Amphoteric Hydroxides, Lewis Model of Acids and Bases, Lewis Acid, Lewis Base	15.11: Acid-Base Properties of Oxides and Hydroxides (pg. 679 to 681) 15.12: Lewis Acids and Bases (pg. 682 to 686)		pg. 690 #83 to 88 pg. 690 #89 to 94; pg. 692 #140	
	Chapter 15 Take-Home Quiz (Assign March 25, Thursday)	Chapter 15 Homework Due (March 29, Monday)		Ch 15 Take-Home Quiz (Due: March 29, Monday)	

Chapter 16: Acid-Base Equilibria and Solubility Equilibria

Wk/Class	Topics	Suggested Reading	✓	Assignments	✓
March 22 / Day 1	Homogeneous and Heterogeneous Equilibria, Common Ion, Common Ion Effect and Calculations, Buffered Solution, Calculations involving Buffered Solution, Buffering Capacity, Preparing a Buffer, Preparation of a Buffer Solution, pK_a , Henderson-Hasselbalch Equation ($pH = pK_a + \log \frac{[A^-]}{[HA]}$)	16.1: Homogeneous Versus Heterogeneous Solution Equilibria (pg. 698) 16.2: The Common Ion Effect (pg. 698 to 701) 16.3: Buffer Solutions (pg. 701 to 708)		pg. 740 #1 to 6 pg. 740 #7 to 20; pg. 744 #102 & 107	
March 22 / Day 2	pH (Titration) Curve, Equivalence Point, pH of Half-way to Equivalence Point = pK_a , millimol (mmol), Titrations between (Strong Acid with Strong Base, Weak Acid with Strong Base, Weak Base with Strong Acid), Acid-Base Indicators and their pH Ranges, Phenolphthalein, Bromothymol Blue, End Point and Colour Change	16.4: Acid-Base Titrations (pg. 708 to 716) 16.5: Acid-Base Indicators (pg. 716 to 718)		pg. 741 #22 to 32; pg. 743–744 #88 and 106 pg. 741 #33 to 38; pg. 744 #100	
March 29 / Day 1	Solubility Product Constant (Solubility Product) K_{sp} , Molar Solubility (mol/L), Solubility (g/L), Predicting Precipitation Reactions, Separation of Ions by Fractional Precipitation or Selective Precipitation, Common Ions Effect on Solubility	16.6: Solubility Equilibria (pg. 718 to 725) 16.7: Separation of Ions by Fractional Precipitation (pg. 725 to 727) 16.8: The Common Ion Effect and Solubility (pg. 727 to 728)		pg. 741–744 #39 to 54, 92, 94, 99, 109, 112, 113, 116 pg. 742–744 #55, 56, 93, 110 pg. 742–744 #57 to 62; 97, 111	
March 29 / Day 2	pH and Solubility, Ion Product (Q), Determining Precipitation Conditions, Qualitative Analysis (Selective Precipitation and Flame Tests), Complex Ion, Ligand, Formation (Stability Constant), Complex Ions and Solubility, Qualitative Analysis of Cations and Anions	16.9: pH and Solubility (pg. 728 to 731) 16.10: Complex Ion Equilibria and Solubility (pg. 731 to 736) 16.11: Application of the Solubility Product Principle to Qualitative Analysis (pg. 737 to 739)		pg. 742 #63 to 68; pg. 745 #118 pg. 742–743 #69 to 76, 89, 91, 98 pg. 743 #77, 79 to 82	
April 5 (Easter Break)	Lab #7: Qualitative Analysis of Cations and Anions (Assign March 31, Wednesday – over Easter Break)	Lab #7 Handout Lab #7 Video		Lab Report #7 Due: April 15, Thursday	
April 19 / Day 1 & 2	Unit 6 Test (covers Chapters 15 and 16) Multiple Choice: (April 19, Monday) Extended Response (April 22, Thursday)			Chapter 16 Homework Due (April 22, Thursday)	