

## AP Chemistry Unit 1 Outline: Basic Chemistry

### Chapter 1: Chemistry - The Study of Change

Classes	Topics	Suggested Reading	✓	Assignments	✓
1	Course Outline, Lab Safety, Common Laboratory Equipment & Apparatus, Common Lab Techniques (Meniscus, Lighting Bunsen Burner, Electronic Balance, Pipetting)	Lab Safety Rules, Apparatus and Technique Handout and Lab Safety Video		<b>Lab Safety Quiz (August 29, Mon) (with Chapter 1 &amp; 2 Quiz)</b>	
2 & 3	Lab Writeup, Scientific Method, Theory, Scientific Law, Accuracy, Reliability, Classification of Matter (Pure Substance and Mixture, Elements and Compounds), Three States of Matter, Physical, Chemical, Extensive and Intensive Properties, Mass, Volume, Density, Microscopic and Macroscopic Properties	1.1 Chemistry: A Science for the 21 <sup>st</sup> Century (pg. 4 – 7) 1.2 The Study of Chemistry (pg. 7 – 8) 1.3 The Scientific Method (pg. 8 – 10) 1.4 Classification of Matter (pg. 11 – 13) 1.5 The Three States of Matter (pg. 13 – 14) 1.6 Physical and Chemical Properties of Matter (pg. 14 – 15)		pg. 32 #12 to 15	
4	SI Units, Scientific (Exponential) Notations, Precision, Percent Error and Percent Yield, Exact Numbers, Uncertainty, Significant Digits, Weight, Temperature Scales, Density Calculations, Unit Factor (Analysis) Method	1.7 Measurement (pg. 15 – 21) 1.8 Handling Numbers (pg. 22 – 27) 1.9 Dimensional Analysis in Solving Problems (pg. 27 – 30)		pg. 33 #21 to 26 pg. 33–34 #28 to 38 pg. 34 #39 to 52	

### Chapter 2: Atoms, Molecules and Ions

Classes	Topics	Suggested Reading	✓	Assignments	✓
1 & 2	History of Chemistry, Law of Conservation of Mass, Law of Definite and Multiple Proportions, Atomic Theories (Dalton, J.J Thomson, Nuclear, Quantum), Millikan Oil drop Experiment, Atomic Structures and Subatomic Particles, Radioactivity and particles, Isotopes, Atomic Number and Mass Number, Valence Electrons, Atomic Orbitals, Periodic Table of Elements (Mendeleev), Molecules, Ions (Cations and Anions), Metals, Non-Metals, Ionic and Covalent Compounds, Groups (Families), Periods, Binary and Polyatomic Elements and Molecules	2.1 The Atomic Theory (pg. 42 – 43) 2.2 The Structure of Atom (pg. 43 – 49) 2.3 Atomic Number, Mass Number and Isotopes (pg. 49 – 50) 2.5 Molecules and Ions (pg. 53 – 54) 2.4 The Periodic Table (pg. 51 – 53)		pg. 71 #3, 5, 8  pg. 71– 72 #12, 14, 16, 18; pg. 74 #68 pg. 72 #30 to 34, 36 pg. 72 #20, 23, 24, 26	
3 & 4	Chemical and Molecular Formulas, Allotrope, Structural Formula, Empirical Formulas, Nomenclature of Ionic Compounds, Polyatomic Ions and Oxoanions Nomenclature of Hydrates, Nomenclature of Molecular Compounds, Names and Formulas of some Common Molecular Compounds, Nomenclature of Acids	2.6 Chemical Formulas (pg. 55 – 59) 2.7 Naming Compounds (pg. 59 – 68) 2.8 Introduction to Organic Compounds (pg. 68 – 70) <i>(Read only: won't be tested until Unit 2)</i>		pg. 72–73 #37, 40 to 50 (even) pg. 73–74 #51, 55, 57 to 60, 67, 68, 71, 74 <b>Memorize Table 2.3 (Common Cations and Anions) on pg. 61</b> <b>Memorize Figure 2.4 (Greek Prefixes) on pg. 63</b> <b>Memorize Names of Common Molecular Compounds (Notes)</b>	

### Chapter 3: Mass Relationships in Chemical Reactions

Classes	Topics	Suggested Reading	✓	Assignments	✓
1	Atomic Mass., Atomic Mass Unit (amu), Average Atomic Mass and Relative Abundance, Mole, Avogadro's Number, Molar Mass, Conversions between Mass, Mole, and Molar Mass $\left(n = \frac{m}{M}\right)$	3.1 Atomic Masses (pg. 80 – 81) 3.2 Avogadro's Number and Molar Mass of an Element (pg. 81 – 85) 3.3 Molecular Mass (pg. 85 – 87)		pg. 110 #5, 7, 8 pg. 110 #13 to 22  pg. 110–111 #24, 25, 26, 28, 30	
2	Mass Spectrometer, Mass Percent, Determination of Empirical Formulas and Molecular Formulas and Hydrates, Chemical Reactions, Reactants, Products, Coefficients, Classifying and Balancing Different Types of Chemical Reactions (Composition, Decomposition, Single and Double Replacements, Hydrocarbon Combustion)	3.4 The Mass Spectrometer (pg. 88) 3.5 Percent Composition of Compounds (pg. 88 – 92) 3.6 Experimental Determination of Empirical Formulas (pg. 92 – 94) 3.7 Chemical Reactions and Chemical Equations (pg. 94 – 99)		pg. 111–112 #40 to 54 (even)  pg. 112 #59, 60	
3	Stoichiometry, Mole Ratio, Gravimetric Stoichiometry, Excess and Limiting Reagents Calculations, Reaction Yield	3.8 Amounts of Reactants and Products (pg. 99 – 103) 3.9 Limiting Reagent (pg. 103 – 106) 3.10 Reaction Yield (pg. 106 – 107)		pg. 112–113 #63, 64 to 78 (even) pg. 114 #81 to 86 pg. 114–118 #90, 92, 94, 95, 96, 98, 142, 148	
5	<b>Chapter 1 to 3 Quiz (September 13, Friday)</b>				

## Chapter 4: Reactions in Aqueous Solutions

Classes	Topics	Suggested Reading	✓	Assignments	✓
1	Aqueous Solutions, Dissociations, Hydration, Strong and Weak Electrolytes, Nonelectrolytes, Reversible Reactions, Solute, Solvent, Solubility, General Rules for Solubility, Precipitation, Strong and Weak Acids and Bases, Metathesis Reactions, Molecular Equations, Complete Ionic Equations, Net-Ionic Equations	4.1 General Properties of Aqueous Solutions (pg. 122 – 124) 4.2 Precipitation Reactions (pg. 124 – 128)		pg. 160–161 #1 to 14  pg. 161 #17, 18, 20 to 24; pg. 166 #127, 132  <b>Memorize Table 4.2 (Solubility Rules) on pg. 125</b>	
2	General Properties of Acids and Bases, Brønsted-Lowry Acids and Bases, Hydronium ion, Acid-Base Neutralizations, Acid Decompositions to Gases, Molarity or Molar Concentration $\left( C = \frac{n}{V} \right)$ , Dilution ( $C_1V_1 = C_2V_2$ ) and Dilution Technique, Pipet, Volumetric Flask	4.3 Acid-Base Reactions (pg. 129 – 134) 4.5 Concentration of Solution (pg. 147 – 151)		pg. 161–162 #26, 27, 28, 30 to 34 pg. 163 #58, 60, 62, 64, 66, 67, 70, 72, 74	
3	Predicting Amounts of Precipitate Produced or Minimum Limiting Reagent Needed, Neutralization, Volumetric Analysis, Indicator, Equivalence (Stoichiometric) Point, Endpoint, Titration Technique, Titrant, Analyzed, Using Burets	4.6 Gravimetric Analysis (pg. 151 – 153) 4.7 Acid-Base Titrations (pg. 153 – 156)		pg. 163 #76, 78, 80 pg. 164 #82, 84 to 86, 88; pg. 166 #128; pg. 167 #145 to 148	
4	<b>Lab Safety Quiz (September 11, Wednesday)</b>	Lab Safety Video			
5	<b>Lab Activity #1: Acid and Base Titration Revisit</b>	Lab Activity #1 Procedure		<b>Lab Activity #1 Questions (Due with Chapter 4 Homework)</b>	
6 & 7	<b>Lab #1: Separating a Synthetic Pain Relief Mixture to Resolve Consumer Complaints (September 18 and 20, Wednesday and Friday)</b>	Lab #2 Procedure		<b>Lab #1 Report Due (October 8, Tuesday)</b> <b>*Due with Lab #2 Report</b>	
8 & 9	<b>Lab #2: Gravimetric Analysis of Hard Water (September 24 &amp; 25, Tuesday &amp; Wednesday)</b>	Lab #2 Procedure		<b>Lab #2 Report Due (October 8, Tuesday)</b>	
10	<b>Unit 1 Test (September 27, Friday) (covers Chapters 1 to 4)</b>				