



Hercules High School

Course Syllabus: AP Chemistry 2015-2016

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What are we going to learn this year?

Unit	Dates: No. of Instructional Days	Unit Title	Chapters	Topics Covered	Big Idea(s)	Aligned Labs
1	Aug.17-28 10 days	Fundamentals of Chemistry	1,2,3	<ul style="list-style-type: none">❖ Scientific Method❖ Classification of Matter❖ Nomenclature❖ Mole Concept❖ Empirical and Molecular Formula❖ Balancing Equations❖ Stoichiometry❖ Limiting Reagents❖ Theoretical and % Yield	1,2	<ul style="list-style-type: none">❖ Math & Measurement in Science (SP.2)❖ Physical and Chemical Properties❖ Stoichiometry Lab (SP.2)
2	Aug.30-Sept. 11 9 days	Types of Chemical Equations	4	<ul style="list-style-type: none">❖ Electrolytes and Properties of water❖ Molarity❖ Precipitation Reactions and Solubility❖ Acid/Base Reactions and Formation of Salt by Titration❖ Oxidation Numbers❖ Balancing Redox	2,3	<ul style="list-style-type: none">❖ pH Titration Lab (SP. 5)❖ Bleach Lab (SP)2
3	Sept. 14-25 10 days	Types of Reactions	3	<ul style="list-style-type: none">❖ Conservation of mass❖ Redox and Single Replacement❖ Double Replacement Reactions❖ Combustion Reactions❖ Addition/❖ Synthesis❖ Decomposition	3	<ul style="list-style-type: none">• Copper Reactions Lab (SP.1)• Zn/I₂ Lab

4	Sept.28- Oct .9 10 days	Gas laws		<ul style="list-style-type: none"> • General Gas laws • Dalton's Law • Gas Stoichiometry • Graham's Law • Kinetic Theory • Real Gases 	2	<ul style="list-style-type: none"> • Molecular Mass of a Volatile Liquid (SP.5)
5	Oct.12-23 9 days	Thermochemistry	4,13.1-4	<ul style="list-style-type: none"> • Law of Conservation of Energy, Work and Internal Energy • Endo/Exothermic Reactions • Energy Diagrams • Calorimetry • Hess's Law • Heat of Formation/Combustion • Bond Energies 	5	<ul style="list-style-type: none"> • Hess's Law Lab (SP.7)
6	Oct.26- Nov.6 10 days	Atomic Structure and Periodicity	5,19.2-5	<ul style="list-style-type: none"> • Electron Configurations and Aufbau Principle • Periodic Trends • Properties of Light and Study of Waves • Atomic Spectra of Hydrogen and • Energy Levels • Quantum Theory • Electron Orbitals • Spectroscopy (Mass, Photoelectron) 	1,2	<ul style="list-style-type: none"> • Spectroscopy Lab (SP.5)
7	Nov.9-26 13 days	Chemical Bonding	6	<ul style="list-style-type: none"> • Lewis Structures • Resonance and Formal Charge • Polarity and Dipole Moments • VSEPR Models • Molecular Geometry • Hybridization • Molecular Orbitals and Diagrams 	2,3	<ul style="list-style-type: none"> • Bonding Lab (SP.3)

8	Nov. 30- Dec.4 6 days	Liquids, Solids and Solutions	7	<ul style="list-style-type: none"> • Ionic Bonding • Hydrogen Bonding • London Dispersion Forces • Dipole-Dipole Forces • PhaseDiagrams/ Changes • Heating/Cooling Curves • Vapor Pressure 	2	<ul style="list-style-type: none"> • Solution Preparation Lab (SP.4) • Vapor Pressure of Liquids Lab (SP.2)
9	Dec.7-18 9 days	Kinetics	8,9	<ul style="list-style-type: none"> • Rates of Reactions • Factors that affect rate • Rate Constants • Rate Laws • Reaction Order • Mechanism • Boltzmann Distribution • Activation Energy 	4	<ul style="list-style-type: none"> • Determining order of a Reaction (SP.1)
10	Jan.4-15 10 days	General Equilibrium		<ul style="list-style-type: none"> • Dynamic Equilibrium • Le Chatelier's Principle • Equilibrium Constant (K_c) 	6	<ul style="list-style-type: none"> • Determination of K_c with varied initial concentrations (SP.2)
11	Jan.18-29 9 days	Acids and Bases	10,11	<ul style="list-style-type: none"> • Definition of Acids/Bases • K_w and pH scale • Strong and Weak Acids/Bases • Polyprotic Acids • pH of Salts • K_a, pK_a, pH, pOH • Titration 	2	<ul style="list-style-type: none"> • Types of Titration (SP.3)
12	Feb.1-12 10 days	Buffers, K_{sp} , and Titrations	14	<ul style="list-style-type: none"> • Characteristics and Capacity of Buffers • Titration and pH Curves • Indicators • pH and Solubility • K_{sp} 	2,3	<ul style="list-style-type: none"> • Preparation of a Buffer (SP.7)
13	Feb-22- March 18 10 days	Thermo- dynamics	15,16,17	<ul style="list-style-type: none"> • Laws of Thermodynamics • Spontaneity 		<ul style="list-style-type: none"> • Solubility and Energy of Calcium

				<ul style="list-style-type: none"> • Entropy • Free Energy • Energy and Equilibrium • Rate and Spontaneity 	5	Hydroxide (SP.2)
14	Mar.21-31 7 days	Electrochemistry		<ul style="list-style-type: none"> • Balancing Redox Equations • Voltaic and Electrolytic Cells and Voltage • Spontaneous and non-spontaneous equations • Chemical Applications 	3	<ul style="list-style-type: none"> • Designing an electrolytic cell with CuSO_4 and AgNO_3 (Sp.6)
15	April 1 to May 1	AP Chemistry Exam Review	All Chapters	<ul style="list-style-type: none"> • All topics covered in Units 1-14 	1-6	
16		Final AP Chemistry Project	N/A	<ul style="list-style-type: none"> • All topics covered in Units 1-14 	1-6	