

Prescott Unified School District Instructional Guide

2015-2016 Chemistry 1-2 Ford

Time Block	Unit	Content	Skills	Standards	Assessments/Labs
Weeks One/Two	Introduction to Chemistry	Lab Safety Algebra Review Major Areas of Chemical Study	Demonstrate safe and ethical procedures and behavior in all lab (inquiry) activities Experimental design: hypothesis, observations, variables, data, analysis, conclusion. Research project chemistry in the real world. ELA: Identify real world applications of various areas of chemistry by reading a peer reviewed text and citing specific evidence that supports the scientist's claims.	S1C1PO1-4 S1C2PO1-4 <ul style="list-style-type: none"> ● Balances ● Qualitative observations S2C1PO1,3, 4 S2C2PO3 ELA 10-11.RST.1	Safety Exam- 25 multiple choice, 10 true/false questions. Safety Contract Mystery Powder Lab
Week Three/Four	Matter and Change	Extensive & Intensive Properties Chemical and Physical Properties Substances/Compounds	Categorize a sample of matter into various categories. Identify a physical versus a chemical changes and properties. Identify a chemical change regarding color, gas, precipitate, and the law of the conservation of energy.	S5C1PO1,2 S5C1PO4 S5C4PO1,2	Cumulative Quiz Physical vs. Chemical Changes Lab Vocabulary Activity
Weeks Five/Six/Seven	Measurement	Scientific Notation Accuracy/Precision/Percent Error Significant Figures: Rounding, Addition, Subtraction, Multiplication, Division, and total in a number. SI Units: <u>Volume</u> , length, mass, joule, temperature, and time. Dimensional Analysis with SI Units Density Calculations	Distinguish among accuracy, precision, and the error of a measurement. Construct conversion factors from equivalent measures. Calculate the density of a material using experimental data.	S1C2PO3 <ul style="list-style-type: none"> ● Glassware measurements ● Thermometers S1C2PO1,5 <ul style="list-style-type: none"> ● Graph density S1C3PO4,6 <ul style="list-style-type: none"> ● Sample size/trials ● Average data S5C1PO1,2 S5C4PO2	Cumulative Quiz Significant Figures and Measurements Lab Density Quick Lab - With multiple trials to find average and discuss sample size/trials Graph density versus substance after sharing data as a class. Lab- Zinc Coating Thickness
Weeks Eight/Nine	Atomic Structure	History of the atom: Democritus, Dalton, Rutherford, Millikan, Goldstein, Chadwick	Describe the locations and parts of the atom. Determine the number of protons, electrons, and neutrons in an atom, isotope, or ion.	S5C1PO1,2,6,7 S2C1PO2 S1C2PO1,5	Cumulative Quiz History of the Atom Children's Book or Video Cadium Lab

		<p>Distinguishing between atoms, ions, and isotopes.</p> <p>Average Atomic Mass Atomic Number Mass Number</p> <p>Atomic Models: parts of the atom up to Rutherford</p>	<p>Explain what makes atoms, ions, and isotopes different from each other.</p> <p>Calculate the average atomic mass of an element.</p> <p>ELA: Follow the procedures for the Candium lab in order to calculate the average atomic mass for the compound.</p> <p>Technology: Create an online children's book or a video and post it to youtube to share with the class.</p>	<p>ELA 11-12.RST.3</p> <p>TECH S1C3PO1,2</p>	
--	--	--	---	--	--

Time Block	Unit	Content	Skills	Standards	Assessments
Weeks 1 & 2	Quantum Mechanical Model	Bohr's Model of the atom Schrodinger: Quantum Mechanical Structure and Organization Electron Configuration Frequency and Wavelength Atomic Emission Spectrum	Describe energies and positions of electrons according to quantum mechanical model. Create the electron configuration and electron diagram of an element using the Aufbau principle and Hund's rule. Describe the relationship between wavelength, frequency, and electron energies. ELA: Summarize a peer reviewed article regarding the impacts of a compound on the environment using words, pictures, or diagrams.	S5C1PO1,2,3,6,7,8 S5C5PO2,3,7 S2C1PO2 S1C2PO4,5 ELA 11-12.RST.2	Cumulative Quiz Flame Test Lab
Week 3	Periodic Trends	Trends in the periodic table based on electron configuration. Location of groups on the periodic table.	Locations of types of elements on the periodic table. Describe trends among elements for atomic radii, ionic radii, electronegativity, and ionization energy. Technology: Communicate information about the location of certain elements and their characteristics on edmodo to each student.	S5C1PO1,2,3 TECH S2C1PO2	Make your own periodic table Cumulative Quiz
Weeks 4, 5, & 6	Naming Ions Ionic Compounds Creating and their Characteristics Polyatomic Ions Metallic Bonding	Ionic Bonds Ionic Compound Characteristics Bonding in Metals	Describe how cations and anions form Naming cations, anions, and ionic compounds with transition metals and polyatomic ions. Naming acids and bases Explain how the octet rule applies to atoms of metallic and nonmetallic elements Describe properties of ionic compounds and how they dissolve in water. Discuss uses and applications of alloys (metallic bonds)	S5C1PO1,2,3,5,6,8 S5C4PO4,7	Forming Ionic Compounds Lab Cumulative Quiz
Week 7, 8, & 9	Covalent Bonding	Molecular compounds Naming molecular compounds Covalent Bonding VSPER Theory Polar Bonds and Molecules Intermolecular Forces	Describe how electrons are shared to form covalent bonds. Describe and apply VSPER Theory to predicting the shapes and bond angles of molecular compounds. Identify a polar bond and a polar molecule. Evaluate the strength of intermolecular attractions compared to the strength of intramolecular attractions. Apply a naming flowchart to various chemical compounds. ELA: Read two scientific articles about covalent bonding in society. Compare each author's perspective and purpose for the	S5C1PO1,2,3,5,6,8 S5C4PO4,7 ELA 11-12.RST.6	Cumulative Quiz VSPER Theory Lab Building Molecules Lab Exam-Molecular Geometry and Inorganic Nomenclature

			text. Compare the physical and chemical processes included in each article. Analyze the strengths and weaknesses of the ideas based on the information included. Explain why the authors included the information. Identify other information that may be important to discuss in the article.		
--	--	--	--	--	--

Time Block	Unit	Content	Skills	Standards	Assessments
Weeks 1, 2, & 3	Chemical Quantities	Mole - Representative Particles Relationships Mole-Mass Relationships Mole-Volume Relationships Percent Composition and Empirical/Molecular Formulas	Calculate and convert molar quantities to masses, representative particles, and volumes of gas at STP conditions Interpret and calculate empirical and molecular formulas ELA: Follow written instructions in order to complete the empirical formula of a hydrate lab including heating a substance and using standard laboratory procedures.	S5C4PO3,5,6 S1C1PO1-4 S1C2PO1-4 <ul style="list-style-type: none"> Heating substances Qualitative and Quantitative observations ELA 11-12.RST.3	Cumulative Quiz Percent Water in a Hydrate and Empirical Formula of the Hydrate
Weeks 4 & 5	Chemical Reactions	Predicting products of chemical reactions Types of Chemical Reactions Products Reactions in Aqueous Solutions	Describe synthesis, decomposition, double replacement, single replacement and combustion reactions. Conservation of energy in a chemical reaction. Predict products of synthesis, decomposition, double replacement, single replacement and combustion reactions. Describe the information in a complete and net ionic equations. Technology: Identify the major types of chemical reactions and examples of each online. Find a valid source explaining each and showing an example of each. Defend the validity of each website.	S5C4PO1,3,9 S5C3PO3 S1C2PO4,5 TECH S3C1PO1,2 TECH S3C2PO1,2,3,4,5	Cumulative Quiz Types of Chemical Reactions Two Day Lab
Weeks 6, 7, & 8	Stoichiometry	Quantitative Relationships in Chemical Reactions Stoichiometric Calculations Limiting Reactant, Excess Reactant, and Percent Yield	Construct mole ratios from balanced chemical equations and apply these ratios to stoichiometric calculations Identify and use limiting reactants to calculate the maximum amount of products produced and the amount of excess reactant in a specific reaction Calculate the theoretical yield and apply to determine the percent yield of specific chemical reactions	S5C1PO1,2 S5C3PO1,3,4 S5C4PO1,3,8,9	Cumulative Quiz Percent Yield Lab Lab Report Sheet-Moles, Mass and Stoichiometry Lab Report Sheet-Limiting Reactants and Percent Yield
Week 9	States of Matter	Gases Liquids Solids Changes of State Phase Diagrams	Describe the assumptions of the kinetic theory as it applies to gases, liquids, and solids Identify the conditions for various phase changes Interpret a phase diagram	S5C1PO1 S5C3PO1,7 S5C5PO1,4 S5C4PO7,11 ELA 11-12.RST.4	Cumulative Quiz States of Matter Quick Activity

			ELA: Read and interpret a phase diagram in order to determine the phase change occurring when crossing a line from high pressure to low pressure or high temperature to low temperature.		
--	--	--	--	--	--

Time Block	Unit	Content	Skills	Standards	Assessments
Weeks 1 & 2	Gas Laws	Properties of Gases Gas Laws Gases: mixtures and movements	Describe the relationships between temperature, volume, and pressure of a gas according to the gas laws. Use combined gas law to solve quantitative problems. Use ideal gas law to solve quantitative problems. Explain how molar mass of a gas affects the rate at which a gas diffuses and effuses. ELA: Identify real world applications of various areas of chemistry by reading a peer reviewed text and citing specific evidence that supports the scientist's claims. Technology: Use a Phet simulation to test the interdependence of pressure, temperature, and volume.	S5C1PO1,2 S5C3PO6 S5C5PO1,4,5 ELA 10-11.RST.1 TECH S1C1PO1 TECH S1C2PO1,2,3	Cumulative Quiz Lab Report Sheet-Gas Laws and Stoichiometry Collecting a Gas Over Water Lab
Weeks 3 & 4	Solutions	Properties of Solutions Concentrations of Solutions Calculations involving Colligative properties	Solve calculations based on molarity, molality, mole fraction, %m/m, %m/v, %v/v concentrations Solve freezing point depression, boiling point elevation, and vapor pressure lowering problems.	S5C4PO4,7,8	Cumulative Quiz Making a Molar Solution and Dilution Lab
Weeks 5, 6, & 7	Thermochemistry	Measuring and expressing enthalpy changes for a chemical reaction or phase change Hess' Law Calorimetry	Solve enthalpy calculations in reactions involving heats of reaction and when a substance goes through phase changes Explain how energy, heat, and work are related Complete Calorimetric Calculations ELA: Follow the procedures for collecting calorimetric measurements of matter, paying attention to the safety precautions and type of preparation needed to test a variety of different types of matter.	S5C3PO1,2,3,4,5 S5C4PO8 S5C5PO1,6 S5C3PO1,2,3,4 S5C4PO8,10 ELA 11-12.RST.3	Cumulative Quiz Hess' Law Practice Problem Food Calorimetry Lab Report Sheet -Specific heat of metal
Week 8	Reaction Equilibrium	Progress of Chemical Reactions Reversible Reactions and Equilibrium	Identify relative rates of chemical reaction if equilibrium is manipulated. Describe how the amounts of products and reactants change in a chemical system at equilibrium. Apply Le Chatelier's Principle to systems in equilibrium	S5C1PO1,2 S5C2PO1 S5C4PO11	Cumulative Quiz Equilibrium Lab
Week 9	Acids & Bases	Acid-Base Theories Hydrogen Ions and Acidity Strengths of Acids and Bases Neutralization Reactions	Compare and contrast acids and bases as defined by Arrhenius, Bronsted-Lowry, and Lewis theories Calculate pH and pOH values based on concentrations Explain and apply the technique of titration to neutralization reactions	S5C4PO12	Cumulative Quiz Acid-Base Intro Activity pH and pOH titration Lab

		Titrations			What is the pH of the Acid? Lab
--	--	------------	--	--	------------------------------------