SASD Curriculum Map Content Area:__Science____ Course:___Chemistry___

UNIT Title/Focus	Review of Measurement	TIME OF YEAR/LENGTH *(E.G. Oct-Nov/3 weeks)*	September/3days-1week
DRIVING QUESTION(S)	**What are the accepted rules for measurement in Chemistry?** **Which numbers are important to report and how do we know when an correct and acceptable measurement has been made?** **How can we identify the characteristics of errors in measurement and what are they?**		
CONTENT VOCABULARY	**Metric system, S.I. Units, conversions, significant figures, base units, mass, volume, time, density, temperature, scientific notation, conversion factor, accuracy, precision, percent error, beaker, graduated cylinder, funnel, Bunsen burner, stirring rod, policeman, scoopula, clay triangle, crucible, erlenmayer flask, ring stand, buret, buret clamp, test tube, test tube clamp, pipet**		

TOPIC	ELIGIBLE CONTENT/ STANDARDS	OBJECTIVES	ASSESSMENT	RESOURCES
Measurement and conversions	Core Reading/Writing R:CC.3.5.11-12.C. R: CC.3.5.11-12.D W: CC.3.6.11-12.F.	- Students will recognize common metric/S.I. units and what they represent - Students will be able to use correct procedure in converting from one unit to another -Students will be able to explain the meaning of conversion factors and to develop their own	Quiz and laboratory work	Calculator, Laboratory equipment Textbook Projector
Significant figures	C: CHEM.A.1.1.3 R: CC.3.5.11-12.D	- Students will know the significant figure rules - Students will be able to correctly apply the rules in mathematical operations and to individual numbers	Quiz	Calculator Textbook Projector
Scientific notation	R: CC.3.5.11-12.B. R: CC.3.5.11-12.D	-Students will be able to explain the purpose and usefulness of scientific notation in their own words. -Students will be able to convert numbers to and from scientific notation	Quiz	Calculator Textbook Projector
Accuracy and precision	R: CC.3.5.11-12.D	-Students will be able to define accuracy and precision -Students will be able to identify accuracy and precision in sets of data -Students will be able to suggest types and sources of error from the accuracy and precision of sets of data and explain why they made these choices.	Quiz	Laboratory equipment Textbook Projector
Safety	R: CC.3.5.11-12.I. R: CC.3.5.11-12.D R: CC.3.5.11-12.C.	Students will be able to -Identify Safety hazards in the laboratory -List common safety rules for the laboratory -Analyze case-study scenarios involving safety issues and recommend courses of action to rectify these issues	Quiz Constant Observation in laboratory Laboratory Assignment	Safety acknowledgement sheet Projector

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Unit 2:

UNIT Title/Focus	**Features of the Periodic Table and Review of atomic structure**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**September/ 1.5-2 weeks**
DRIVING QUESTION(S)	**What information does the periodic table contain?** **How can the numbers of protons, electrons, and neutrons in each element be determined using the periodic table?** **What special groups exist in the periodic table?**		
CONTENT VOCABULARY	**Period, group, alkali metals, alkaline earth metals, transition metals, halogens, noble gases, lanthanides, actinides, element, atom, isotope, ion, proton, neutron, electron, atomic number, mass number, ionic charge, valence electrons, metal, metalloid, nonmetal, electronegativity, atomic radius, ionic radius, electron affinity, periodic trends**		

TOPIC	**ELIGIBLE CONTENT/ STANDARDS**	**OBJECTIVES**	**ASSESSMENT**	**RESOURCES**
Structure of the atom	Core Reading/Writing R: CC.3.5.11-12.D	Students will be able to - identify the particles that comprise the atom. - explain the structure of the atom in terms of the electrical forces between its particles - explain the relative size of the atoms in terms of real world analogies	Quiz	Periodic table Textbook Projector
Organization of the periodic table	C: CHEM.A.2.1.2 CHEM.A.2.2.2 R: CC.3.5.11-12.D	Students will be able to - Identify the number of protons, neutrons, and electrons an element has - Identify the special group and element is a member of, the element's state of matter at room temperature, and the element's identity as a metal, nonmetal, or metalloid using the periodic table	Quiz	Periodic table Textbook Projector
Calculations involving the periodic table	C: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to - Determine the number of neutrons a specific isotope of an element has - Calculate the number of electrons in an ion - Determine the number of valence electrons and element has from its position on the periodic table	Quiz	Periodic table Textbook Projector
Periodic Trends	C: CHEM.A.2.3.1 CHEM.A.2.3.2 CHEM.CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to - Define the terms atomic radius, ionic radius, electron affinity, electronegativity, and ionization energy - Compare and explain the periodic trends in atomic radius, ionic radius, electron affinity, electronegativity, and ionization energy	Quiz	Periodic table Textbook Projector

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Unit 3:

UNIT Title/Focus	**Chemical Formulas and Compounds**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**September-October/ 2-2.5 weeks**
DRIVING QUESTION(S)	**What are the rules for naming ionic compounds and writing their formulas?** **What are the rules for naming covalent compounds and writing their formulas?** **What are the rules for naming acids and writing their formulas?**		
CONTENT VOCABULARY	**Ionic compound, cation, anion, polyatomic ion, ionic charge, covalent compound, covalent prefixes, acid, base, oxyacid, binary acid**		

TOPIC	ELIGIBLE CONTENT/ STANDARDS	OBJECTIVES	ASSESSMENT	RESOURCES
Naming and writing formulas of ionic compounds	Core CHEM.A.1.1.5 Reading/Writing R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to - write the names of ionic compounds from their formulas. - write the formulas of compounds from their names. - explain the bonding in ionic compounds in terms of ionization and electrical attraction.	Quiz, homework project	Periodic table, reference list of polyatomic ions Textbook Projector
Naming and writing formulas of covalent compounds	CHEM.A.1.1.5 R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to - write the formulas of covalent compounds from their names - write the names of covalent compounds from their formulas - recognize the difference between ionic and covalent compounds on inspection.	Quiz, homework project	Periodic table Textbook Projector
Naming and writing formulas of acids	C: CHEM.A.1.1.5 R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to - write the formulas of acids from their names - write the names of acids from their formulas - explain the difference between the two types of acids and their naming conventions	Quiz	Periodic table Textbook Projector

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Unit 4:

UNIT Title/Focus	Chemical Equations and Reactions	TIME OF YEAR/LENGTH *(E.G. Oct-Nov/3 weeks)*	October/ 2.5 Weeks
DRIVING QUESTION(S)	**What is the correct way to write a chemical reaction?** **What are the different types of chemical reactions?** **How do we know what the products of a chemical reaction will be?**		
CONTENT VOCABULARY	**Chemical reaction, reactants, products, chemical equations, coefficient, synthesis reaction, combustion reaction, decomposition reaction, single-replacement reaction, double-replacement reactions, precipitate, solvent, aqueous solution, complete ionic equation, spectator ions, net ionic equations,**		

TOPIC	ELIGIBLE CONTENT/ STANDARDS	OBJECTIVES	ASSESSMENT	RESOURCES
Writing chemical equations from formulas and balancing chemical equations	Core C: CHEM.B.2.1.5 Reading/Writing R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to: - Translate a word equation into a formula equation - Write a word equation and formula equation given a description of a chemical reaction - Balance a formula equation	Quiz/Test	Textbook Projector
Types of reactions	C: CHEM.B.2.1.3 CHEM.B.2.1.4 R: CC.3.5.11-12.D CC.3.5.11-12.C.	Students will be able to: - Define and give general equations for composition, decomposition, single-replacement, and double-replacement reactions - Classify a reaction as one of the types listed above - Identify the type of reaction and predict the products of a reaction when given the reactants - Explain the significance of an activity series	Quiz/Test Laboratory Assignment	Textbook Projector
Complete ionic equations and Net ionic equations	R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to: - Write a complete ionic equation and a net ionic equation given a description of a chemical reaction - Identify spectator ions in chemical reactions in aqueous solution - Explain the interaction and behavior of ions in aqueous solution	Quiz/Test	Textbook Projector

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Unit 5:

UNIT Title/Focus	Electrons in Atoms	TIME OF YEAR/LENGTH *(E.G. Oct-Nov/3 weeks)*	October-November/ 2.5 Weeks
DRIVING QUESTION(S)	**How are electrons arranged in atoms?** **How do electrons change positions in the atom?**		
CONTENT VOCABULARY	**Electromagnetic radiation, wavelength, frequency, amplitude, electromagnetic spectrum, quantum, Planck's constant, photoelectric effect, photon, atomic emission spectrum, ground state, De Broglie wavelength, de Broglie equation, Heisenberg Uncertainty principle, atomic orbital, principal quantum numbers, principal energy levels, energy sublevels, electron configuration, Aufbau principle, Pauli exclusion principle, Hund's rule, valence electrons, electron configuration**		

TOPIC	ELIGIBLE CONTENT/ STANDARDS	OBJECTIVES	ASSESSMENT	RESOURCES
Introduction to Electromagnetic Radiation	Core Reading/Writing R: CC.3.5.11-12.D	Students will be able to: - Describe the wave-particle duality concepts of light - Explain the relationships among velocity, wavelength, and frequency of electromagnetic radiation mathematically - Perform multi step calculations involving the above	Quiz/Test	Textbook Projector
Emission and Absorption Spectra and Atomic Energy levels	C: CHEM.A.2.2.4 R: CC.3.5.11-12.D CC.3.5.11-12.C.	Students will be able to: - Explain the different energy levels of atoms in terms of electron transitions and gains and losses of energy - Define the importance of emission and absorption spectra - Calculate emitted or absorbed amounts of energy in electron transitions - Describe what happens to electrons and their energies in specific transitions	Quiz/Test Laboratory Assignment	Textbook Projector
The Quantum Mechanical Atom and electron configuration	C: CHEM.A.2.2.1 **R:** CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to: - List the four Quantum numbers and describe their relationships to the atomic orbitals - Describe the orbital composition of each energy level and list the number of electrons - Write electron configurations of atoms and ions in the periodic table - Determine the identity of an element from its electron configuration - List exceptions to the electron configuration rules and explain the reasons for these exceptions	Quiz/Test	Textbook Projector

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Unit 6:

UNIT Title/Focus	**Chemical Bonding**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**November/ 3 weeks**
DRIVING QUESTION(S)	**What are the types of chemical bonds between atoms?** **What do molecules look like and how are their electrons arranged?**		
CONTENT VOCABULARY	**Ionic bond, covalent bond, molecule, Lewis structures, sigma bonds, endothermic, exothermic, pi bond, structural formula, resonance, coordinate covalent bond, VSEPR model, hybridization, polar covalent bond, metallic bonding, electron sea model**		

TOPIC	ELIGIBLE CONTENT/ STANDARDS	OBJECTIVES	ASSESSMENT	RESOURCES
Lewis Structures	Core C: CHEM.B.1.4.2 CHEM.B.1.3.3 CHEM.B.1.3.2 Reading/Writing R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to: - Define and differentiate between ionic and covalent bonds - Classify Bonds according to electronegativity differences - State the octet rule and use it to write Lewis Structures - Draw Lewis structures for polyatomic ions or molecules containing single or multiple bonds	Quiz/Test	Textbook Molecular modeling kit Software Projector
VSEPR Theory	C: CHEM.A.1.2.5 R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to: - Explain the postulates of VSEPR theory - Predict the shapes and geometries of molecules and polyatomic ions using VSEPR theory - Explain how molecular shape is accounted for by hybridization - Determine if a molecule is polar or nonpolar	Quiz/Test Model building project	Textbook Molecular modeling kit Software Projector
Metallic Bonding	R: CC.3.5.11-12.D	Students will be able to: - Describe the electron sea model of metallic bonding - Explain why metals shine, and are malleable and ductile	Quiz/Test	Textbook Projector

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Unit 7:

UNIT Title/Focus	**Stoichiometry and the Mole**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**December-January/ 3 weeks**
DRIVING QUESTION(S)	**What is the mole and how is it important to dealing with large numbers of atoms and molecules?** **How can we determine the formula of a compound from experimental data?** **How can we determine how much product we can make or reactant we need for a reaction?**		
CONTENT VOCABULARY	**Avogadro's Number, molar mass, percent composition, empirical formula, molecular formula, hydrate, stoichiometry, mole ratio, limiting reactant, excess reactant, theoretical yield, actual yield, percent yield**		

TOPIC	**ELIGIBLE CONTENT/ STANDARDS**	**OBJECTIVES**	**ASSESSMENT**	**RESOURCES**
The mole	Core Reading/Writing R: CC.3.5.11-12.D	Students will be able to: - Define a mole in terms of Avogadro's number - Convert between moles, mass, and number of atoms - Calculate the average atomic mass for an element - Use the molar mass to convert between moles and grams - Calculate the number of molecules, formula units, or ions in a given molar amount of a compound	Quiz/Test	Textbook Overhead Projector
Mole Calculations: Empirical Formula, Molecular formula	C: CHEM.B.1.2.3 CHEM.B.1.2.1 R: CC.3.5.11-12.I. R: CC.3.5.11-12.D CC.3.5.11-12.C.	Students will be able to: - Define percent composition in terms of mass and moles - Calculate the percent composition of a compound - Calculate the empirical formula of a compound - Calculate the molecular formula of a compound	Quiz/Test Laboratory Assignment	Textbook Projector
Stoichiometry, Limiting reactant, and Percent yield	C: CHEM.B.2.1.1 CHEM.B.2.1.2 R: CC.3.5.11-12.I. R: CC.3.5.11-12.D CC.3.5.11-12.C.	Students will be able to: - Define stoichiometry - Define Mole ratio and describe its role in stoichiometry calculations - Give the mole ratio for any two substances in a chemical equation - Calculate the amount of moles of a reactant or product, given the amount of moles of a different reactant or product - Calculate the mass of a reactant or product, given the mass of a reactant or product - Define limiting reactant and determine the limiting reactant in a reaction - Define theoretical yield and calculate the theoretical yield of the limiting reactant - Define and calculate the percent yield of a product	Quiz/Test Laboratory Assignment	Textbook Software Projector

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Unit 8:

UNIT Title/Focus	**States of Matter**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**January-February/ 2 weeks**
DRIVING QUESTION(S)	**What factors influence the different states of matter and how do these factors influence them?**		
CONTENT VOCABULARY	**Kinetic-molecular theory, elastic collision, temperature, diffusion, effusion, Graham's law of effusion, pressure, barometer, pascal, atmosphere, Dalton's Law of partial pressure, dispersion forces, dipole-dipole forces, hydrogen bond, viscosity, surface tension, surfactants, capillary action, crystalline solid, unit cell, amorphous solid, melting point, vaporization, evaporation, condensation, sublimation, deposition, freezing point, triple point, critical point, phase diagram**		

TOPIC	**ELIGIBLE CONTENT/ STANDARDS**	**OBJECTIVES**	**ASSESSMENT**	**RESOURCES**
Kinetic-Molecular Theory	Core Reading/Writing R: CC.3.5.11-12.D	Students will be able to: - State the postulates of kinetic-molecular theory and describe how it explains some properties of matter - Describe each of the characteristic properties of gases; expansion, low density, fluidity, compressibility, and diffusion - Describe conditions under which a real gas deviates from ideal behavior - State Graham's Law of Effusion and Diffusion and use it to determine the relative rates of effusion of two gases of known molar mass - State Dalton's Law of Partial pressure and use it to calculate partial pressures and total pressures	Quiz/Test	Textbook Projector Software
Intermolecular Forces	R: CC.3.5.11-12.D CC.3.5.11-12.C.	Students will be able to: - Describe dispersion forces, dipole forces, and hydrogen bonding - Explain the effects of intermolecular forces based on their relative strengths - Use intermolecular forces to explain observable phenomenon in various atoms and molecules	Quiz/Test Laboratory Assignment	Textbook Projector Software
Phase Diagrams, solid, and liquids	R: CC.3.5.11-12.D	Students will be able to: - Interpret phase diagrams - Explain and predict observations of substances based on changes in temperature and pressure - Discuss properties of liquids and solids in terms of particle models and intermolecular forces - Distinguish crystalline and amorphous solids	Quiz/Test	Textbook Projector

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Unit 9:

UNIT Title/Focus	Gases	TIME OF YEAR/LENGTH *(E.G. Oct-Nov/3 weeks)*	February/ 2 weeks
DRIVING QUESTION(S)	**How do the properties of gases affect each other and how can we apply kinetic molecular theory to explain them and perform calculations?**		
CONTENT VOCABULARY	**Boyle's law, Charles' Law, Gay-Lussac's Law, combined gas law, ideal gas law, Avogadro's principle, molar volume, standard temperature and pressure (STP), ideal gas constant**		

TOPIC	ELIGIBLE CONTENT/ STANDARDS	OBJECTIVES	ASSESSMENT	RESOURCES
Specific relationships In gas laws	Core C: CHEM.B.2.2.1 CHEM.B.2.2.2 Reading/Writing R: CC.3.5.11-12.D	Students will be able to: - State Boyle's Law and use it to calculate volume-pressure changes at a fixed temperature - State Charles' Law and use it to calculate volume-temperature changes at a fixed pressure - State Gay-Lussac's Law and use it to calculate pressure-temperature changes at a fixed volume. - Use the combined gas law to calculate volume-temperature-pressure changes - Define STP - Discuss the meaning of absolute zero temperature and use Kelvin temperatures in calculations - Explain how Gay-Lussac's Law and Avogadro's principle apply to the volumes of gases in chemical reactions	Quiz/Test	Textbook Projector Software
The ideal Gas law	R: CC.3.5.11-12.I. R: CC.3.5.11-12.D	Students will be able to: - State the ideal gas law - Use the ideal gas law to calculate pressure, volume, temperature, moles of gas, density and molar mass of a gas - Use a chemical equation to specify volume ratios for gaseous reactants and/ or products - Use volume ratios to solve stoichiometry problems involving volumes, masses, or molar amounts	Quiz/Test	Textbook Projector

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Unit 10:

UNIT Title/Focus	**Solutions**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**February-March/ 3 weeks**	
DRIVING QUESTION(S)	**What are solutions like at the molecular level and how can we describe their behavior at that level?**			
CONTENT VOCABULARY	**Soluble, insoluble, immiscible, miscible, solvation, heat of solution, solubility, saturated solution, unsaturated solution, supersaturated solution, Henry's Law, concentration, Molarity, molality, mole fraction, dilution, colligative properties, vapor pressure lowering, boiling point elevation, freezing point depression, osmosis, osmotic pressure, colloid, suspension, Tyndall effect, Brownian Motion,**			
TOPIC	**ELIGIBLE CONTENT/ STANDARDS**	**OBJECTIVES**	**ASSESSMENT**	**RESOURCES**
Introduction to Solutions	Core CHEM.A.1.2.1 Reading/Writing R: CC.3.5.11-12.D.	Students will be able to: - Distinguish between heterogeneous and homogeneous mixtures - Differentiate miscible and immiscible substances	Quiz/Test	Textbook Projector Software
Concentration Units	C: CHEM.A.1.2.4 CHEM.A.1.2.2 R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Define % mass, % volume, molarity, molality, and mole fraction - Solve problems involving % mass, % volume, molarity, molality, and mole fraction and dilution	Quiz/Test Laboratory Assignment	Textbook Projector
Colligative Properties	R: CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Define colligative properties - List 3 colligative properties and describe their causes - Write the expressions for freezing point depression and boiling point elevation and describe their units - Calculate freezing point depression and boiling point elevation and from them, molar mass of a contaminant - Describe osmosis in solution terms - Explain how osmosis can be used to purify and isolate solvents	Quiz/Test Laboratory Assignment	Textbook Projector

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Unit 11:

UNIT Title/Focus	Thermodynamics	TIME OF YEAR/LENGTH *(E.G. Oct-Nov/3 weeks)*	March/ 3-3.5 weeks
DRIVING QUESTION(S)	How can energy and disorder be used to describe the behavior and temperature of chemical systems?		
CONTENT VOCABULARY	Energy, law of conservation of energy, chemical potential energy, heat, calorie, joule, specific heat, calorimeter, system, surroundings, universe, enthalpy, enthalpy of combustion, heat of vaporization, heat of fusion, Hess's law, standard enthalpy of formation, spontaneous process, entropy, law of disorder, free energy,		

TOPIC	ELIGIBLE CONTENT/ STANDARDS	OBJECTIVES	ASSESSMENT	RESOURCES
Introduction to energy concepts	Core Reading/Writing R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Define energy - Define specific heat - Explain the meaning of specific heat in terms of energy lost or gained per some unit - Convert between different energy units - Calculate heat transferred in various processes - Solve calorimetry problems	Quiz/Test Laboratory Assignment	Textbook Projector software
Hess's Law and Standard Enthalpy of Formation	R: CC.3.5.11-12.I. CC.3.5.11-12.D.	Students will be able to: - Explain Hess's Law - Uses Hess's law to calculate enthalpies of reaction by adding reactions together to find an overall reaction - Use Hess's law to calculate standard enthalpies of formation	Quiz/Test	Textbook Projector
Entropy and Free Energy	R: CC.3.5.11-12.I. CC.3.5.11-12.D.	Students will be able to: - Define entropy and free energy - Predict changes in entropy based on given and real-world observations of a system - Define a spontaneous reaction - Calculate free energy for a reaction and determine its spontanaiety	Quiz/Test	Textbook Projector

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Unit 12:

UNIT Title/Focus	**Reaction Rates**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**March-April/ 3-3.5 weeks**
DRIVING QUESTION(S)	**How can we express the rate of a chemical reaction?** **How can we express the rate of a reaction mathematically and use it to make predictions about future reactions?**		
CONTENT VOCABULARY	**Reaction rate, collision theory, activated complex, transition state, activation energy, catalyst, inhibitor, heterogeneous catalyst, homogeneous catalyst, rate law, specific rate constant, reaction order, method of initial rates, instantaneous rate, reaction mechanism, intermediate, rate-determining step**		

TOPIC	**ELIGIBLE CONTENT/ STANDARDS**	**OBJECTIVES**	**ASSESSMENT**	**RESOURCES**
Expressing Reaction Rates	Core Reading/Writing R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Define the rate of a reaction - Express reaction rates in terms of molarity and time - Define the terms rate constant and half life - Explain half-life in terms of a chemical reaction - Express the relationship between the rate constant of a reaction and its half life	Quiz/Test Laboratory Assignment	Textbook Projector
Method of initial Rates	R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Explain why experimental data is needed to determine the rate of a reaction - Write the expression for the rate of a reaction - Explain the method of initial rates - Use the method of initial rates to determine reaction order and exact expression for the rate of a reaction	Quiz/Test Laboratory Assignment	Textbook Projector
Reaction mechanisms	W: CC.3.6.11-12.B CC.3.6.11-12.C. R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Determine the overall reaction from a mechanism consisting of a series of steps - Identify the rate-determining step of a reaction - Write rate expressions for elementary reactions - Design an experiment to collect data on the rates of a reaction	Quiz/Test Laboratory Assignment	Textbook Projector

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Unit 13:

UNIT Title/Focus	**Chemical Equilibrium**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**April/ 3-3.5 weeks**
DRIVING QUESTION(S)	**What is chemical equilibrium and how can it be described in mathematical and linguistic ways?**		
CONTENT VOCABULARY	**Reversible reaction, chemical equilibrium, law of chemical equilibrium, equilibrium constant, homogeneous equilibrium, heterogeneous equilibrium, Le Chatlier's principle, solubility product, common ion effect,**		

TOPIC	**ELIGIBLE CONTENT/ STANDARDS**	**OBJECTIVES**	**ASSESSMENT**	**RESOURCES**
What is equilibrium?	Core Reading/Writing R; CC.3.5.11-12.I. CC.3.5.11-12.D.	Students will be able to: - Define chemical equilibrium - Explain why reactions do not go entirely from reactants to products - Define reverse reaction - Explain equilibrium behavior in terms of kinetic-molecular theory	Quiz/Test	Textbook Software Projector
Calculating equilibrium Constants	R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Determine the equilibrium constant expression for a reaction given the balanced equation - Calculate the equilibrium constant of a reaction from equilibrium concentration data and initial concentrations - Determine the effect on the equilibrium constant of a reaction from changes to the balanced equation - Determine the equilibrium constant of a reverse reaction	Quiz/Test Laboratory Assignment	Textbook Software Projector
Le Chatlier's Principle	R: CC.3.5.11-12.I. CC.3.5.11-12.D.	Students will be able to: - Describe what effects changes in concentration of reactants and products have on the equilibrium of a reaction - Relate the value of the reaction quotient Q to the equilibrium constant k - Predict the future behavior of a reaction based on Q and k	Quiz/Test	Textbook Projector

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Unit 14:

UNIT Title/Focus	**Acids and Bases**	**TIME OF YEAR/LENGTH** *(E.G. Oct-Nov/3 weeks)*	**April-May/ 4-4.5 weeks**
DRIVING QUESTION(S)	**What are acids and bases?** **What reactions do acids and bases participate in?** **How can we describe the structure and behavior of acids and bases?**		
CONTENT VOCABULARY	**Acidic solution, basic solution, Arrhenius Model, Bronsted-Lowry model, Lewis Acid, conjugate acid, conjugate base, amphoteric, strong acid, weak acid, acid ionization constant, strong bases, weak bases, base ionization constant, ion product constant for water, pH, pOH, neutralization reaction, salt, titration, equivalence point, acid-base indicators, end point, salt hydrolysis, buffer capacity,**		

TOPIC	**ELIGIBLE CONTENT/ STANDARDS**	**OBJECTIVES**	**ASSESSMENT**	**RESOURCES**
What are acids and bases	Core Reading/Writing R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - List five general properties of aqueous acids and aqueous bases - Define and give examples of a traditional acid and base, a Bronsted-Lowry acid and base, and a Lewis acid and base - Explain the difference between strong and weak acids and strong and weak bases, and give an example of each - Define and recognize traditional, Bronsted-Lowry, and Lewis acid-base reactions - Define and amphoteric substance and give an example	Quiz/Test Laboratory Assignment	Textbook Software Projector
pH and concentration theory	R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Define pH and give the pH of a neutral solution - Describe the self-ionization of water - Explain and use the pH scale - Calculate pH from acid or base concentration - Write equations for the reactions of acid anhydrides and basic anhydrides with water	Quiz/Test Laboratory Assignment	Textbook Software Projector
Neutralization and acid/base reactions	W: CC.3.6.11-12.B CC.3.6.11-12.C. R: CC.3.5.11-12.I. CC.3.5.11-12.D. CC.3.5.11-12.C.	Students will be able to: - Predict the products of reactions involving aqueous acids, aqueous bases, and oxides - Describe how an acid-base indicator functions - Describe how a buffer functions - Calculate the molarity of a solution from titration data - Design an experiment to calculate the molarity of an unknown acid or base	Quiz/Test Laboratory Assignment	Textbook Software Projector