Teacher: CORE AP Chemistry	
Course: AP Chemistry	Month: All Months

August **Chapters 1, 2, and 3: Introduction to Chemistry**

	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	How can an unknown solution be identified from its physical characteristics?	I. Scientific Method	I. *convert* units into one another using significant figures and proper measurement techniques	*uncertainty*	Lab: Stoichiometric determination of a Precipitate	3.2.12.B.4-Describe conceptually the attractive and repulsive forces between objects relative to their charges and the distance between them.
	What is the difference between pure substances, mixtures, molecules, atoms and ions?	II. Classification and Properties of Matter		*significant figures*	two quizzes leading up to the summative exams. Part 1: common ions, physical and chemical properties, sig figs, temperature and density. Part 2: empirical and molecular formula, and dimensional analysis	
	How can one predict properties based on the placement on the periodic table?	III. Separation Science	II. *classify* matter into its forms of atoms, molecules, ions, pure susbtance and mixtures	*mixtures*		
	How do you determine the limiting reactant and calculate percent yield of an equation?	IV Physical and Chemical Properties		*pure substances*	CH 1-3 Summative Test to be taken approximately two weeks after school begins	

How can units be converted into one another using significant figures?	V. Temperature and Density	III. *calculate* percent error and determine the uncertainty within measurements	*homogeneous*
How do you determine the empirical and molecular formula of a compound?	VI. Empirical and Molecular Formulas		*heterogeneous*
What is the proper use of all Laboratory equipment?	VII. Meet the Elements	IV. *use* stoichiometry to solve problems	*Tyndall effect*
How can the MSDS of a chemical be used to identify safety and health concerns, and proper disposal methods of chemicals?	VIII. Math Review, Significant Figures and Statistal Techniques		*percent error*
	IX. Dimensional Analysis and Proportions	V. *describe* the contributions that atomic scientists have made in the discovery	*solutions*
	X. Units of Measurement and Uncertainty		*dimensional analysis*
	XI. Safety in the Lab	VI. *name and describe* ionic and molecular compounds and *write* formulas for them	*Pauli*
		VII. *determine* the empirical and molecular formulas for compounds	*Hund* *Heisenberg*
		VIII. *write and balance* chemical equations	*Rutherford* *Thomson* *Bohr*

			IX. *compare* the concentration of one substance to another through limiting rstoichiometric relationships X. *discuss and describe* common safety themes in the lab	*Planck* *Chadwick* *moelcular compounds* *ionic compounds* *stoichiometry* *chemical equations* *limiting reactant* *Law of conservation of mass*		

September **Chapter 14: Chemical Kinetics**

	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	How do the concentration, physical nature of reactants, temperature and catalysts affect the reaction rates?	I. Factors that Affect Reaction rates	I-IV. *describe* the factors that affect reaction rates and orders of reaction	*catalysts*	Lab: Decolorization of Crystal Violet	3.2.12.A.1-Compare and contrast colligative properties of mixtures. Compare and contrast the unique properties of water to other liquids.
	How are rates expressed in terms of changes in concentration over time?	II. Concentrations and rates	V. *predict* the reaction mechanism based on elementary steps	*reaction order*	Iodine-Starch Clock Reaction	
	How can the order of a reaction be deduced from epxerimental evidence?	III. Reaction Rates and Orders of Reaction	VI. *discuss* the importance of catalysts on the reaction mechanism	*reaction rate*	two quizzes leading up to the summative: <u>Part 1</u> Relative Rates, Differentiated Rate and Integrated Rates. <u>Part 2</u> Arrenhius Rate and Mechanisms	

	How can a graph give information about the order of a reaction?	IV. Temperature and Rate		*elementary steps*		
	What is the effect of temperature of reaction rate?	V. Reaction Mechanisms		*rate-determining step*	CH 14 Test: Chemical Kinetics	
	How can the elementary steps of a mechanism be predicted based on patterns?	VI. Catalysis		*reaction mechanism*		
	How do catalysts work and what is their effect on the enthalpy diagram and the speed of a reaction?					
October	**Chapter 15: Equilibrium**					
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	How can the position of equilibrium be predicted based on the ratio of products to reactants in a chemical equilibrium?	I. Dynamic Equilibrium and Le Chatelier's principle	I. describe how Le Chatelier's principle is used to determine the shift in reactions	*Le Chatelier's principl*	Lab: Le Chatelier's Principle (Am I Stressed?)	3.1.12.A.8-CHANGE AND CONSTANCY Describe and interpret dynamic changes in stable systems.
	How can the equilibrium constant be calculated from equilibrium expressions?	II. Equilibrium constants and the Law of mass action		*reaction quotient*	one quiz leading up to summative. Equilibrium expression, Reaction Quotient, and LeChatelier's (everything but ICE tables)	3.2.12.A.5-MODELS/PATTERNS Use VSEPR theory to predict the molecular geometry of simple molecules. CONSTANCY AND CHANGE Predict the shift in equilibrium when a system is subjected to a stress.

How does Le Chatelier's Principle predict which direction the reaction will shift according to the stresses placed on an equilibrium reaction?		II. calculate the equilibrium constant and write expressions for various equilibrium processes	*Law of mass action*		
What influence does a catalyst have on the equilibrium position?			*dynamic equilibrium*	CH 15 Test: Chemical Equilibrium	

November **Chapter 10: Gases**

Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
How are the properties of gases different from those of liquids and solids?	I. Characteristics of Gases	I, VI. Describe the postulates of the kinetic molecular theory	*kinetic molecular theory*	Lab: Charles' Law or Boyle's Law	3.2.12.B.4-Describe conceptually the attractive and repulsive forces between objects relative to their charges and the distance between them.
How are pressure units converted into one another?	II. Pressure and different units		*Ideal Gas Law*		
How are all gas laws related to the ideal gas law?	III. The Gas Laws	II. convert between different pressure units, and describe how pressure if affected by the weather	*Boyle's Law*		
How can gases be explained using the postulates of the kinetic moelcular theory?	a. Boyle's Law		*Charles' Law*	CH 10 Test: Gases	
What is the difference between effusion and diffusion?	b. Charles' Law	III. relate gas laws to one another by the Ideal Gas Law	*Combined Gas Law*		

	How can real gases be accommodated for using corrections in the ideal gas law?	c. The Combined Gas Law		*Graham's Law of effusion*		
		d. Graham's Law of Effusion	IV. calculate various quantities using the Ideal Gas Law	*diffusion*		
		e. the Ideal Gas Law (and van der Waals Equation)		*Avogadro's Law*		
		f. Dalton's Law of Partial Pressures	VII-VIII. describe how particles move in relationship to each other and account for unpredicted behavior based on non-ideality	*vand der Waals equation*		
		g. Avogadro's Law IV. Applications of the Ideal Gas Equation V. Mixtures and Partial Pressures VI. Kinetic-Molecular Theory of Gases VII. Moelcular Effusion and Diffusion VIII. Real Gases and Deviations				
December	**Chapter 16: Acids and Bases**					
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	How does Arrhenius and Bronsted and Lowry differentiate between defintions of acids and bases?	I. Properties of Acids and Bases	I-II. *describe* the different types of acids and bases according to different theories	*Arrhenius acids and bases*	Determination of the ionization constant of a weak acid	3.2.12.A.4-Apply oxidation/reduction principles to electrochemical reactions. Describe the interactions between acids and bases.

How does Lewis describe the concept of electron donors and acceptors regarding acids and bases?	II. Arrhenius, Bronsted-Lowry, and Lewis acids and baseds		*Lewis acids and bases*	Acid-Base Titration using pH probes and/or pH papter
How is the pH and pOH of strong acids and strong bases calculated?	III. The Autoionization of Water and Kw	III. *describe* the auto-ionization of water and use the water dissociation constant to calculate hydronium and hydroxide concentrations	*Bronsted-Lowry acids and bases*	
How is the pH and pOH of weak acids and weak bases calculated using Ka and Kb?	IV. the PH scale		*autoionization of water*	
How are formulas for oxy acids, binary acids, hydroxy and hydrogen salts and oxy salts written and named?	V. Strong Acids and Bases: weak Acids, Weak Bases, Ka and Kb	IV. *describe* the pH scale, in terms of logarithmec effects	*water ionization constant*	CH 16 Test: Acids and Bases
How is an acid-base neutralization reaction written?	VI. Acid/Base Properties of Salts		*acid dissociation constant*	
What are the six strong acids and what are the strong bases?	VII. Acid/Base Chemical Structure	V. *determine* the strength of acids and bases using Ka and Kb values	*base dissociation constant*	
How is the acidic nature or basic nature related to the chemical structure of acids and bases?			*salts*	
		VI-VII. *classify* salts as acidic, basic or neutral based on their properties		

January **Chapter 17: Additional Aspects of Aqueous Equilibria**

Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
What effect does a common ion have on the equilibrium position?	I. The Common-Ion Effect	I. determine the shift due to the presence of a common ion in an equilibrium reaction	*common ion effect*	Qualitative Analysis of Cations/Anions	3.2.12.A.4-Apply oxidation/reduction principles to electrochemical reactions. Describe the interactions between acids and bases.
How do buffers resist changes in pH and how can buffer calcualtions be quantified using the Henderson-Hasselbach equation?	II. Buffers and Buffer Calculations using the Henderson-Hasselbach equation		*Henderson-Hasselbach equation*	Determination of the Concentration of a Polyprotic Acid	
How is an acid-base titration performed and how can a titration curve be analyzed?	III. Acid-Base Titrations and the Equivalence Point vs. Endpoint	II. calculate the concentration of species in a buffer by using the Henderson-Hasselbach equation	*buffer*	CH 17 test: Additional Aspects of Aqueous Equilibria	
How can pH curves indicate the type of neutralization between acids and bases?	IV. Solubility Equilibria		*buffering capacity*		
How can solubility product constants be determined and be used to compare salts to one another?	V. Precipitation and Separation of Ions	III. describe and prepare an acid-base titration	*precipitation*		
How can ions be identified using selective precipitation methods?	VII. Qualitative Analysis of Metallic Elements		*equivalence point*		

			IV-VI. use the solubility rules to determine the identify of unknown ions in a soltuion by qualitative analysis	*end point* *titration* *analyte* *standard*		

January **Chapters 5 and 19: Thermochemistry and Thermodynamics**

	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	What is the difference between potential and kinetic energy, work and heat?	I. Thermal Energy, heat and temperature	I-II. *describe* the method of heat transfer and explain using thermodynamic terms	*enthalpy*	Hess's Law Laboratory	3.2.12.B.3-Describe the relationship between the average kinetic molecular energy, temperature, and phase changes.
	How can the enthalpy change for a reaction be calculated using calorimetry?	II. The First Law of Thermodynamics	III. *quantify* the energy changes in a system using calorimetry	*bond enthapies*	Determination of the Specific Heat of a Metal	
	How can the enthalpy of an overall equation be determined using Hess's Law?	III. Calorimetry	IV-V. *manipulate* energy equations in order to determine the total enthalpy of a system	*1st Law of Thermodynamics*		
	How can the heat released or absorbed be quantified using stoichiometry and the mole concept?	IV. Hess's Law		*Hess's Law*		
		V. Enthalpies of Formation		*enthalpies of formation* *specific heat* *Joules* *calories*	CH 5 and 19 Test: Thermochemistry	

February **Chapter 20: Electrochemistry**

Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
What are the parts of an electrochemical cell?	I. Oxidation States	I. *determine* the oxidatiion state of an element	*oxidation states*	Lab:Electrochemical Cell	3.2.12.A.4-Apply oxidation/reduction principles to electrochemical reactions. Describe the interactions between acids and bases.
How do the gain or loss of electrons affect the oxidation or reduction of a reaction?	II. Balancing Redox Reactions	II. *balance* redox reactions in acidic and basic environments	*voltaic cell*	CH 20 Test: Electrochemistry	
How can cell reduction potentials and free energy be calculated using Faraday's Law?	III. Voltaic Cells and EMFs under Standard Conditions	III. *use* standard reduction potentials to determine the spontaneity of a cell	*electrolytic cell*		
How can the products of a electrolytic and voltaic cell reaction be predicted?	IV. Free Energy and Redox Reactions	IV. *calculate* the free energy from an electrochemical cell	*electromotive force*		
How can the cell potential be related to the equilibrium constant and the free energy change?	V. EMFs under Nonstandard Conditions	V. *describe* electrolytic cells	*standard reduction potential*		
How do you draw a voltaic cell and what is the proper cell notation for the drawing?	VI. Batteries and Fuel Cells	VII-VIII. *explain* corrosion in terms of a voltaic process and contrast with electrolysis	*batteries*		
	VII. Corrosion VIII. Electrolysis		*corrosion*		

February **Chapter 4: Aqueous Reactions and Solution Stoichiometry**

Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
What are the different types of equations?	I. General Properties of Aqueous Solutions	I. *describe* the dissolution process	*dissolution*		3.2.12.A.4-Apply oxidation/reduction principles to electrochemical reactions. Describe the interactions between acids and bases.
How can the activity series be iused to predict products in single replacement reactions?	II. Precipitation Reactions		*acid/base reactions*	Lab: Synthesis and Identification of Alum	
How can reduction-oxidation reactions be balanced?	III. Acid/Base Reactions	II. *describe* the solubility rules and write net ionic equations	*oxidation reactions*		
How can the molarity, molality, mole fraction and mass percent of a solution be calculated?	IV. Oxidation/Reduction Reactions		*molarity*	CH 4 Test: Aqueous Solution Stoichiometry	
How can an unknown be identified using quantitative analysis?	V. Concentration of Solutions	III-IV. *classify* chemical reactions such as acid/base neutralizations and reduction-oxidation	*molality*		
How can compounds be classified? (i.e. acids, bases, acid anhydrides, base anhydrides)	VI. Solution Stoichiometry and Chemical Analysis		*mole fraction*		
		V-VI. *determine* the molarity, molality and mole fraction of substances			

	What is the oxidation state of an element from the periodic table? How is an acid-base titration performed?					
February	**Chapter 6: Electronic Structure of Atoms** **Chapter 7: Periodicity**					
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	What are the parts of a wave and what are the different sections of the electromagnetic spectrum?	I. The Dual Nature of Light	I. *describe* particles as both matter and waves	*line spectrum*	Lab: Flame Test of Unknown Metallic Salts	3.2.12.B.5-Research how principles of wave transmissions are used in a wide range of technologies. Research technologies that incorporate principles of wave transmission.
	What is the photoelectric effect?	II. Quantization of Light and Photons	II. determine the energies, frequencies and wavelengths of light due to their characteristics	*photoelectric effect*	Lab: Geissler Tube Activity and Spectroscopes	3.2.12.A.2-Distinguish among the isotopic forms of elements. Explain the probabilistic nature of radioactive decay based on subatomic rearrangement in the atomic nucleus. Explain how light is absorbed or emitted by electron orbital transitions.
	How can metallic salts be identified using line emission spectra?	III. Line Spectra and the Bohr Model	III. describe the energies given off by photons of light according to their various wavelengths and attribute this spectrum to a chemical element's "fingerprint"	*electron configuration*	CH 6 and 7 test: Electronic Structure and Periodicity	

How can electron configurations be determined for elements on the periodic table using Hund's rule, the Pauli Exclusion Principle and the Aufbau Principle?	IV. The Wave Behavior of Matter	IV-V. illustrate the behavior of electrons within orbitals by describing their 90 % probability in a specific subleve of orbitals	*Hund*
How do the energies of electrons affect the locations of their orbitals?	V. Quantum Mechanics and Atomic Orbitals	VI-VII. determine the electron configurations of various elements and their excetions	*Pauli*
	VI. Polyelctronic atoms	VIII. describe the role that several scientists made in classifying the Periodic Table	*Aufbau*
	VII. Electron configurations and exceptions	IX-XII. predict patterns for various elements based on their properties of atomic size, ionization energies, electron affinities, electronegativities and reactivity	*orbitals*
	VIII. History of the Periodic Table		*sublevels*
	IX. Effective Nuclear Charge and Shielding		*energy levels*
	X. Atomic and Ionic Size		*electronegativity*
	XI. Ionization Energy and Electron Affinity and Electronegativity		*ionization energy*

		XII. Reactivity of Metals and Nonmetals in a Group		*electron affinity* *reactivity*		

February **Chapter 8: Chemical Bonding**

	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	What is the difference between ionic and covalent bonding?	I. Ionic and Covalent Bonding	I-II, VI. *describe* percent ionic character in terms of how electrons behave in bonds and their polarity between elements	*bond polarity*	Lab: Conductivity of Compounds	3.2.12.A.5-MODELS/PATTERNS Use VSEPR theory to predict the molecular geometry of simple molecules. CONSTANCY AND CHANGE Predict the shift in equilibrium when a system is subjected to a stress.
	How are Lewis structures drawn according to the octet rule?	II. Bond Polarity and Electronegativity	III-IV. *draw* various Lewis structures and resonance structures for molecules	*ionic character*	CH 8 test: Chemical Bonding	
	How does electronegativity reveal the polarity of a bond?	III. Drawing Lewis Structures	V. *recognize* the exceptions to the octet rule and draw Lewis structures for them	*Lewis structures*		
	What are some exceptions to the octet rule, and why do they exist?	IV. Resonance Structures		*octet rule*		
	How are resonance structures drawn for certain molecular compounds?	V. Exceptions to the Octet Rule				
	What is the strength of a bond in terms of bond enthalpy?	VI. Strengths of Covalent Bonds				

March **Chapter 11: Intermolecular Forces, Liquids and Solids**

Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
How does temperature affect the strength of intermolecular forces and the physical state of the substance?	I. A Molecular Comparison of Gases, Liquids and Solids	I-II. *classify* the type of bonding within molecules and between them based on their polarity	*intermolecular forces*	CH 11 Test:Intermolecular Forces, Liquids and Solids	3.2.12.B.4-Describe conceptually the attractive and repulsive forces between objects relative to their charges and the distance between them.
What are the main kinds of intermolecular forces that occur between substances?	II. Intermolecular Forces	IV. *design* a phase diagram and identify all of its parts	*intramolecular forces*		
How are viscosity and surface tension related to the strength of intermolecular forces?	III. Some Properties of Liquids	V. *calculate* changes in colligative properties such as boiling point elevation, freezing point depression and vapor pressure reduction	*surface tension*		
What phase changes occur between different states of matter?		VII-VIII. *classify* the type of bonding and structure of various types of solids	*viscosity*		
How is boiling related to vapor pressure and the pressure acting on the surface of the liquid?	IV. Vapor Pressure		*boiling point elevation*		
How are phase diagrams interpreted?			*freezing point depression*		
What are the different types of crystalline solids?	VI. Structure of Solids		*vapor pressure reduction*		

	How can real gases be corrected for using a modification of the ideal gas law?	VII. Bonding in Solids		*osmotic pressure*		
	What is the history of the atom? What are the most relevant theories?			*colligative properties*		

March/ April **Chapter 9: Molecular Geometry and Bonding Theories**

	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	How are Lewis structures classified according to VSEPR theory?	I. Molecular Shape and VSEPR Theory	I. *identify* the different electron geometry and molecular geometry in terms of shape	*molecular geometry*	Molecular Models of Compounds	3.2.12.A.5-MODELS/PATTERNS Use VSEPR theory to predict the molecular geometry of simple molecules.
	How can polarity be explained in terms of molecular shape?	II. Polarity and Shape	II. *describe* the polarity of bonding within a molecule	*trigonal planar*	CH 9 test: Molecualr Geometry and Bonding Theories	CONSTANCY AND CHANGE Predict the shift in equilibrium when a system is subjected to a stress.
	How can the localized electron model be used to explain molecular shape and molecular bonding?	III. Covalent Bonding and Orbital Overlap (localized electron model)	III-V. *predict* the placement of electrons within orbitals	*tetrahedral*		
	How are moelcular orbitals created from atomic orbitals?	IV. Hybrid Orbitals		*trigonal pyramidal*		
	What is the bond order of a reaction based upon the molecular orbitals of elements?	V. Multiple Bonds and Molecular Orbital Theory (Molecular Orbital Theory)		*T-shape*		

				see-saw *octahedral* *trigonal* *bipyramidal* *bent* *linear* *hybrid orbitals* *localized electron* *model* *sigma bond* *pi bond* *molecular orbital* *theory*	
April	**Chapter 13: Properties of Solutions**					
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	What role do intermoelcular forces play in the dissolution process?	I. The Solution Process	I-III. *describe* the factors that affect solubility and the rate of dissolution	*dissolution*	Lab: Determining an Unknown by Freezing Point Depression	3.2.12.A.1-Compare and contrast colligative properties of mixtures. Compare and contrast the unique properties of water to other liquids.
	How is an equilibrium process related to a saturated solution?	II. Saturated Solutions and Solubility	IV. *calculate* concentra tion in terms of molarity, molality and mole fraction	*saturation*	CH 13 test: Properties of Solutions	3.2.12.B.3-Describe the relationship between the average kinetic molecular energy, temperature, and phase changes.
	How are solubility curves used to identify salts and compare them?	III. Factors Affecting Solubility	V. *discuss* colligative properties of solutions and calculate temperature differences	*salts*		
	What are the different methods for calculaitng concentration?	IV. Ways of Expressing Concentration	VI. *explain* the colloids as a type of mixture	*molarity*		

	How are freezing points and boiling points affected by the concentration of solute in solution?	V. Colligative Properties		*molality*		
	How are osmotic pressure and vapor pressure affected by the concentration of solutes in solution?	VI. Colloids		*mole fraction*		
	What are colloids and how are they affected by the absorbance of light?			*vapor pressure reduction* *osmotic pressure* *boiling point elevation* *freezing point depression* *Tyndall effect* *colloids*		
May	**AP Exam**					
	Essential Questions	**Content**	**Knowledge and Skills**	**Vocabulary**	**Assessments**	**Standards**
	How can the maximum score on the AP Exam be achieved?	**Preparing for the AP Examination-** **Give back old tests and take a mock test - two, three, four weeks prior to national exam**	***practice* test-taking strategies for the National AP Chemistry Exam**	**all chemistry vocabulary to date**	**AP Exam usually the first week in May**	**3.4.12.A.3-Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).**

Ater the	Lab Practical					
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	How can the application of chemical research in laboratory help to solve real-world problems?	Structure of Matter (atomic theory, atomic structure, chemical bonding) States of Matter (gases, liquid and solids, solutions) Reactions (reaction types, stoichiometry, equilibrium, kinetics, thermodynamics) Descriptive Chemistry (relationships in the periodic table) Laboratory (Physical Manipulations, processes and procedures; observations and data manipulation, communication, group collaboration, the laboratory report)	*perform and design* an inquiry laboratory experiment to validate a chemical concept	all chemistry vocabulary to date	Lab Practical	3.4.12.E.6-Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.
	How can the knowledge of chemistry help in solving real-world	all content prior (cumulative)	I. to *research* a topic in chemistry that applies to real world processes	all chemistry vocabulary from the year		3.4.12.E.6-Compare and contrast the importance of science, technology, engineering and math

problems?	Resarch based project-lab inquiry	II. to *present* the research project in an informational session in front of their peers			(STEM) as it pertains to the manufactured world.

After the exam

Ch. 25: Organic Chemistry

Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
How can organic hydrocarbons with multiple bonds be named?	I. Properties and Characteristics of Organic Molecules	I. *describe* the properties of organic compounds	*alkanes*	Formation of esters lab	3.2.12.A.5- MODELS/PATTERNS Use VSEPR theory to predict the molecular geometry of simple molecules. CONSTANCY AND CHANGE Predict the shift in equilibrium when a system is subjected to a stress.
How can molecules with various functional groups be named?	II. Hydrocarbons, Alkanes, Alkenes, and Alkynes	II-III. *name and describe* the bonding in alkanes, alkenes and alkynes	*alkenes*		
How can isomers of various types of organic compounds be drawn?	III. Unsaturated Hydrocarbons	IV. *name and write* formulas for organic compounds with various functional groups	*alkynes*		
How does chirality influence the superimposition of isomers?	IV. Functional Groups	V. *predict* the chirality within a molecule	*saturated hydrocarbons*		
How can organic compounds be classified (i.e. proteins, carbohydrates and nucleic acids) in the body?	V. Chirality	VI. *describe* important properties of biochemical molecules and reactions	*isomers*		

		VI. Introduction to Biochemistry		*chirality*		
		VII. Proteins		*functional groups*		
		VIII. Carbohydrates		*proteins*		
		IX. Nucleic Acids		*carbohydrates*		
				nucleic acids		
After the exam	Ch. 24: Transition Elements and Coordination Chemistry					
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Standards
	How are various coordination complexes named?	I. Names and structures of complex ions	I, III. *name and draw* complex ion formulas	*coordination number*		3.2.12.A.4-Apply oxidation/reduction principles to electrochemical reactions. Describe the interactions between acids and bases.
	How can crystal field theory be used to predict the colors and magnetic properties of complexes?	II. Bonding in coordination systems	II. *describe* the bonding and coordination numbers within complexes	*ligand*		
	How are geometric and optical isomers drawn?	III. Formation of complex ions	IV. *discuss* practical application of metallic complexes in the real world	*metallic complex*		
	How can crystal field theory be used to predict the high spin or low spin nature of complexes?	IV. Practical applications		*coordination sphere*		
	What are some equations for writing complex ions?			*oxidation state*		

After the exam	Chapters 21, 2 and 6: Nuclear Chemistry and Atomic Structure							
	Essential Questions	Content	Knowledge and Skills	Vocabulary	Assessments	Lessons	Resources	Standards
	How is the law of conservation of mass applied to nuclear chemistry	I. Types of subatomic particles	describe radioactivity in terms of decay	radioactivity vs. radiation		Lab: Alpha Radiation Shielding Activity		3.2.12.A.2-Distinguish among the isotopic forms of elements. Explain the probabilistic nature of radioactive decay based on subatomic rearrangement in the atomic nucleus. Explain how light is absorbed or emitted by electron orbital transitions.
	How are alpha and beta decay reactions written?	II. The Nucleus	II. *describe* the stability of nuclides and the process of artifical bombardment and nuclear transmutation	*artificial bombardment*	Test on Ch. 21: Nuclear Chemistry 3/31/2016			
	What are the penetrating effects of alpha, beta and gamma radiation?	III. Mass Spectroscopy and Isotopes	III. *determine* the half-life of nuclides	*radioactive decay*				
	How is the neutron-proton ratio responsible for the instability of a nucleus?	IV. Nuclear Stability	IV. *compare and contrast* fission and fusion	*half lives*				
	How can half-life be calculated using various equations?	VI. Atomic Structure	V. *discuss* the biological effects of radiation	*fission*				
	What are the different ways to measure and detect radioactivity?	VII. History of the Atom		*fusion*				

How can the binding energy of a nucleus be calculated?	VIII. Electromagnetic Spectrum properties	*radiation therapy*
What is the difference between fission and fusion?	IX. Quantization of Energy	*food irradiation*
What are the harmful effects of radiation on living things?	X. Photoelectric Effect	
	XI. Positron Emission Spectroscopy	
	XII. Paramagnetism	