Unit 1			
Safety			
Duration	2 weeks (Aug)		**Assessed**
Priority Standard(s)		No relevant Missouri state standards	
Supporting Standard(s)			

Unit 2			
Scientific Measurements			
Duration	4 weeks (Aug/Sept)		**Assessed**
Priority Standard(s)		No relevant Missouri learning standards	
Supporting Standard(s)			

Unit 3			
Mole Concept			
Duration	3 weeks (Sept/Oct)		**Assessed**
Priority Standard(s)	9-12.PS1.B.3	Use symbolic representations and mathematical calculations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. [Clarification Statement: Emphasis is on conservation of matter and mass through balanced chemical equations, use of the mole concept and proportional relationships.]	
Supporting standards: AP College Board Big Idea 3 Chemical Reactions and Big Idea 1 Structure of Matter	3.4	The student is able to relate quantities (measured mass of substances, volumes of solutions, or volumes and pressures of gases)to identify stoichiometric relationships for reaction, including situations involving limiting reactants and situations in which the reaction has not gone to completion	
	1.1	The student can justify the observation that the ratio of the masses of the constituent elements in any pure sample of that compound is always identical on the basis of the atomic molecular theory.	
	1.4	The student is able to connect the number of particles, moles, mass, and volume of substances to one another, both qualitatively and quantitatively.	
	1.2	The student is able to select and apply mathematical routines to mass data to identify or infer the composition of pure substances and/or mixtures.	

Unit 4			
Atomic Structure/Nuclear			
Duration	3 weeks (Oct/Nov)		**Assessed**
Priority Standard(s)	9-12.PS1.C.1	Use symbolic representations to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. [Clarification Statement: Emphasis is on simple qualitative models, such as pictures or diagrams, and on the scale of energy released in nuclear processes relative to other kinds of transformations.]	
	9-12.PS4.B.2	Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. [Clarification Statement: Emphasis is on the idea that photons associated with different frequencies of light have different energies, and the damage to living tissue from electromagnetic radiation depends on the energy of the radiation. Examples of published materials could include trade books, magazines, web resources, videos, and other passages that may reflect bias.]	
Supporting Standard(s)	9-12.ESS1.A.3	Communicate scientific ideas about the way stars, over their life cycle, produce elements. [Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.]	
	9-12.PS2.B.2	Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.	
	9-12.PS4.B.1	Communicate technical information about how electromagnetic radiation interacts with matter. [Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.]	
Supporting standards: AP College Board Big Idea 1 Structure of Matter	1.14	The student is able to use data from mass spectrometry to identify the elements and the masses of individual atoms of a specific element.	
	1.15	The student can justify the selection of a particular type of spectroscopy to measure properties associated with vibrational or electronic motions of molecules.	

Unit 5			
Electrons and Energy			
Duration	3 weeks (Nov)		**Assessed**
Priority Standard(s)	9-12.PS4.A.1	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. [Clarification Statement: Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the Earth.]	
	9-12.PS4.A.2	Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. [Clarification Statement: Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, and photoelectric effect.]	
Supporting standards: AP College Board Big Idea 1 Structure of Matter	1.5	The student is able to explain the distribution of electrons in an atom or ion based upon data.	
	1.6	The student is able to analyze data relating to electron energies for patterns and relationships.	
	1.7	The student is able to describe the electronic structure of the atom, using PES data, ionization energy data, and/or Coulomb's law to construct explanations of how the energies of electrons within shells in atoms vary.	
	1.8	The student is able to explain the distribution of electrons using Coulomb's law to analyze measured energies.	
	1.12	The student is able to explain the distribution of electrons using Coulomb's law to analyze measured energies.[See SP6.2;Essential Knowledge 1.B.2]	
	1.13	Given information about a particular model of the atom, the student is able to determine if the model is consistent with specified evidence.	
	1.15	The student can justify the selection of a particular type of spectroscopy to measure properties associated with vibrational or electronic motions of molecules.	

Unit 6			
Periodicity			
Duration	3 weeks (Dec)		**Assessed**
Priority Standard(s)	9-12.PS1.A.1	Use the organization of the periodic table to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. [Clarification Statement: Examples of properties that could be predicted from patterns could include reactivity of metals, types of bonds formed, numbers of bonds formed, and reactions with oxygen.]	
Supporting standards: AP College Board Big Idea 1 Structure of Matter	1.9	The student is able to predict and/or justify trends in atomic properties based on location on the periodic table and/or the shell model.	
	1.10	Students can justify with evidence the arrangement of the periodic table and can apply periodic properties to chemical reactivity.	
	1.11	The student can analyze data, based on periodicity and the properties of binary compounds, to identify patterns and generate hypotheses related to the molecular design of compounds for which data are not supplied.	

		Unit 7	
		Ionic Compounds and Ionic Bonding	
Duration	3 weeks (Jan)		**Assessed**
Priority Standard(s)	9-12.PS1.A.4	Apply the concepts of bonding and crystalline/molecular structure to explain the macroscopic properties of various categories of structural materials, i.e. metals, ionic (ceramics), and polymers. [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.]	
Supporting standards: AP College Board Big Idea 2 Properties of Matter	2.17	The student can predict the type of bonding present between two atoms in a binary compound based on position in the periodic table and the electronegativity of the elements.	
	2.19	The student can create visual representations of ionic substances that connect the microscopic structure to macroscopic properties, and/or use representations to connect the microscopic structure to macroscopic properties (e.g., boiling point, solubility, hardness, brittleness, low volatility, lack of malleability, ductility, or conductivity).	
	2.20	The student is able to explain how a bonding model involving delocalized electrons is consistent with macroscopic properties of metals (e.g., conductivity, malleability, ductility, and low volatility) and the shell model of the atom.	
	2.26	Students can use the electron sea model of metallic bonding to predict or make claims about the macroscopic properties of metals or alloys.	
	2.22	The student is able to design or evaluate a plan to collect and/or interpret data needed to deduce the type of bonding in a sample of a solid.	

Unit 8			
Molecular Compounds and Covalent Bonding			
Duration	3 weeks (Feb)		**Assessed**
Priority Standard(s)	9-12.PS1.A.4	Apply the concepts of bonding and crystalline/molecular structure to explain the macroscopic properties of various categories of structural materials, i.e. metals, ionic (ceramics), and polymers. [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.]	
Supporting standards: AP College Board Big Idea 2 Properties of Matter	2.18	The student is able to rank and justify the ranking of bond polarity on the basis of the locations of the bonded atoms in the periodic table.	
	2.21	The student is able to use Lewis diagrams and VSEPR to predict the geometry of molecules, identify hybridization, and make predictions about polarity.	
	2.2	The student is able to explain the relative strengths of acids and bases based on molecular structure, interparticle forces, and solution equilibrium.	
	2.17	The student can predict the type of bonding present between two atoms in a binary compound based on position in the periodic table and the electronegativity of the elements.	
	2.22	The student is able to design or evaluate a plan to collect and/or interpret data needed to deduce the type of bonding in a sample of a solid.	

Unit 9			
Chemical Reactions			
Duration	3 weeks (March)		**Assessed**
Priority Standard(s)	9-12.PS1.A.2	Construct and revise an explanation for the products of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. [Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, or of oxygen and hydrogen.]	
Supporting standards: AP College Board Big Idea 3 Chemical Reactions	3.1	Students can translate among macroscopic observations of change, chemical equations, and particle views.	
	3.2	The student can translate an observed chemical change into a balanced chemical equation and justify the choice of equation type (molecular, ionic, or net ionic) in terms of utility for the given circumstances.	
	3.10	The student is able to evaluate the classification of a process as a physical change, chemical change, or ambiguous change based on both macroscopic observations and the distinction between rearrangement of covalent interactions and noncovalent interactions.	
	3.11	The student is able to interpret observations regarding macroscopic energy changes associated with a reaction or process to generate a relevant symbolic and/or graphical representation of the energy changes.	

Stoichiometry/Chemical Quantities

Duration	3 weeks (April)		**Assessed**
Priority Standard(s)	9-12.PS1.B.3	Use symbolic representations and mathematical calculations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. [Clarification Statement: Emphasis is on conservation of matter and mass through balanced chemical equations, use of the mole concept and proportional relationships.]	
	9-12.PS1.B.2	Refine the design of a chemical system by specifying a change in conditions that would alter the amount of products at equilibrium. [Clarification Statement: Emphasis is on the application of Le Chatelier's Principle and on refining designs of chemical reaction System, including descriptions of the connection between changes made at the macroscopic level and what happens at the molecular level. Examples of designs could include different ways to increase product formation including adding reactants or removing products.]	
Supporting standards: AP College Board Big Idea 3 Chemical Reactions	3.1	3.1 Students can translate among macroscopic observations of change, chemical equations, and particle views.	
	3.2	3.2 The student can translate an observed chemical change into a balanced chemical equation and justify the choice of equation type (molecular, ionic, or net ionic) in terms of utility for the given circumstances.	
	3.3	3.3 The student is able to use stoichiometric calculations to predict the results of performing a reaction in the laboratory and/orto analyze deviations from the expected results.	
	3.4	3.4 The student is able to relate quantities (measured mass of substances, volumes of solutions, or volumes and pressures of gases)to identify stoichiometric relationships for reaction, including situations involving limiting reactants and situations in which the reaction has not gone to completion.	
	3.5	3.5 The student is able to design a plan in order to collect data on the synthesis or decomposition of a compound to confirm the conservation of matter and the law of definite proportions.	
	3.6	3.6 The student is able to use data from synthesis or decomposition of a compound to confirm the conservation of matter and the law of definite proportions.	