Board Approved August 2010 Revised July 2016

Week	Marking Periods 1&2	Week	Marking Periods 3 & 4
1	Lab Safety	11	Electron Structure, Periodic Table, & Periodic Trends
2	Measurements & Calculations in Chemistry	12	Chemical Bonding, Molecular Geometry, & Intermolecular Forces
3	Measurements & Calculations in Chemistry	13	Chemical Bonding, Molecular Geometry, & Intermolecular Forces
4	Measurements & Calculations in Chemistry	14	Names & Formulas
5	Matter	15	Names & Formulas
6	Energy	16	The Mole Concept
7	Energy (include Heating & Cooling Curves)	17	Math of Chemical Formulas Using the Mole
8	Atoms, Ions, & Isotopes	18	Chemical Reactions & Balancing Equations
9	Nuclear Chemistry	19	Chemical reaction, Reactions Types, Energy Exchange, Equilibrium, & Reaction Rates
10	Light & the EMS	20	Chemical Quantities in Reactions (Stoichiometry)

Department Science Subject Chemistry

Time Frame	1 Week

Topic

Lab Safety and Chemistry in Today's World

Essential Questions

- Why should students study chemistry and chemicals?
- What is the importance of laboratory safety?

Enduring Understandings

- Students should study chemistry because it plays an integral part in all aspects of life.
- Having students learn the scientific method will help them to develop a theory using observations, hypotheses, and experiments.
- Students will demonstrate the basic safety rules that must be followed when working in the laboratory.

Alignment to NGSS

ETS1.B HS-ETS1-2 ETS1 ETS2 TECH.8.2.12.B PS1.A PS1.B HS-PS1-3

Student Outcomes

- Understand the importance of studying the science of chemistry..
- List the basic safety rules that must be followed when working in the laboratory.
- Explain the reason for each laboratory safety rule.
- Describe the tools that will be used in the chemistry lab.
- Apply and understand the importance of all safety rules when performing lab work

Learning Activities

- **Experiments / Activities**
- Lab Safety in the Chemistry Classroom
- Lab Safety Poster Activity
- **Videos & Tutorials**
- Accident at Jefferson High
- Lab Safety Simplified
- The World of Chemistry

Assessments

- Do Now
- Lab Reports
- Quizzes, Tests, & Projects
- Group Discussion / Collaboration
- Inquiry Based Activities
- Homework
- Flipped Classroom
- Chrome Book Activities

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Lab Activities
- Wireless Computer Activities
- Elmo Projector
- Overhead Projector

Time Frame	3 weeks

Topic

Unit 1 - Essential Measurements and Calculations in Chemistry

Essential Questions

- What base units and prefixes are used in science for measuring length, mass, and volume?
- What are significant digits and how are they used in calculations?
- How are measurements converted into scientific notation?
- What are unit equalities and how are they used in solving dimensional analysis calculations?
- What information is needed to calculate both density and percent error?
- How are graphs used to distinguish between inversely and directly proportional relationships?

Enduring Understandings

- Students should be able to identify the metric units of measurements for mass, length, and volume.
- Students should be able to determine which digits in measurements are significant in chemistry calculations.
- Students will demonstrate how to convert measurements into and out of scientific notation.
- Having students learn how to obtain conversion equalities will allow students to use dimensional analysis to solve various quantitative problems in chemistry.
- Students will demonstrate their understanding of calculating of both density and percent error.
- Students will use their knowledge of construction a scientific graph to explain and display experimental data.

Alignment to NGSS

ETS1-3 ETS1C HS-PS1-j HS-PS1-2 HS-PS3-g HS-PS1-4 PS1.A ETS1.B HS-ETS1-2 ETS1-2 TECH.8.2.12.B RST.11-12.1 MP.2 MP.4 HSN-Q.A.1-3 HSN-Q.A.1 HAS-CED.A.4 HS-LS2-7 HS-ESS1-1 HS-ESS-2

Student Outcomes

- Use units as a way to understand problems and to guide the solution of multi-step problems; choose and use units consistently in formulas
- Reason abstractly and quantitatively
- Model with mathematics
- Develop and use models to help with understanding of key concepts.
- Planning and carrying out investigations using the metric system and significant figures
- Analyze and interpret data and graphs based on laboratory investigations.
- Constructing explanations and designing solutions for a specific scientific problem
- Select appropriate tools to collect, record, analyze, and evaluate data
- Plan and conduct an investigation
- Apply the concept of slope when calculating density
- Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.
- Apply techniques of algebra and functions to represent and solve scientific engineering problems

Learning Activities

Experiments / Activities

- Introductory Laboratory Techniques – The Metric System
- Accuracy Vs Precision Lab
- Graphing Laboratory Data
- Graphing and Dimensional Analysis Lab
- Rainbow Volumes
- Density of a Penny
- Bunsen Burner Inquiry Lab

Videos

- The World of Chemistry - Measurements

Assessments

- Do Now
- Lab Reports
- Quizzes, Tests, & Projects
- Group Discussion / Collaboration
- Inquiry Based Activities
- Homework
- Flipped Classroom
- Chrome Book Activities

21st Century Skills

X	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
X	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Chrome Book Activities

Time Frame	1 weeks

Topic

Unit – 2 Structure & Properties Matter

Essential Questions

- How can a periodic table tell me about the subatomic structure of a substance
- How can I use the periodic table to predict reactions when mixing two elements?
- How can I use the properties of something to predict what is happening with subatomic particles.
- I want to do the right thing: What is the greener choice for grocery bags, cold drink containers or hot drink containers? (Students will make an evidence based claim)

Enduring Understandings

- Students should be able to name and describe the four states of matter.
- Students will be able to compare and contrast the difference between a pure substance and a mixture.
- Learning the difference between homogeneous and heterogeneous mixtures will allow students to describe several techniques to separate mixtures.
- Through studying matter, students will be able to compare their chemical and physical properties.
- Plan and conduct an investigation to gather evidence to compare the relative difference among elements on the periodic table

Alignment to NGSS

HS-PS-1 HS-ETS1-2 HS-ETS1-2 HS-PS1-3 ETS1.B

Student Outcomes

- Use valid and reliable evidence (obtained from students' own investigations, models, theories,, simulations, and peer review) showing how properties of matter is related to the organization of the valence electrons and the periodic table.
- Use the periodic table as a model to provide evidence for relative properties of elements at different scales based on patterns within a group and period.
- Use models (flow chart) to summarize and understand how matter can be found in nature
- Plan and conduct an investigation to prove the Law of Conservation of Matter
- Classify examples of matter as pure substances or mixtures.
- Identify the states and the physical and chemical properties of matter.

Learning Activities

Experiments / Activities

- Periodic Trends of a Group
- Quantitative Observations of a Chemical Reaction
- Qualitative Observation of a Chemical Reaction
- Physical and Chemical Changes Lab
- Law of Conservation Of Matter
- Mixtures lab

Engineering Practices

-ChemMatters,Feb.2014 " It's Not Easy Being Green, Or is It?"

Videos

- The World of Chemistry – Driving Forces
- The World of Chemistry - A Matter of State
- Flipped Classroom – GPB 301 (Development of Atomic Theory), 302 (Structure of the Atom, 402 (Organization of the Periodic Table"
- Nova –"Hunting the Elements"
- Discovery Ed – "The Periodic Table"

Assessments

- Do Now
- Lab Reports
- Quizzes, Tests, & Projects
- Group Discussion / Collaboration
- Inquiry Based Activities
- Homework
- Flipped Classroom
- Chrome Book Activities

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Flipped Classroom

Time Frame	2 week

Topic

Unit – 3 Energy in Chemical Systems

Essential Questions

- How do the various temperature scales differ?
- What are the 3 basic forms of energy?
- How can energy be conserved?
- How can students determine the difference between endothermic and exothermic reactions?
- What is a calorimeter and how does it determine heats of reactions?

Enduring Understandings

- By understanding various temperature scales, students will be able to conduct various calculations.
- Students will demonstrate their understanding of the basic forms of energy and understand the process of energy transformations
- Students will demonstrate their understanding of calorimetry
- Interpret and create both heating and cooling curves of water

Alignment to NGSS

HS-PS3-4 RST.11-12.8 MP.2 MP.4 HS-PS3-1 HS-PS3-3 HS-PS3-4 EST1-2

Student Outcomes

- Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles (IMF)
- Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in more uniform energy distribution among the components in the system.
- Use models to describe a system and define its boundaries, initial conditions, inputs and outputs
- Given a temperature, calculate a corresponding value on another temperature scale.
- Identify energy as either kinetic, potential, or radiant.
- Demonstrate how to convert between different units of energy.
- Describe the difference between endothermic and exothermic chemical reactions.
- Explain the relationship between the heat capacity and the specific heat of a substance.
- Explain how a calorimeter is used to determine the quantity of heat transferred in a chemical reaction.
- Use the energy values to calculate the kilocalories or kilojoules in food.
- Interpret and create heating or cooling curves of various substances

Learning Activities

Videos

- Nova – "Absolute Zero"
- Nova – "Conquest of the Cold"
- Heating curve tutorial
- World of Chemistry – Driving Forces
- Flipped Classroom – GPB 1301 – Thermochemistry

Experiments

- Specific heat of Marbles Lab
- Energy in Snack Food
- Fire & Ice Lab
- Heating Curve of Water lab

Assessments

- Do Now
- Lab Reports
- Quizzes, Tests, & Projects
- Group Discussion / Collaboration
- Inquiry Based Activities
- Homework
- Flipped Classroom
- Chrome Book Activities

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Flipped Classroom

Time Frame	2 Weeks

Topic

Unit – 4 Atomic Structure and Nuclear Chemistry

Essential Questions

- Why should students study the periodic table of elements?
- How did scientists help to develop the modern periodic table?
- How can students identify between specific groups and periods?
- What is the periodic law?
- Who were the scientists and what was their contribution to the current model of the atom?
- What are the major components of an atom?
- How can you determine the number of protons, neutrons, and electrons in an atom or ion?
- What is half-life of a radioactive element?

Enduring Understandings

- Studying the periodic table is very useful for discovering, learning, and remembering the different properties of the elements.
- The contributions of the various scientists led to the current development of the periodic table.
- Students will demonstrate the understanding of the current atomic model by studying the past history of the atom.
- Learning the major components of the atom will lead students to the understanding of atomic number, mass number. ions, and isotopes.
- Students will demonstrate the understanding of nuclear chemistry.

Alignment to NGSS

HSPS1-j HS-PS1-2 HS-PS3-g HS-PS1-4 PS1.A ETS1.B HS-ETS1-2 ETS1 ETS2 TECH.8.2.12.B RST.11-12.1 MP.4 MP.2 HSN-Q.A.1 HSN-Q.A.2 HSN-Q.A.s HAS-CED.A.4

Student Outcomes

- Develop models based on evidence 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.
- Model with mathematics
- Reason abstractly and quantitatively
- Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations
- Cite specific textual evidence to support analysis of science and technical text.
- Use the periodic table to identify the groups and the period of an element and decide whether it is a metal, metalloid, or a nonmetal.
- State the periodic law.
- Discuss contributions that scientists made to the periodic table.
- Explain why elements in a group have similar properties.
- Define the term atom, ions, and isotopes and discuss how they are different and related.
- Name and describe the three subatomic particles of an atom.
- Determine the number of protons, neutrons, and electrons in an atom or ion

Learning Activities

Experiments / Activities

- Atoms, Ions, and Isotopes Bead Manipulative Lab
- Halloweenium
- Conservation of Mass Lab
- Pennium- Simulation of Nuclear Decay
- Nuclear Dropout
- Color the Periodic table activity
- Nuclear Decay Card Activity
- Research & Write- Write a letter to congress discussing your stance on nuclear power

Videos

- Hewitt – Nuclear Decay
- Discovery – Elements of Chemistry
- Discovery Elements of Chemistry: The Periodic Table
- The World of Chemistry – The Periodic Table
- The Periodic Table – VTSC 633
- History of the Atom
- The World of Chemistry – The Atom
- Flipped Classroom – GPB 1501 & 1502 – Nuclear Science Part I & II

Assessments

- Bell Work
- Lab Reports
- Lab Quizzes
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Homework
- Class discussion/ group work

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Flipped Classroom
- Chrome Book

Time Frame	2 weeks

Topic

Unit 5 - Light & Electronic Structure

Essential Questions

- What is electromagnetic radiation?
- How does the atomic spectra of an element correlate with energy levels of an atom?
- What are sublevels and orbitals in an atom?
- How can students draw orbital diagrams and write electron configurations of an element?
- How can students write electron configurations for an atom using the sublevel blocks on the periodic table?
- How can students use the electron configurations of elements to explain the periodic trends?

Enduring Understandings

- By studying the electromagnetic spectrum, students will be able to compare the wavelength of radiation with its energy.
- By studying the electromagnetic spectrum students will understand that electrons can only absorb or emit a specific amount of energy.
- Students will demonstrate the understanding that an atom is composed of specific sublevels and orbitals.
- Students will demonstrate the understanding that sublevels fill in order of increasing energy..

Alignment to NGSS

HSPS1-j HS-PS1-2 HS-PS3-g HS-PS1-4 PS1.A ETS1.B HS-ETS1-2 ETS1 ETS2 TECH.8.2.12.B RST.11-12.1 MP.4 MP.2 HSN-Q.A.1 HSN-Q.A.2 HSN-Q.A.s HAS-CED.A.4 HS-PS4-3 HS-PS3-f

Student Outcomes

- 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.
- Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling through space.
- Model with mathematics $C=\lambda v$ & $E=hv$
- Reason abstractly and quantitatively
- Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations
- Cite specific textual evidence to support analysis of science and technical text.
- Use the periodic table to identify the groups and the period of an element and decide whether it is a metal, metalloid, or a nonmetal..
- State the main idea in Bohr's model of the atom
- Describe the sublevels and orbitals in atoms.
- Describe atomic orbitals in terms of their shape, size, and energy.
- Determine the electron configurations of several elements.
- Draw the orbital diagram for various elements of the periodic table.
- Define periodic trend and identify the important periodic trends of the periodic table.

Learning Activities

Experiments / Activities

- Flame Test Lab
- Drawing Atomic Diagrams
- Periodic Table Basics
- The Electromagnetic Spectrum Activity
- Predicting the Location of a 1*s* Electron
- Determining Trends in a Group
- Understanding Electron Configurations Lab
- Electron Distribution Using Peas

Videos

- The World of Chemistry - Color
- The World of Chemistry – Signals from Within
- The World of Chemistry – Periodic Table
- The World of Chemistry – The Busy Electron
- Flipped Classroom – GPB 1302 & 1303 – The Electromagnetic Spectrum & Waves and Particles of light

Assessments

- Bell Work
- Lab Reports
- Tests & Quizzes
- Chrome Book Activities
- Projects
- Inquiry Based Activities
- Homework
- Class discussion/ group work
- Flipped Classroom

21st Century Skills

X	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
X	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Flipped Classroom
- Chrome Book

Time Frame	2 weeks

Topic

Unit - 6 Chemical Bonding, Molecular Geometry, & Intermolecular Forces

Essential Questions

- How can one explain the structure, properties, and interactions of matter?
- How can students use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms?
- What is the octet rule for both atoms and ions?
- What is the difference between ionic bonding and covalent bonding?
- What are polyatomic ions?
- How can students use Lewis structures to predict the shape, polarity and IMF of a molecule?

Enduring Understandings

- Using the octet rule, students will write the symbols of single ions for the representative elements.
- Represent both ionic and covalent bonding for various compounds
- Describe the VSEPR Theory
- Identify the shapes of various molecules and polyatomic ions
- Explain what determines polarity of molecules
- Explain and describe the different types of intermolecular forces and explain how they influence properties of liquids and solids.

Alignment to NGSS

HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS2-6 PS1.A PS2.B ETS1.B HS-PS3-3 HS-ETS1-2 HS-ETS1-3

Student Outcomes

- Apply scientific principles and evidence to provide an explanation about the type of bonding found in various compounds
- From the given model, students identify and describe the components of the model that are relevant for:
  - Elements and their arrangement in the periodic table
  - Electrons in the outermost energy level of the atom and the number of protons present
- Using the octet rule, write the symbols for both atoms and the single ions for the representative elements.
- Describe the characteristics of both ionic and covalent bonding.
- Describe what a polyatomic ion is.
- Use the VSEPR theory to make predictions about a molecule or polyatomic ion

Learning Activities

Experiments / Activities

- Electronic Cereal
- Conductivity of Molecular and Ionic Compounds
- What Type Am I lab
- Formation of a Salt Lab
- Gum Drop Lab – VSEPR Theory

Videos

- The World of Chemistry - Chemical Bonds
- Discovery – Compounds and Reactions
- Standard Deviants – Atomic Bonding
- Streaming Facts on File
- Flipped Classroom – 501 & 502 – Bonding Part I & II
- GPB 503- Molecular Geometry

Assessments

- Bell Work
- Lab Reports
- Tests & Quizzes
- Chrome Book Activities
- Projects
- Inquiry Based Activities
- Homework
- Class discussion/ group work
- Flipped Classroom

21st Century Skills

X	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
X	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Flipped Classroom
- Chrome Book

Time Frame	4 weeks

Topic

Unit 7 – Chemical Formulas & the Math of Chemical Formulas (Mole)

Essential Questions

- What is the correct formula of a compound by balancing ionic charges?
- How can you write the correct formula for a compound given the English name?
- How can you write the English name of a compound given the formula?
- What is a mole and describe its importance in chemistry?
- What is molar mass and why is it important in chemical calculations?
- How can you convert among the number of moles, the mass of a sample, the volume of a gas, and the number of particles?
- What is the percent composition of a substance and how is it calculated?
- What is the difference between an empirical formula and a molecular formula

Enduring Understandings

- Name and write formulas for various compounds containing polyatomic ions.
- Describe the characteristics of a covalent bond.
- Write names for molecular compounds using the prefix system.
- Explain how to identify a compound as either a binary or ternary acid.
- Describe how acids are named
- Students should be able to write the definition of a mole and explain its importance.
- Students will demonstrate how to calculate the molar mass of a given chemical formula.
- Using molar mass and Avogadro's number, students will be able to complete various conversions using dimensional analysis.
- Students will calculate the mass percentage of each element in a compound.
- Students will demonstrate both empirical and molecular formulas.

Alignment to NGSS

HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS2-6 PS1.A PS2.B ETS1.B HS-PS3-3 HS-ETS1-2 HS-ETS1-3 MP.1 MP.2 MP.4 MP.5 TECH.8.2.12.B RST.11-12.1 HSN-Q.A.1 HSN-Q.A.2 HSN-Q.A.3 HAS-CED.A.4

Student Outcomes

- Identification of the type of chemical compound, including how to write their chemical formulas
- Students identify and describe the relevant components in the mathematical representation:
  - Quantities in terms of atoms, moles, and mass
  - Molar mass of all compounds
- Apply mathematical modeling by using the mole to convert between various units
- Define a mole and describe its importance.
- Identify and use Avogadro's number.
- Define molar mass and explain how it relates the mass of a substance to the number of particles in the substance.
- Convert among the number of particles, moles, and the mass of a substance.
- Describe molar volume and use it to solve problems.
- Find the percent composition of a given formula.

- Use percent composition to determine the formula of an unknown sample.
- Find empirical and molecular formulas.

Learning Activities

Experiments / Activities

- Percent Composition of a Hydrate
- Atomic Coatings
- Cream of the Crop – A Percent Composition Activity
- Candy Molecules Activity
- Percent Sugar in Bubble Gum Lab
- Molar Quantities Lab
- Determining the Gram Atomic Mass of an Element
- Determining an Empirical Formula

Videos

- Standard Deviants – The Mole
- The World of Chemistry – The Mole
- Streaming Facts on File Video
- Flipped Classroom- GPB 701 – Introduction to the Mole and Molar Mass

Assessments

- Bell Work
- Lab Reports
- Tests & Quizzes
- Chrome Book Activities
- Projects
- Inquiry Based Activities
- Homework
- Class discussion/ group work
- Flipped Classroom

21st Century Skills

X	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
X	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math
- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Flipped Classroom
- Chrome Book

Time Frame	3 weeks

Topic

Unit 8- Chemical Reactions & Chemical Equations in Reactions (Stoichiometry)

Essential Questions

- What are chemical reactions and why do they occur?
- How can chemical reactions be represented?
- How does a balanced chemical equation demonstrate the law of conservation of matter?
- What are the four general types of chemical reactions?
- What characteristics identify each type of a chemical reaction?
- What is stoichiometry?
- How are molar relationships represented in a balanced chemical equation?
- What are the main types of stoichiometry problems?
- What determines the amount of products formed in a chemical reaction?
- How is the percent yield of a chemical reaction determined?
- What is the significant of the enthalpy change of a reaction?

Enduring Understandings

- Students should be able to describe the characteristics of a chemical reaction.
- Students will be able to distinguish between the reactants and the products in a chemical equation.
- Having students learn how to properly write a chemical equation will allow them to balance chemical equations and illustrate the law of conservation of matter.
- By studying stoichiometry, students will be able to calculate various quantitative calculations in chemistry.
- Students will demonstrate how to obtain mole ratios from a correctly written and balanced equation.
- Students should able to identify the various types of stoichiometry problems which will allow them to use dimensional analysis to complete calculations.
- Students will demonstrate basic understanding of identifying a limiting reactant when given the quantities of two reactants.
- Students will be able to determine the percent yield of a reaction, given the actual quantity of the product.
- By studying heat of reactions, students will apply heat stoichiometry to determine in a reaction is endothermic or exothermic.

Alignment to NGSS

HS-PS1-1 HS-PS1-2 HS-PS1-3 HS-PS2-6 PS1.A PS2.B ETS1.B HS-PS3-3 ETS1.C HS-ETS1-2 HS-ETS1-3 MP.1 MP.2 MP.4 MP.5 TECH.8.2.12.B RST.11-12.1 PS1.B HSN-Q.A.1 HSN-Q.A.2 HSN-Q.A.3 HAS-CED.A.4 HS-PS1-6 HS-PS1-5 HS-PS1-4

Student Outcomes

- Construct and revise an explanation for the outcome of simple chemical reactions based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- Given new evidence or context, students construct a revised or expanded explanation about the outcome of a chemical reaction and justify the revision
- Develop a model to illustrate that the release or absorption of energy from a chemical

reaction system depends upon the changes in total bond energy

- Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.(include equilibrium-Le Chatelier's Principle)
- Use mathematical representation to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
- Describe the characteristics of a chemical reaction.by distinguishing between reactants and products.
- Explain how a chemical equation describes what happens in a chemical reaction.
- Write balanced chemical equations.
- Identify a reaction as a synthesis, decomposition, single replacement, double replacement, or combustion.

Learning Activities

Experiments / Activities

- Reactivity of Metals in Single –Replacement Reactions
- Bags of Reactions
- Evidence of a Chemical Reaction
- Types of Chemical Reactions
- LAB – AIDS #84 Identifications of Chemical Reactions Kit
- Classifying Chemical Reactions
- 11-3 Explore Feeling Left Out – Inquiry Activity
- Valentines Lab – Exploring Chemical Reactions
- Stoichiometry Lab
- Determining Percent Yield in a Chemical Reaction

Videos

- Bill Nye – Chemical Reactions
- Discovery – Elements of Chemistry Compounds and Reactions
- The World of Chemistry - Molecules in Action
- Streaming Facts on File Video

Assessments

- Bell Work
- Lab Reports
- Tests & Quizzes
- Chrome Book Activities
- Projects
- Inquiry Based Activities
- Homework
- Class discussion/ group work
- Flipped Classroom

21st Century Skills

x	Creativity	x	Critical Thinking	x	Communication	x	Collaboration
x	Life & Career Skills	x	Information Literacy	x	Media Literacy		

Interdisciplinary Connections

- Math

- Writing
- History

Technology Integration

- Computer Based Graphing
- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Flipped Classroom
- Chrome Book