

Course: Chemistry 1 Honors

Course Code: 2003350

Quarter: 3 Unit 7

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Topic of Study: Moles and Stoichiometry

Standards: P8 – Matter MA.S1 – Measurement MA.A1 – Real and Complex Number Systems

Concepts: Mole Conversions, Empirical Formula Calculations, Stoichiometry, Percent Yield

Essential Question: How are balanced chemical equations used to determine quantities in a reaction?

Key Learning: The mole is important concept used in chemical calculations.

Unit 7: 20 days (10 blocks)

NGSSS	Content Limits	Target
<p>SC.912.P.8.9 Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions. Concept Complexity: High</p> <p>MA.912.A.1.5 Use dimensional (unit) analysis to perform conversions between units of measure, including rates. Cognitive Complexity: Moderate</p> <p>MA.912.A.1.4 Perform operations on real numbers (including integer exponents, scientific notation..) using multi-step and real-world problems. Cognitive Complexity: Moderate</p> <p>MA.912.S.1.2 Determine appropriate and consistent stands of measurement for the data to be collected in a survey or equipment. Cognitive Complexity: Moderate</p>	<p>I How is the mole defined?</p> <p>A. molar mass</p> <p>B. Avogadro's number of particles</p> <p>C. Applied</p> <ol style="list-style-type: none"> 1. conversions 2. empirical formula 3. molecular formula 4. molarity 	<p>Define the mole in terms of mass and/or number of particles.</p> <p>Determine the mass of one mole of a compound (molar mass).</p> <p>Convert between grams, moles, atoms and molecules using simple ratios.</p> <p>Calculate the concentration of a solution given grams of solute and volume of solution.</p> <p>Distinguish between empirical and molecular formulas.</p> <p>Given the experimental molar mass and empirical formula, determine the molecular formula.</p>
<p>Vocabulary: mole, particles, Avogadro's number, empirical, molecular, molarity, formula mass</p>		
<p>SC.912.P.8.9 Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions. Concept Complexity: High</p> <p>MA.912.A.1.5 Use dimensional (unit) analysis to perform conversions between units of measure, including rates. Cognitive Complexity: Moderate</p> <p>MA.912.A.1.4 Perform operations on real numbers (including integer exponents, scientific notation..) using multi-step and real-world problems.</p>	<p>II How is a known quantity used to calculate unknown quantities within a balanced chemical equations?</p> <p>A. reactant to product</p> <ol style="list-style-type: none"> 1. moles to mass 2. mass to mass 3. mass to particle number <p>III What is percent yield?</p> <p>A. calculate from experimental data</p> <ol style="list-style-type: none"> 1. mass 2. molarity 	<p>Identify the mole ratios in a balanced chemical equation.</p> <p>Convert molar mass to particle number, moles, and/or mass for reactant to product.</p> <p>Convert molar mass to particle number, moles, and/or mass for product to reactant.</p> <p>Convert molar mass to particle number, moles, and/or mass for product to product.</p>

St. Lucie County Public Schools Chemistry Scope and Sequence 2012-2013

Cognitive Complexity: Moderate MA.912.S.1.2 Determine appropriate and consistent stands of measurement for the data to be collected in a survey or equipment. Cognitive Complexity: Moderate		Convert molarity of reactant to mass of product. Determine the percent yield given experimental mass of product.
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Vocabulary: percent yield, limiting reactant, mole ratio, dimensional analysis

Unit 7 – 20 days
10 block periods

Suggest Laboratories for Unit 7	Title	Lab Type	Resources: P -Pearson Textbook G -Glencoe Textbook H -Holt Textbook Reference pages
SC.912.P.8.9 Molar Quantities	<u>Counting by Measuring Mass</u>	Small Scale	P – page 324
	<u>Exploring the Mole</u>	Quick Lab	H – page 225
	<u>How Much is a Mole?</u>	Discovery	G – page 309
SC.912.P.8.9 Percent Comp Empirical Formula Molecular Formula	<u>Percent Composition</u>	Quick Lab	P – page 328
	<u>Percent Comp of a Hydrate</u>	Skills	H – page 780
	<u>Percent Comp & Gum</u>	Mini Lab	G – page 329
	<u>Hydrated Crystals</u>	ChemLab	G – page 342
SC.912.P.8.9 Mole Ratio Limiting Reagent Percent Yield	<u>Limiting Reagents</u>	Quick Lab	P – page 404
	<u>All Used Up</u>	Start Up	H – page 301
	<u>Stoich & Gravimetric Analysis</u>	Skill	H – page 786
	<u>A Mole Ratio</u>	ChemLab	G – page 374

Course: Chemistry 1 Honors

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Quarter: 3 Unit 8

Topic of Study: Energy Changes

Standards: P8 – Matter P10 – Energy P12 - Motion

Concepts: States of Matter, Phase Changes, Calorimetry

Essential Question: How does the kinetic molecular theory predict the properties of gases, liquids, and solids?

Key Learning: Matter exists in various states with differing properties.

Unit 8: 10 days (5 blocks)

NGSSS	Content	Target
<p>SC.912.P.8.1 Differentiate among the four states of matter. Cognitive Complexity: Moderate</p> <p>SC.912.P.10.5 Relate temperature to the average molecular kinetic energy. Cognitive Complexity: Moderate</p> <p>SC.912.P.12.11 Describe phase transitions in terms of kinetic molecular theory. Cognitive Complexity: Moderate</p>	<p>I What processes occur during phase change?</p> <p>A. Kinetic Molecular Theory</p> <ol style="list-style-type: none"> 1. applied to solids, liquids, gases 2. plasma <p>B. Physical Changes in Matter</p> <ol style="list-style-type: none"> 1. phases changes 2. energy changes <p>C. Phase diagrams/Heat Curves</p> <ol style="list-style-type: none"> 1. boiling and melting points 2. location of phases 3. triple point 4. relationship of pressure on melting and boiling points. 5. heat of fusion and heat of vaporization 	<p>Apply the Kinetic Molecular Theory to the states of matter.</p> <p>Categorize the states of matter based on particle arrangement and motion.</p> <p>Illustrate changes of state (evaporation, condensation, boiling, and freezing) using time/temperature (heating and cooling) graphs.</p> <p>Distinguish between potential and kinetic energy.</p> <p>Describe changes in phase using a phase diagram (temperature vs. pressure).</p> <p>Explain the connection of heat to a change in temperature and phase.</p> <p>Relate heat of fusion and heat of vaporization to state changes.</p>
<p>Vocabulary: sublimation, condensation, vaporization, deposition, melting, freezing, kinetic energy, potential energy, temperature, exothermic, endothermic, heat of fusion, heat of vaporization, joules</p>		
<p>SC.912.P.10.4 Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter. Cognitive Complexity: High</p>	<p>II How can calorimetry be used to calculate the energy changes in a substance?</p> <p>A. Phase changes</p> <ol style="list-style-type: none"> 1. temperature change 2. exothermic/endothermic changes 3. heat of fusion/vaporization <p>B. Calorimetry</p> <ol style="list-style-type: none"> 1. types of calorimeters 2. specific heat capacity of substances 	<p>Calculate the amount of heat absorbed or released by a substance as its temperature changes.</p> <p>Solve problems using heat of fusion and heat of vaporization.</p> <p>Describe the use of a calorimeter.</p> <p>Solve problems involving specific heat.</p>
<p>Vocabulary: heat, calorie, joule, energy, specific heat, calorimeter</p>		<p>Unit 8 – 10 days 5 block periods</p>

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Suggest Laboratories for Unit 8	Title	Lab Type	Resources: P -Pearson Textbook G -Glencoe Textbook H -Holt Textbook Reference pages
SC.912.P.10.4 Heat Transfer	<u>Heat of Fusion of Ice</u>	Quick Lab	P – page 571
	<u>Heat of Combustion of a Candle</u>	Small Scale	P – page 583
	<u>Heating Curve for Water</u>	Start Up	H – page 377
	<u>How much energy is...vapor?</u>	Prob. Solve	G – page 503
	<u>Enthalpy of Fusion for Ice</u>	Mini Lab	G – page 505
	<u>Calorimetry</u>	ChemLab	G – page 520
	<u>Calorimetry and Hess's Law</u>	Skills	H – page 792

Course: Chemistry 1 Honors

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Quarter: 3 Unit 9

Topic of Study: Gases

Standards: P10 – Energy P12 – Motion

Concepts: Properties of Gases, Gas Laws

Essential Question: How do gases change under varying conditions?

Key Learning: Gas laws express a mathematical relationship between volume, temperature and pressure.

Unit 9: 14 days (7 blocks)

NGSSS	Content	Target
<p>SC.912.P.12.10 Interpret the behavior of ideal gases in terms of kinetic molecular theory. Cognitive Complexity: High</p> <p>SC.912.P.10.5 Relate temperature to the average molecular kinetic energy. Cognitive Complexity: moderate</p>	<p>I How does the kinetic energy of the particles of a gas affect its properties?</p> <p>A. particle</p> <ol style="list-style-type: none"> 1. size 2. mass 3. motion <p>B. phase change</p> <p>C. properties of gases</p> <ol style="list-style-type: none"> 1. ideal gas 2. real gas <p>II How are gas pressure, volume, temperature and mole amount related?</p> <p>A. Pressure and Temperature</p> <ol style="list-style-type: none"> 1. Kelvin scale 2. Pressure units <p>B. Molar Volume</p> <ol style="list-style-type: none"> 1. STP 2. mole to volume 3. mass to volume <p>C. Gas Laws</p> <ol style="list-style-type: none"> 1. Boyle's Law 2. Charles' Law 3. Gay-Lussac's Law 4. Combined Gas Law <p>D. Ideal Gas Law</p> <ol style="list-style-type: none"> 1. ideal gas constant 	<p>Compare the properties of real and ideal gases</p> <p>Demonstrate the effects of kinetic energy on expansion, pressure, temperature, density and diffusion.</p> <p>Describe how the development of Boyle's, Charles', and Gay-Lussac's Laws were combined to create the combined gas law.</p> <p>Apply the three gas laws to problems involving the pressure, temperature, and volume of a gas</p> <p>Define standard temperature and pressure.</p> <p>Calculate the volume of a gas from mole amounts.</p> <p>Calculate the volume of a gas from mass.</p> <p>Apply the combined gas law to problems involving the pressure, temperature, and volume of a gas.</p> <p>Relate the amount of gas present to its pressure, temperature, and volume by using the ideal gas law</p> <p>Use the properties of ideal gases to predict measurable quantities.</p>

Vocabulary: barometer, ideal gas, real gas, absolute zero, Kelvin temperature, pressure, volume, moles

Unit 9 – 14 days

7 block periods

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Suggest Laboratories for Unit 9	Title	Lab Type	Resources: P -Pearson Textbook G -Glencoe Textbook H -Holt Textbook Reference pages
SC.912.P.12.10/P.10.5 Properties of Gases	<u>Carbon Dioxide from Antacid Tablets</u>	Quick Lab	P – page 467
	<u>Pressure Relief</u>	Start Up	H – page 415
	<u>More Than Just Hot Air</u>	Discovery	G – page 419
	<u>The Density of Carbon Dioxide</u>	Mini Lab	G – page 459
	<u>Using The Ideal Gas Law</u>	ChemLab	G – page 444

End of Quarter 3 – 44 days