

Chemistry Q1

Unit: Core: Science , Grade(s) 9th Grade - 12th Grade

Chemistry Q1

Duration: 10 Weeks

Unit		
Scope and Sequence		
DIGITAL / PRINT TEXT	ESSENTIAL QUESTIONS	DIFFERENTIATION
<p>Holt "Visualizing Matter"</p> <ul style="list-style-type: none"> Chapter 3: Atomic Structure (pp. 72-105) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Chapter 1: Chemistry is a Physical Science (pp. 4-27) Chapter 3: Atoms: The Building Blocks of Matter (pp. 64-89) Chapter 4: The Development of a New Atomic Model (pp. 91-121) How and why did atomic models change over time? How can the electron configuration of an element in its ground state be determined? How would one identify an element using its emission and absorption spectra? 		<p><i>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. <p>Challenges</p> <ul style="list-style-type: none"> -Quantum numbers and equations of de Broglie, Schrödinger and Plank -Electron energy levels with d and f sublevels, their orbital shapes and the characteristic number. -Extend electron configuration, extended and noble gas notation to period 5 of the periodic table. <p>Supplements</p> <ul style="list-style-type: none"> http://www.pbslearningmedia.org/asset/lps07_int_theatom/
PERFORMANCE TASKS		
<p><i>This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.</i></p>		
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VOCABULARY	Hund's rule, Aufbau process, quantum mechanical model, photon, noble gas notation, valence electrons, isotopes	
ASSESSMENTS		
ACADEMIC CONNECTIONS	<p>ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.</p>	
FIELD EXPERIENCES		
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> Atoms and Molecules is a program produced by Annenberg that deals with teaching the very first steps of chemistry. It introduces the basic building blocks – the atoms – which, through their properties, periodicity and binding, form molecules. http://www.learner.org/resources/series168.html Macro to Micro Structures is a program produced by Annenberg that deals with the conceptualization of micro processes and environments. It involves teaching chemistry through macro phenomena, which can be observed, and micro processes, which occur on the molecular level and can only be imagined. http://www.learner.org/resources/series168.html 	
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DIGITAL / PRINT TEXT	ESSENTIAL QUESTIONS	DIFFERENTIATION
<p>Holt "Visualizing Matter"</p> <ul style="list-style-type: none"> Chapter 4: Periodicity (pp. 106-147) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Chapter 5: Periodic Law (pp. 122-159) How was the periodic table developed and used to discover unknown elements? Why do we see trends in the properties of elements in the periodic table as we go across a period or down a row? How can we convert between mass, moles, volume and number of particles of a substance? 		<p>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org.
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<p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Desktop Investigation- "Design Your Own Periodic Table" (pp. 127) <p>Periodic Table Card Activity</p> <ul style="list-style-type: none"> http://www.chemheritage.org/discover/online-resources/chemistry-in-history/activities/path-to-the-periodic-table.aspx <p>Who Is Counting Lab: The one found on Google at this site is very similar to the Flinn Lab above.</p>		<p>Flinn ChemTopic Labs</p> <ul style="list-style-type: none"> "The Periodic Table Vol. 4 "It's in the Cards" "The Periodic Table Vol. 4 "Density is a Periodic Property" "Molar Relationships and Stoichiometry" Vol. 7: "Who's Counting?"
VOCABULARY	atomic radii, ionic radii, first ionization energies, electronegativity, Avogadro's number	
ASSESSMENTS		
ACADEMIC CONNECTIONS	<p>ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics. Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.</p>	
FIELD EXPERIENCES		
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> The PeriodicTable of Data is an interactive periodic table. Students can select the properties they wish to view. Recommended Tasks: http://www.rsc.org/periodic-table Interconverting Masses, Moles & Numbers of Particles: https://www.youtube.com/watch?v=IbCX6dQZPo Stoichiometry webquest http://www.quia.com/files/quia/users/rpetersonvhs/ Discover the explosive results of alkali metals when water and alkali metals come together - and the science behind the reaction. http://www.open.edu/openlearn/science-maths-technology/science/chemistry/alkali-metals 	
ESL		

Standards Covered

Core: Science

Chemistry

SCI.9-12: Structure and Properties of Matter

- SCI.9-12: Atomic structure
 - SCI.9-12: Electron configurations
 - SCI.9-12: Electrons
 - SCI.9-12: Evolution of atomic models/theory
- SCI.9-12: Periodic table
 - SCI.9-12: Properties
 - SCI.9-12: Trends
- SCI.9-12: Quantifying matter

Materials

For a closer look at the materials list below, log onto <https://cleveland.schoolnet.com>

Lessons:

- CHEM Path to the Periodic Table
- CHEM History of Atomic Theory Webquest

Resources:

- CHEM Path to the Periodic Table Student Guide
- CHEM Path to the Periodic Table Element Cards
- CHEM Interactive Online Periodic Table

Chemistry Q2

Unit: Core: Science , Grade(s) 9th Grade - 12th Grade

Chemistry Q2

Duration: 10 Weeks

Unit		
Scope and Sequence		
DIGITAL / PRINT	ESSENTIAL QUESTIONS	DIFFERENTIATION
TEXT		
Holt "Visualizing Matter" <ul style="list-style-type: none"> Chapter 5: Ionic Compounds (pp. 148-187) Holt "Modern Chemistry" <ul style="list-style-type: none"> Chapter 6: Chemical Bonding (pp. 160-163, 176-182) Chapter 7: Chemical Formulas and Chemical Compounds (pp. 202-210, 221-228) What factors determine the type of bond that will form between two atoms? How is the formula of an ionic compound determined from its name? How are ionic compounds named? 		<p>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. Supplements - Ionic Bonding Tutorial: http://www.pbslearningmedia.org/asset/lps07_int_ionicbonding/
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Holt "Modern Chemistry" <ul style="list-style-type: none"> Experiment 7-2 "Naming Ionic Compounds" (pp. 810-812) Flinn ChemTopic Labs "Chemical Bonding" Vol. 5 <ul style="list-style-type: none"> "Formula of an Ionic Compound" "Go Fish for an Ion" card game 		<ul style="list-style-type: none"> Bonding Webquest: http://staff.fcps.net/bbcrawfo/Integrated_2/a_bonding_webquest.htm Compound "Puzzles" - https://chemistrycats.wikispaces.com/file/view/Ionic+Bonding+Puzzle.pdf
VOCABULARY	bond energy, ionic lattices, electronegativity, metallic bonding, polyatomic ions, nomenclature, valence electrons, transition elements, main block elements	
ASSESSMENTS		
ACADEMIC CONNECTIONS	ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics ; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.	
FIELD EXPERIENCES		
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ESL		
INSTRUCTIONAL ALIGNMENT		MIDDLE
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Holt "Visualizing Matter" <ul style="list-style-type: none"> Chapter 6: Covalent Compounds 		<p>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org.

(pp. 188-231)

Holt "Modern Chemistry"

- Chapter 6: Chemical Bonding (pp. 164-175, 183-194)
- Chapter 7: Chemical Formulas & Chemical Compounds (pp. 211-220, 229-233)
- Which elements form covalent bonds, and what factors determine the type of bond formed?
- How are molecular compounds named, and how is the formula of a molecular compound determined from its name?
- What is unique about the chemistry of carbon, and why is this important?
- How can Lewis structures be used to represent molecular compounds, and combined with VSEPR theory to predict the molecular geometry of a compound?

- Challenges: Use Lewis structure and VSEPR theory to predict the molecular geometry for elements other than Hydrogen, Carbon, Nitrogen, Oxygen, Phosphorus, Sulfur and halogens.
- Covalent Bonding
Tutorial: <http://www.pbslearningmedia.org/resource/lps07.sci.phys.matter.covalentbond/covalent-bonding/>
- **Career Connection:** Students will base their investigations (variations and similarities between regular table sugar, high fructose corn syrup, Stevia, Aspartame, saccharin, sucralose, and Agave) upon products produced by companies (e.g.: Heinz, Marzetti, Dannon). While researching the products and companies, they will also identify the professionals involved in similar processes within the companies and how they use chemistry in their work. Students will identify the connection between the classroom chemistry content and business practices relative to improving and modifying foods.

PERFORMANCE TASKS

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Holt "Visualizing Matter"

- Exploration 6A "Polymers and Toy Balls" (pp. 698-701)

Holt "Modern Chemistry"

- Experiment 7-3 "Determining the Empirical Formula of Magnesium Oxide" (pp. 813-815)

ODE Chemistry Model Curriculum

Investigate the variations and similarities between regular table sugar, high fructose corn syrup, Stevia, Aspartame (Equal®), saccharin (Sweet n' Low®), sucralose (Splenda®) and Agave. Draw a conclusion, based on data analysis regarding which compound is the most damaging for human consumption. Present your findings in multiple formats. Variation for this project could be made with oils.

VSEPR Theory Webquest: <http://home.roadrunner.com/~molelady/vseprtheorywebquest.pdf>

Slime Lab - http://www.rsc.org/learn-chemistry/wiki/Expt:PVA_polymer_slime

	<ul style="list-style-type: none"> Experiment 21-3 "Polymers and Toy Balls" (pp. 891-893) 	
VOCABULARY	molecules, bond length, polarity, intermolecular attractions, London dispersion forces, dipole-dipole forces, hydrogen bonding, polymers, VSEPR theory	
ASSESSMENTS		
ACADEMIC CONNECTIONS	<p>ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.</p>	
FIELD EXPERIENCES		
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> Oil strike is an interactive, chemistry-themed game. Try and maximize your profits as you build your own refineries. http://www.rsc-oilstrike.org Masterminding Molecules seeks to develop logic and reinforce the principles of fair testing. It introduces the importance of concepts such as size, polarity and drug-like properties in the discovery of new medicines. http://www.mastermindingmolecules.org/ 	
ESL		

Standards Covered
<p>Core: Science</p> <p>Chemistry</p> <p>SCI.9-12.: Interactions of Matter</p> <ul style="list-style-type: none"> SCI.9-12.: Chemical reactions <ul style="list-style-type: none"> SCI.9-12.: Types of reactions <p>SCI.9-12.: Structure and Properties of Matter</p> <ul style="list-style-type: none"> SCI.9-12.: Intramolecular chemical bonding <ul style="list-style-type: none"> SCI.9-12.: Ionic SCI.9-12.: Polar/covalent

Additional Properties

<p>Author: CMSD</p> <p>Publisher: Cleveland Metro SD</p> <p>Cost/Fee: No</p> <p>Restricted Use: No</p> <p>Rights: All Rights Reserved.</p> <p>Keywords:</p> <p>Created by: Paul, Deep (4/22/2015 11:39 AM)</p> <p>Last modified by: Donahue, Lisa (5/11/2015 2:55 PM)</p>

Chemistry Q3

Unit: Core: Science, Grade(s) 9th Grade - 12th Grade

Chemistry Q3

Duration: 10 Weeks

Unit	
Scope and Sequence	
DIGITAL / PRINT TEXT	DIFFERENTIATION
<p>Holt "Visualizing Matter"</p> <ul style="list-style-type: none"> Chapter 9: Causes of Change (pp. 310-353) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Chapter 17: Reaction Energy & Reaction Kinetics (pp. 510-537) 	<p><i>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. <p>ODE Chemistry Model Curriculum</p> <ul style="list-style-type: none"> Design an investigation to show that the volume of any liquid sample is constant when divided by its mass (ACS Laboratory Assessment Activities). Devise an investigation to show that the addition of a solute affects the density of a liquid (ACS Laboratory Assessment Activities). Investigate volume of 1 drop of liquid from a Beral-type pipet. Devise a method. Defend method with data and present it to a wider audience using multiple formats. Determine the percent by mass of water content in popcorn. Correlate its effect on the amount of popcorn produced (or time it takes to start the batch popping). Compare three brands; isolate other variables (http://faculty.coloradomtn.edu/jeschofnig/popcorn.htm). Design an investigation to substantiate or negate claims of a commercial product. Determine function, intent & any potential. Present findings in multiple formats.
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none"> How can changes in the phases of matter be explained using the kinetic molecular theory? How can energy changes in a system be calculated? What factors can be used to predict energy changes in chemical reactions? 	
PERFORMANCE TASKS	
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<p>Holt "Visualizing Matter"</p> <ul style="list-style-type: none"> Exploration 9A: "Calorimetry and Hess's Law" (pp. 718-723) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Experiment 17-1 "Measuring the Specific Heats of Metals" (pp. 860-863) Experiment 17-2 "Calorimetry and Hess's Law" (pp. 864-867) <p>ODE Chemistry Model Curriculum</p> <p>Energetics and Dynamics is a video produced by Annenberg that emphasizes the importance of learning about energetics and dynamics in order to improve students' understanding of basic principles of chemistry. http://www.learner.org/resources/series168.html</p>	<p>Flinn ChemTopic Labs Thermochemistry Vol. 10</p> <ul style="list-style-type: none"> "Measuring Calories" "Measuring Energy Changes -Heat of Fusion" "Heats of Reaction and Hess's Law" "Discovering Instant Cold Packs" <p>Heat of Fusion of Ice Lab: chemnhhs.com/ChemHNHS%20Website/PC%20Chap17/Pearson_Resources17/CHEM12_C1700_SSLT.pdf</p> <p>Heat Capacity of Metals: http://www2.chem21labs.com/labfiles/westerncarolina_g1139lab09_lab.pdf</p> <p>Energy Content in Food Lab: https://www.flinnsci.com/media/510570/soda_can.pdf</p>
VOCABULARY	plasma, Bose-Einstein condensate, super atom, absolute zero, enthalpy, endothermic, exothermic, specific heat capacity, activation energy, catalyst, entropy
ACADEMIC CONNECTIONS	ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> Chem4Kids, University of Colorado at Boulder, website devoted to providing more information about Bose-Einstein condensates. http://www.colorado.edu/physics/2000/bec/ Ultra Cold Atoms is an interview with a scientist who studies Bose-Einstein condensates. He describes the process needed to form Bose-Einstein condensates and the unusual properties of super-cooled matter. http://www.pbs.org/wgbh/nova/physics/ultracold-atoms.html "How Low Can You Go" is an interactive simulation of the process by which substances can be cooled to absolute zero. http://www.pbs.org/wgbh/nova/physics/reaching-ultra-low-temperatures.html Teaching Entropy Analysis in the First Year Chemistry Class and Beyond is an article that appeared in the Journal of Chemistry Education that discusses scientifically accurate ways to teach entropy to high school students. The sections from the beginning of the article to the bottom of page 1586, ending at <i>Advanced Students</i> is appropriate for the level of this chemistry course. http://pubs.acs.org/action/showLargeCover?issue=346860664&
DIGITAL / PRINT TEXT	ESSENTIAL QUESTIONS
Holt "Visualizing Matter"	DIFFERENTIATION
	<i>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</i>

<ul style="list-style-type: none"> Chapter 10: Gases & Condensation (pp. 354-401) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Chapter 10: Physical Characteristics of Gases (pp. 302-331) Chapter 11: Molecular Composition of Gases (pp. 332-361) Phase Diagrams (pp. 381-382) How are the volume, pressure, temperature and number of molecules of a gas related? How can this relationship be explained using the kinetic molecular theory? 	<ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. <p>Supplements: Tutorial on gases and laws</p> <ul style="list-style-type: none"> http://www.chemtutor.com/gases.htm
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PERFORMANCE TASKS

This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.

<p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Desktop Investigation-- "Diffusion" (pp. 353) <p>ODE Chemistry Model Curriculum</p> <p>Energetics and Dynamics is a video produced by Annenberg that emphasizes the importance of learning about energetics and dynamics in order to improve students' understanding of basic principles of chemistry. http://www.learner.org/resources/series168.html</p>	<p>Mixed Gas Laws Worksheet Tutorial https://www.youtube.com/watch?v=ZJqZNCi4_Yw</p> <p>Gas laws worksheet: http://woodridge.k12.oh.us/ourpages/users/dweaver/Chemistry/PracticeWorksheets/GasLawWorksheets.html</p> <p>Flinn "Molar Volume of a Gas Lab" http://www.flinnsci.com/media/960405/ap_chem_3A.pdf</p> <p>Egg in a Bottle Experiment Video: https://www.youtube.com/watch?v=Fhz4xsJ1LUo</p>	
VOCABULARY	Kelvin temperature scale, ideal gas constant, atmospheric pressure, molar volume of a gas, Avogadro's Law, Dalton's law of partial pressures, vapor pressure, volatile	
ASSESSMENTS		
ACADEMIC CONNECTIONS	<p>ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.</p>	
FIELD EXPERIENCES		
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> Flinn ChemTopic Labs "Chemistry of Gases" Vol. 8 "Common Gases" 	
ESL		

Standards Covered

Core: Science

Chemistry

SCI.9-12.: Interactions of Matter

- SCI.9-12.: **Chemical reactions**
 - SCI.9-12.: **Energy**
 - SCI.9-12.: **Kinetics**
- SCI.9-12.: **Gas laws**
- SCI.9-12.: **Stoichiometry**
 - SCI.9-12.: **Limiting reagents**
 - SCI.9-12.: **Molar calculations**
 - SCI.9-12.: **Solutions**

Additional Properties

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Chemistry Q4

Unit: Core: Science , Grade(s) 9th Grade - 12th Grade

Chemistry Q4

Duration: 10 Weeks

Unit		
Scope and Sequence		
DIGITAL / PRINT TEXT	ESSENTIAL QUESTIONS	DIFFERENTIATION
<p>Holt "Visualizing Matter"</p> <ul style="list-style-type: none"> Chapter 10: Gases & Condensation (pp. 354-401) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Chapter 10: Physical Characteristics of Gases (pp. 302-331) Chapter 11: Molecular Composition of Gases (pp. 332-361) Phase Diagrams (pp. 381-382) How are the volume pressure, temperature and number of molecules of a gas related? How can this relationship be explained using the kinetic molecular theory? 		<p><i>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. <p>Supplements: Tutorial on gases and laws</p> <ul style="list-style-type: none"> http://www.chemtutor.com/gases.htm
PERFORMANCE TASKS		
<p><i>This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.</i></p>		
<p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Desktop Investigation-- "Diffusion" (pp. 353) <p>ODE Chemistry Model Curriculum</p> <p>Energetics and Dynamics is a video produced by Annenberg that emphasizes the importance of learning about energetics and dynamics in order to improve students' understanding of basic principles of chemistry. http://www.learner.org/resources/series168.html</p>		<p>Mixed Gas Laws Worksheet Tutorial https://www.youtube.com/watch?v=ZJqZNCi4_Yw</p> <p>Gas laws worksheet: http://woodridge.k12.oh.us/ourpages/users/dweaver/Chemistry/PracticeWorksheets/GasLawWorksheets.html</p> <p>Flinn "Molar Volume of a Gas Lab" http://www.flinnsci.com/media/960405/ap_chem_3A.pdf</p> <p>Egg in a Bottle Experiment Video: https://www.youtube.com/watch?v=Fhz4xsJ1LUo</p>
VOCABULARY		
ASSESSMENTS		
ACADEMIC CONNECTIONS	<p>ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics ; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.</p>	
FIELD EXPERIENCES		
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> Flinn ChemTopic Labs "Chemistry of Gases" Vol. 8 "Common Gases" 	
DIGITAL / PRINT TEXT	ESSENTIAL QUESTIONS	DIFFERENTIATION
<p>Holt "Visualizing Matter"</p> <ul style="list-style-type: none"> Chapter 12: Chemical Equilibrium Chapter 13: Acids and Bases (pp. 486-533) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Chapter 18: Chemical Equilibrium (pp. 552-568) 		<p><i>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. Devise an investigation, given five numbered samples of either acidic or basic solution and a sixth solution sample of phenolphthalein. Rank the samples in order of their concentration. Present methodology and results in multiple formats (adapted, Silberman, 1996).

<ul style="list-style-type: none"> Chapter 15: Acids and Bases (pp. 452-479) Chapter 16: Acid-Base Titration and pH (pp.480-507) How can the results of disturbances in a system that has reached equilibrium be predicted? What are the molecular differences between acids and bases? How can neutralization reactions be used to determine the concentration of a solution? 	<ul style="list-style-type: none"> Design an investigation to determine the most effective antacid per gram for neutralizing stomach acid (HCl), baking soda (NaHCO₃) or magnesium hydroxide (Mg (OH)₂). Kahn Academy: https://www.khanacademy.org/science/chemistry/acids-and-bases
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PERFORMANCE TASKS

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<p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Desktop Investigation – "Household Acids and Bases" (pp. 458) Desktop Investigation- "Testing the pH of Rainwater" (pp. 496) Experiment 16-3 "Is it an Acid or a Base?" (pp. 851-853) Experiment 16-4 "Percentage of Acetic Acid in Vinegar" (pp. 854-857) 	<p>Virtual Titration: http://employees.oneonta.edu/viningwj/sims/titrations_t.html</p> <p>Simulating Equilibrium with Pennies: https://alchemistry.wikispaces.com/file/.../Honors+Equilibrium+Lab.doc</p> <p>Properties of Acids and Bases Lab: www.sciencegeek.net/Chemistry/chempdfs/AcidsandBases.pdf</p> <p>Titration of Vinegar Lab: http://www.smc.edu/projects/28/chemistry_10_experiments/ch10_titration.pdf</p> <p>Microscale Titration of Vinegar Lab: http://www.morganchem.com/PARENTS/MicrotitrationLab.pdf</p>
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VOCABULARY	LeChatelier's Principle, laws of mass action, hydronium ion, hydroxide ion, pH, pOH, titration
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ASSESSMENTS	
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ACADEMIC CONNECTIONS	ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics. Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.
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c	ESSENTIAL QUESTIONS	DIFFERENTIATION
<p>Holt "Visualizing Matter"</p> <ul style="list-style-type: none"> Chapter 14: "Reaction Rates" (pp. 534-573) Chapter 16: "Nuclear Chemistry" (pp. 610-641) <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Chapter 17: "Reaction Rate" (pp. 538-544) Chapter 22: "Nuclear Chemistry" (pp. 701-723) How does changing the conditions in a chemical reaction (i.e. concentration, temperature or pressure) affect the rate of the reaction? What processes are involved in radioactive decay? 		<p><i>The following can be used for gifted & struggling students with teacher modification and according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org.

PERFORMANCE TASKS

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<p>Holt "Visualizing Matter"</p> <p>Exploration 16: Nuclear Chemistry (pp. 610-641)</p> <p>Holt "Modern Chemistry"</p> <ul style="list-style-type: none"> Desktop Investigation- "Factors Influencing Reaction Rate" (pp. 545) Experiment 17-3 "Rate of a Chemical Reaction" (pp. 868-870) 	<p>ODE Chemistry Model Curriculum</p> <p>No nuclear waste generated over the last 40 years has been permanently disposed. Determine the time required for a rock (uranium-238) with a rate constant for decay (4.5 x 10⁻⁹ years) to decompose to safe levels. Propose a method for containing this material until safe levels are achieved</p> <p>Chemical Reactions and Kinetics: http://chemed.chem.purdue.edu/genchem/topicreview/bp/ch22/react.html</p>
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VOCABULARY	
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ASSESSMENTS	
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ACADEMIC CONNECTIONS	ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4; SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics. Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours.; Describe responsible behaviors for working cooperatively in teams, in school and in the workplace.
FIELD EXPERIENCES	
ADDITIONAL RESOURCES	"All Screwed Up" Kinetics Lab: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCkQ6QUoADAA&url=http%3A%2F%2Fwww.questia.com%2Flibrary%2Fp2442%2Fthe-science-teacher&ei=sMduU4PFOmssQSC8oC4Bw&usg=AFQjCNHptvejGxOBAjMbdPmKmpzzSyEvTA&sig2=BLuaCuHX6GwYFUepcpfzhQ
ESL	

Standards Covered

Core: Science

Chemistry

SCI.9-12.: Interactions of Matter

- SCI.9-12.: **Chemical reactions**
 - SCI.9-12.: **Acids/bases**
 - SCI.9-12.: **Equilibrium**
- SCI.9-12.: **Nuclear Reactions**
 - SCI.9-12.: **Nuclear energy**
 - SCI.9-12.: **Radioisotopes**
- SCI.9-12.: **Stoichiometry**
 - SCI.9-12.: **Limiting reagents**
 - SCI.9-12.: **Molar calculations**
 - SCI.9-12.: **Solutions**

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