

CV Guarantee Organization of the Periodic Table (Chemistry 10-12)

Big Idea: Organization of the Periodic Table			
Standard: <u>HS-PS1-1 Matter and its Interactions</u> 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.		Timeline: 2 Weeks	
Key Vocabulary: Element, compound, chemical symbol, chemical formula, phase, aqueous, chemical change, chemical rxn, law of conservation of mass, reactivity, average atomic mass, atomic mass unit, periodic table, group, alkali metal, alkaline earth metal, halogen, period, noble gas, main group element, transition element, lanthanides, actinides, metal, nonmetal, metalloid		Vocabulary Activities: <ul style="list-style-type: none"> ● Interactive notebook entries ● Worksheets ● Classroom activities ● Quizzizz ● Kahoot ● Quizlet 	
Knowledge	Reasoning	Performance Skills	Product Examples
<ul style="list-style-type: none"> ● Decipher basic chemical names and symbols. ● Explain a chemical reaction. ● Understand the law of conservation of matter. 	<ul style="list-style-type: none"> ● Record data and observations from a lab experiment. ● Describe the organization of the periodic table. ● Recognize different patterns related to elemental properties 	<ul style="list-style-type: none"> ● Perform a lab experiment on The Copper Cycle demonstrating the conservation of matter. ● Play "A Periodic Table" review game with partners. 	<ul style="list-style-type: none"> ● Analyze data from Copper Lab Experiment to describe the conservation of matter ● CER
Resources: Stacey, A.M. (2015) Living By Chemistry . Madison, New York: W.H. Freeman and Company.			

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CV Guarantee - Bonding
(Chemistry 10-12)

Big Idea: Bonding patterns in molecular covalent compounds			
<p>Standard:</p> <p>HS-PS1: Matter and Its Interactions</p> <p>HS-PS1-1: 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.</p> <p>HS-PS1-2: Construct and revise an explanation for the outcome 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.</p> <p>HS-PS1-4: 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.</p>		<p>Timeline:</p> <p>3 -4 Weeks</p>	
<p>Key Vocabulary:</p> <p>Molecular formula, structural formula, isomer, HONC 1234, lewis dot symbol, lewis dot structure, bonded pair, lone pair, octet rule, double bond, triple bond.</p>		<p>Vocabulary Activities:</p> <ul style="list-style-type: none"> ● Interactive notebook entries ● Worksheets ● Classroom activities ● Quizzizz ● Kahoot ● Lab investigationa 	
Knowledge	Reasoning	Performance Skills	Product Examples
<ul style="list-style-type: none"> ● Understand that matter is defined as anything that takes up space and has mass and volume. 	<ul style="list-style-type: none"> ● Classify different elements in the Periodic Table based on their characteristics and reactivity. 	<ul style="list-style-type: none"> ● Perform a lab experiment to test the law of the conservation of matter (The Copper Cycle). 	<ul style="list-style-type: none"> ● Diagram the different steps in The Copper Cycle. ● Element investigation - explain specific elements and their

• Identify the trends in the Periodic Table.	• Compare and classify items that contain matter and are not matter.	• Create a Periodic Table of Elements.	significance on the Periodic Table.
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Resources:

Stacey, A.M. (2015) **Living By Chemistry**. Madison, New York: W.H. Freeman and Company.

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CV Guarantee Nuclear Reactions (Honors Physics 10-12)

Big Idea: Nuclear Reactions and Processes			
<p>Standard:</p> <p>HS-PS1-8: Develop models 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.</p> <p>PS3: Energy</p> <ul style="list-style-type: none"> ● PS3.A: Definitions of Energy <ul style="list-style-type: none"> ○ Discusses the concept of energy in nuclear reactions, where energy is released or absorbed. ● PS3.D: Energy in Chemical Processes <ul style="list-style-type: none"> ○ This can relate to the energy changes during chemical reactions, including those involving nuclear processes. 		<p>Timeline:</p> <p>3 Weeks</p>	
<p>Key Vocabulary:</p> <p>Isotope, nuclear reaction, mass number, average atomic mass, radioactive decay, alpha decay, beta decay, gamma decay, beta particle, alpha particle, half-life, fusion, fission, parent isotope, daughter isotope, chain reaction, mass binding energy,</p>		<p>Vocabulary Activities:</p> <ul style="list-style-type: none"> ● Interactive notebook entries ● Worksheets ● Classroom activities ● Quizizz ● Kahoot ● Quizlet 	
Knowledge	Reasoning	Performance Skills	Product Examples
<ul style="list-style-type: none"> ● Describe the general composition of a stable and unstable nucleus. ● Explain the different processes involved in nuclear changes and the conditions required for those processes. ● Explain the connection between nuclear changes and the changes in atomic identity. 	<ul style="list-style-type: none"> ● Interpret a graph of naturally occurring isotopes. ● Write a balanced nuclear equation. 	<ul style="list-style-type: none"> ● Activity: Conduct a research project where students investigate a nuclear technology application, such as nuclear power plants or medical isotopes. Create a presentation or report analyzing the scientific, environmental, and ethical aspects of the technology. Include a 	<ul style="list-style-type: none"> ● Diagram the different nuclear equations for alpha decay, beta decay, gamma decay, fusion and fission. ● Nuclear power investigation reflection paper - research and explain the pros and cons associated with the use of Nuclear Power.

		discussion of alternative energy sources and propose solutions to mitigate any negative impacts.	
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Resources: Mrs. Brousseau's Physics Bundle, Teachers Pay Teachers. Conceptual Physics, Hewitt.

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CV Guarantee - Chemical Reactions
(Chemistry 10-12)

Big Idea: Bonding patterns in molecular covalent compounds	
<p>Standard:</p> <p>HS-PS1: Matter and Its Interactions</p> <p>HS-PS1-2: Construct and revise an explanation for the outcome 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.</p> <p>HS-PS1-4: 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.</p> <p>HS-PS1-5: 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.</p> <p>HS-PS1-6:</p> <ul style="list-style-type: none">○ Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. <p>HS-PS1-7: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.</p>	<p>Timeline:</p> <p>4 Weeks</p>
<p>Key Vocabulary: reactants, products, chemical equation, balanced equation, stoichiometry, conservation of mass, catalyst, activation energy, exothermic, endothermic, equilibrium, reaction rate, concentration, collision theory, catalyst, oxidation, reduction, precipitation, synthesis, decomposition</p>	<p>Vocabulary Activities:</p> <ul style="list-style-type: none">● Interactive notebook entries● Worksheets● Classroom activities● Quizzizz● Kahoot● Lab investigations

Knowledge	Reasoning	Performance Skills	Product Examples
<p>Define a chemical reaction and give an example.</p> <p>List the signs that a chemical reaction has occurred.</p> <p>Identify the reactants and products in a chemical reaction.</p>	<p>Compare and contrast endothermic and exothermic reactions with examples.</p> <p>Summarize the steps of the scientific method as they apply to conducting an experiment on chemical reactions.</p>	<p>Students will design and conduct an experiment to investigate how different factors affect the rate of a chemical reaction, analyze the results, and present their findings.</p>	<p>Students will investigate how changing conditions affect chemical equilibrium and predict the direction of shift in equilibrium using Le Chatelier's principle. They will conduct an experiment, analyze data, and present their findings.</p>

Resources:

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