

HSPI Activity Title from HS Chemistry	NGSS: Science and Engineering Practices
Safety First	<ul style="list-style-type: none"> - Developing and using models - Constructing explanations (for science) and designing solutions (for engineering)
Fundamentals of Experimental Design	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Planning and carrying out investigations - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Organizing Data	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Significant Digits and Measurement	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

<p>Significant Zeroes</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
<p>Classification of Matter</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
<p>Isotopes</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Ions	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Average Atomic Mass	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

Coulombic Attraction	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Electron Energy and Light	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

<p>Electron Configuration</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
<p>Cracking the Periodic Table Code</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
<p>Periodic Trends</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Naming Ionic Compounds	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Polyatomic Ions	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Naming Molecular Compounds	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

Naming Acids	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Molecular Geometry	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Types of Chemical Reactions	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

Relative Mass and Mole	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Mole Ratios	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

Limiting and Excess
Reactants

- Asking questions (for science) and defining problems (for engineering)
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Gas Variables	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Saturated and Unsaturated Solutions	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

Solubility	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Molarity	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

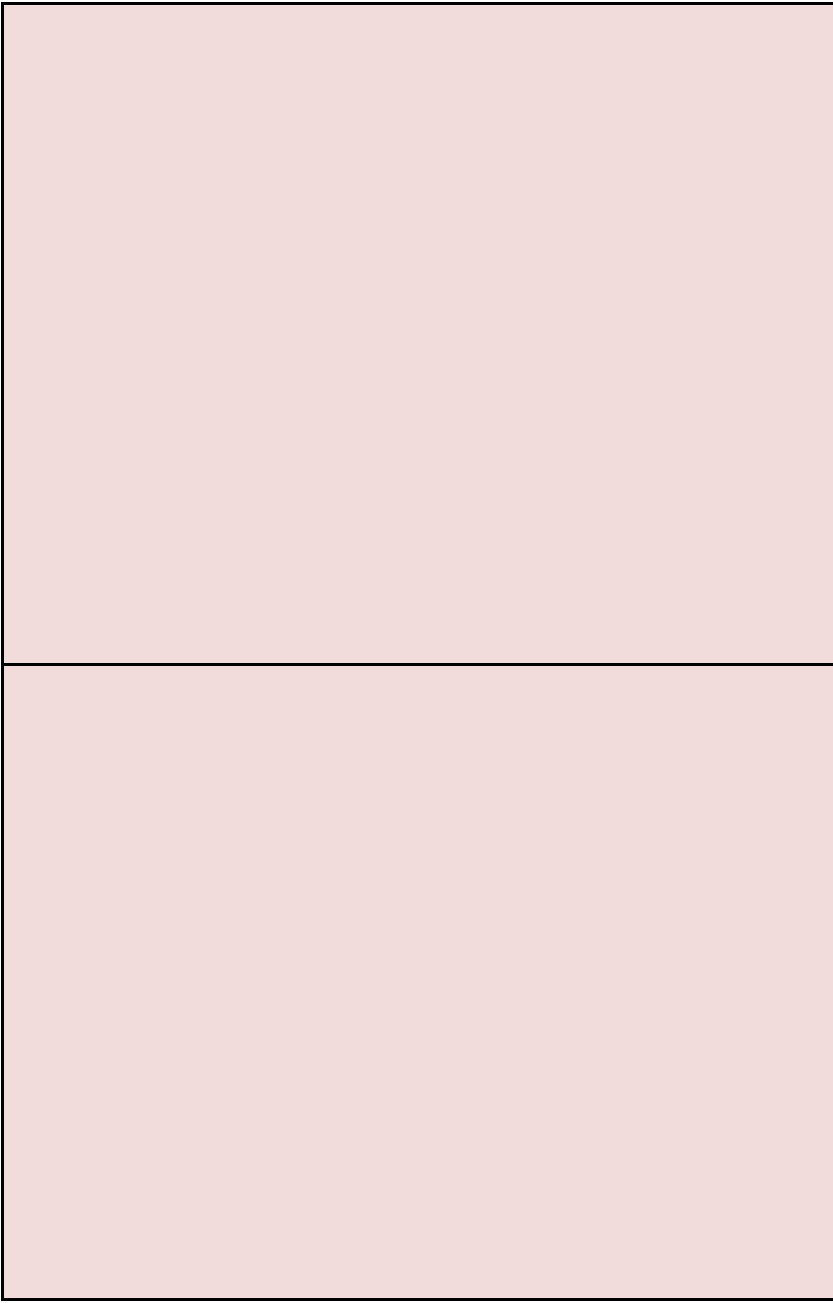
Calorimetry	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Bond Energy	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

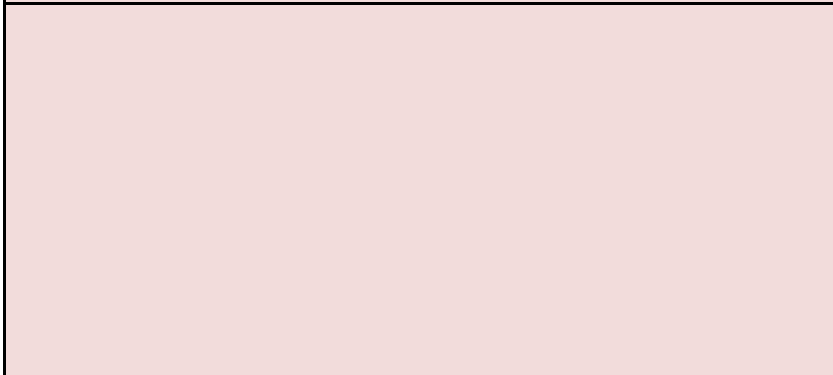
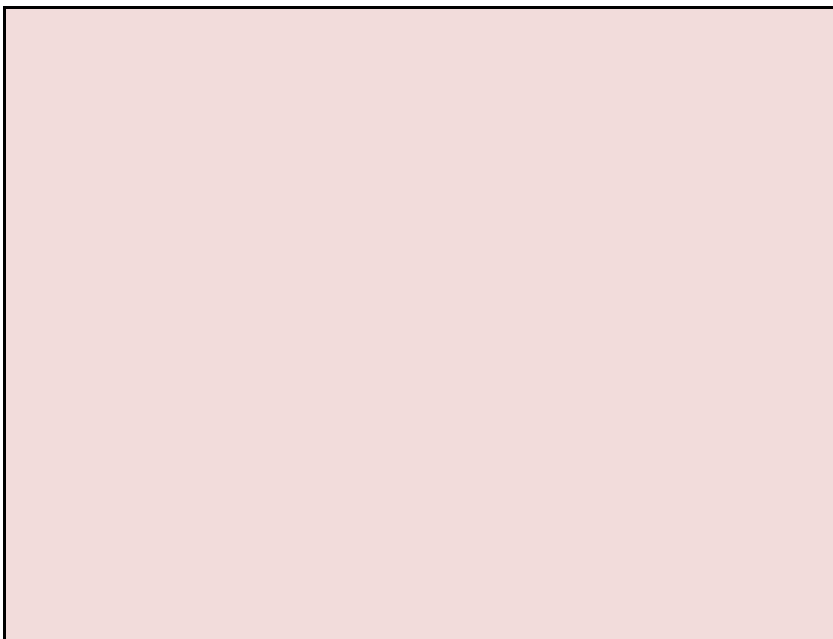
Equilibrium	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Acids and Bases	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

Strong vs Weak Acids	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information
Calculating pH	<ul style="list-style-type: none">- Asking questions (for science) and defining problems (for engineering)- Developing and using models- Analyzing and interpreting data- Using mathematics and computational thinking- Constructing explanations (for science) and designing solutions (for engineering)- Engaging in argument from evidence- Obtaining, evaluating, and communicating information

<p>Oxidation and Reduction</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
<p>Activity Series</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
<p>Batteries</p>	<ul style="list-style-type: none"> - Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

NGSS: Performance Expectations





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.

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.

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.

HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. 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.

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. HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. HS-PS4-3. 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.

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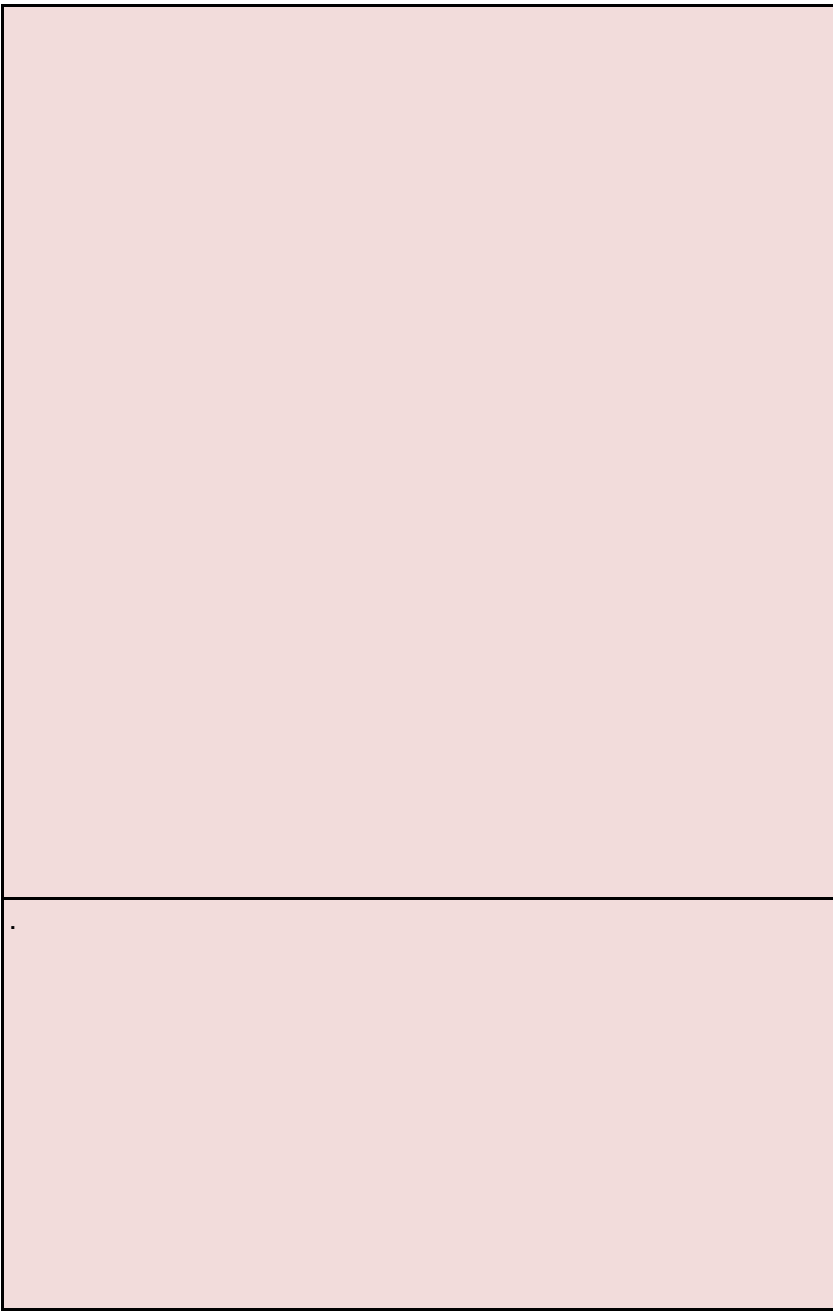
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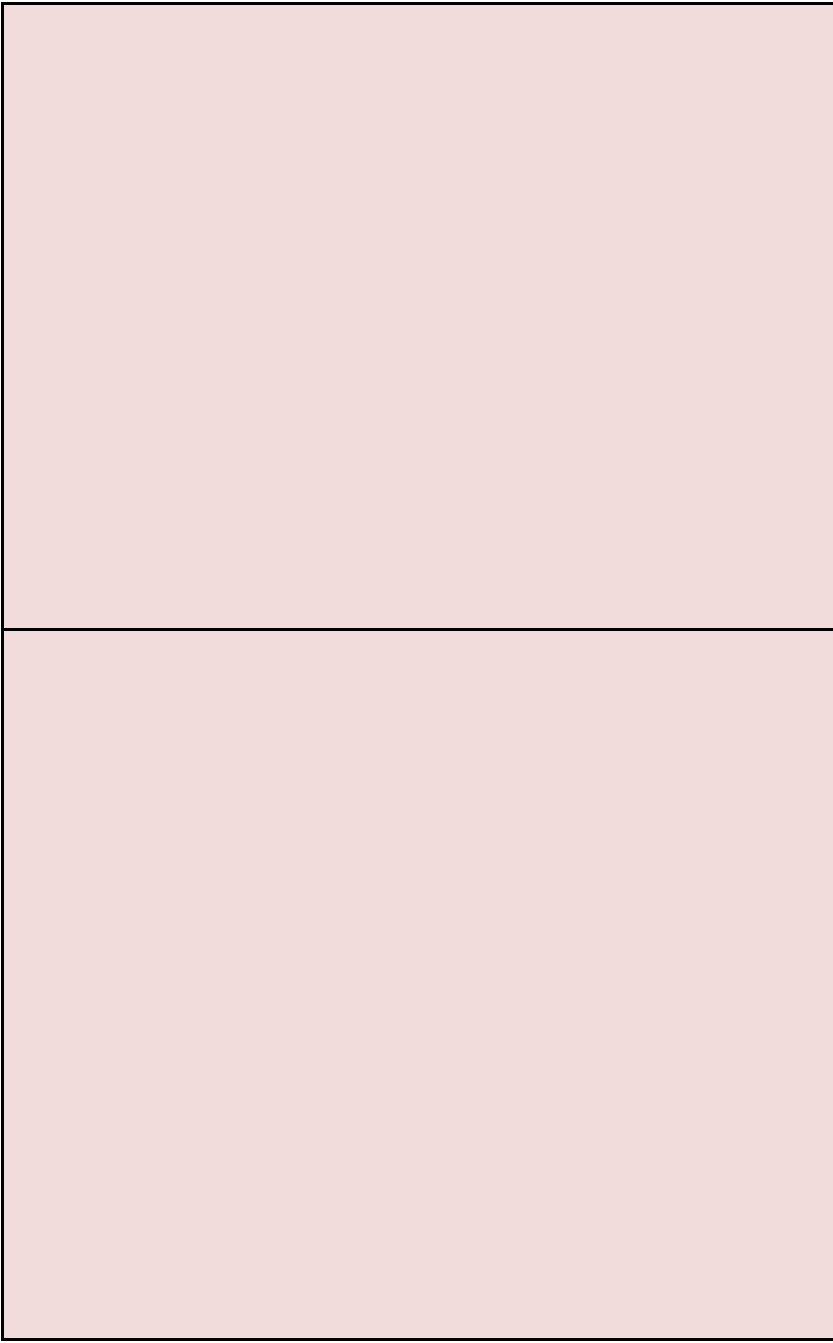
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HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

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. HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

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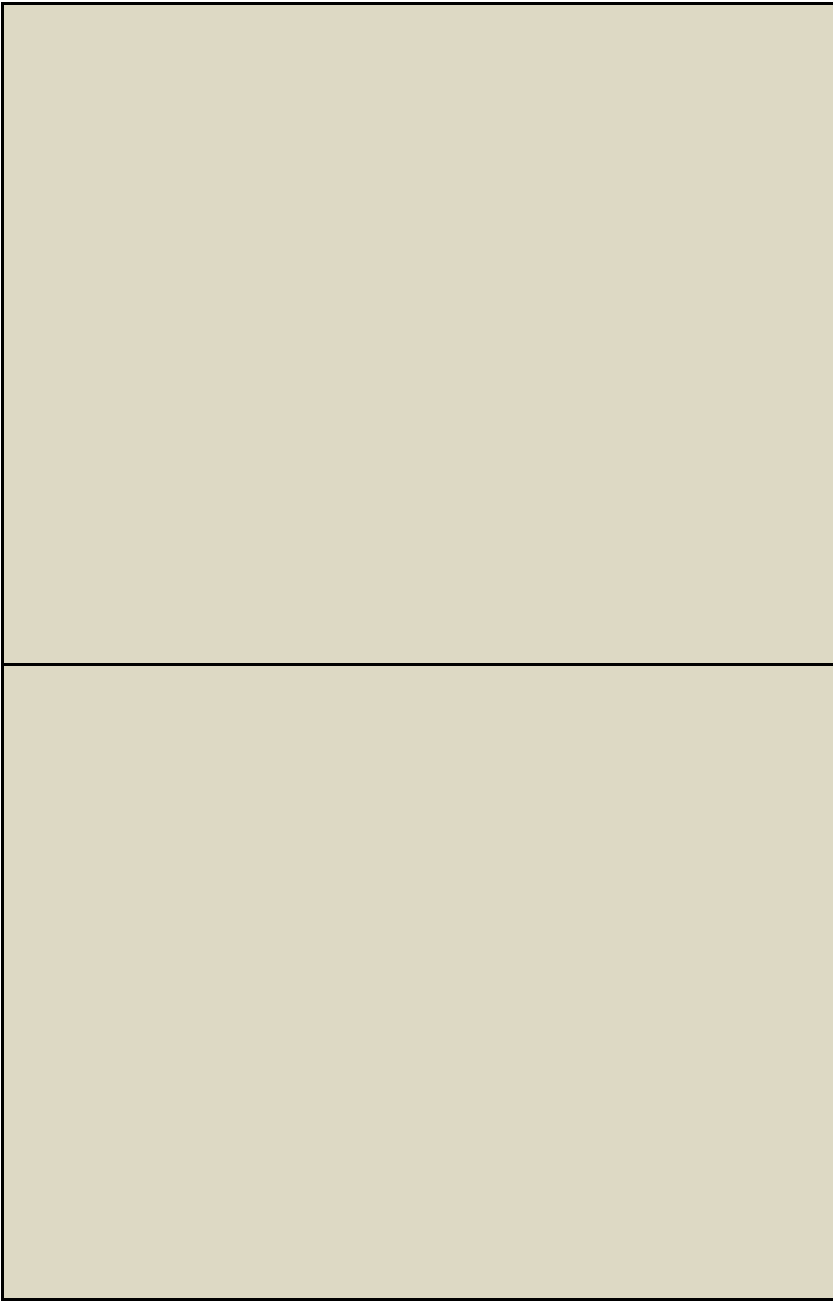
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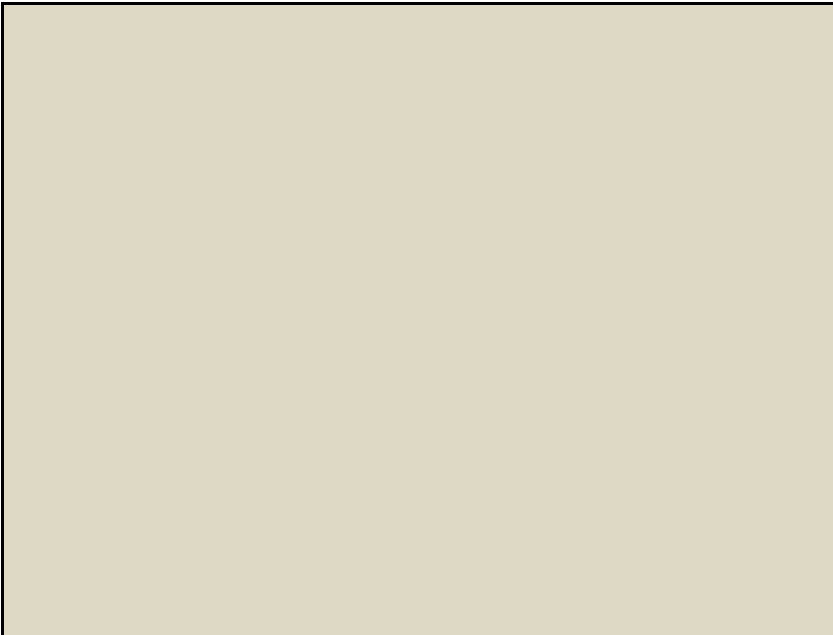
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NGSS: Disciplinary Core Idea





PS 1.a. Structure and Properties of Matter.

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PS 2.b. Types of Interactions. PS 1.a. Structure and Properties of Matter.

PS 1.a. Structure and Properties of Matter. PS 4.a. Wave Properties. PS 4.b. Electromagnetic Radiation.

PS 1.a. Structure and Properties of Matter.

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PS 1.a. Structure and Properties of Matter. PS 1.b. Chemical Reactions.

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PS 1.a. Structure and Properties of Matter. PS 2.a. Forces and Motion.

PS 1.a. Structure and Properties of Matter.

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PS 3.b. Conservation of Energy and Energy Transfer

PS 1.b. Chemical Reactions. PS 3.d. Energy and Chemical Processes.

PS 1.b. Chemical Reactions.

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PS 1.a. Structure and Properties of Matter. PS 1.b. Chemical Reactions.

PS 1.a. Structure and Properties of Matter.

PS 1.b. Chemical Reactions. PS 3.b. Conservation of Energy and Energy Transfer. PS 3.d. Energy and Chemical Processes.

PS 1.a. Structure and Properties of Matter. PS 1.b. Chemical Reactions.

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Common Core: ELA-Science and Technical Subjects	Common Core Math
<p>RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. (HS-PS1-1) WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-PS1-2),(HS-PS1-5) WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS1-3)</p>	
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