

# ChemMatters Magazine December 2023

## Chemistry Concepts & Standard Alignments (NGSS, CCSS)

### Correlations to Next Generation Science Standards



Article	Chemistry Concepts	NGSS Connections
<b><i>Fighting Frost with Ice</i></b>	Physical change Chemical change Activation energy Energy diagrams Enthalpy Exothermic and endothermic Intramolecular forces Intermolecular forces	<p><b>HS-PS1-4.</b> Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy.</p> <p><b>Disciplinary Core Ideas:</b></p> <ul style="list-style-type: none"> <li>PS.1.A: Structure and Properties of Matter</li> <li>PS.2.B: Chemical Reactions</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>Cause and effect</li> <li>Systems and system models</li> <li>Energy and matter</li> </ul> <p><b>Science and Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>Obtaining, evaluating, and communicating information</li> </ul> <p><b>Nature of Science:</b></p> <ul style="list-style-type: none"> <li>Scientific knowledge assumes an order and consistency in natural systems.</li> </ul>
<b><i>Hot and Cold Therapies for Injuries and Disease</i></b>	Enthalpy Exothermic and endothermic Heat Molecular structure	<p><b>HS-PS1-4.</b> Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy.</p> <p><b>HS-LS1-3.</b> Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p> <p><b>HS-ETS1-2.</b> Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p><b>Disciplinary Core Ideas:</b></p> <ul style="list-style-type: none"> <li>PS.1.A: Structure and Properties of Matter</li> <li>LS.1.A: Structure and Function</li> <li>ETS.1.C: Optimizing the Design Solution</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>Cause and effect</li> <li>Energy and matter</li> </ul> <p><b>Science and Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>Constructing explanations (for science) and designing solutions (for engineering)</li> </ul>

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<p><b>5 Things to Know About Glitter</b></p>	<p>Intermolecular forces Polymers</p>	<p><b>HS-PS1-3.</b> 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.</p> <p><b>HS-ETS1-3.</b> Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.</p> <p><b>Disciplinary Core Ideas:</b></p> <ul style="list-style-type: none"> <li>PS.1.A: Structure and Properties of Matter</li> <li>ETS1.C: Optimizing the Design Solution</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>Cause and effect</li> <li>Structure and function</li> </ul> <p><b>Science and Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>Constructing explanations (for science) and designing solutions (for engineering)</li> </ul> <p><b>Nature of Science:</b></p> <ul style="list-style-type: none"> <li>Science addresses questions about the natural and material world.</li> </ul>
<p><b>Keeping the Playing Field Level</b></p>	<p>Molecular structure Pharmaceuticals Instrumentation</p>	<p><b>HS-ETS1-1.</b> Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.</p> <p><b>Disciplinary Core Ideas:</b></p> <ul style="list-style-type: none"> <li>PS.1.A: Structure and Properties of Matter</li> <li>ETS1.C: Optimizing the Design Solution</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>Scale, proportion, and quantity</li> <li>Structure and function</li> </ul> <p><b>Science and Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>Analyzing and interpreting data</li> </ul> <p><b>Nature of Science:</b></p> <ul style="list-style-type: none"> <li>Scientific knowledge is based on empirical evidence.</li> </ul>