

# ChemMatters Magazine December 2020

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



### Correlations to Next Generation Science Standards

Article	Chemistry Concepts	NGSS Connections
<p><a href="#"><u>How to Raise a Jellyfish</u></a></p>	<p>Acids and Bases: indicators, pH, titrations</p> <p>Equilibrium: Le Chatelier's Principle</p>	<p><b>HS-PS1-6</b> Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.</p> <p><b>Disciplinary Core Ideas:</b></p> <ul style="list-style-type: none"> <li>PS1.B: Chemical Reactions</li> <li>ESS3.C: Human Impacts on Earth Systems</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>Scale, Proportion, and Quantity</li> <li>Systems and System Models</li> <li>Stability and Change</li> </ul> <p><b>Science and Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>Analyzing and interpreting data</li> <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>Scientific knowledge assumes an order and consistency in natural systems.</li> </ul>
<p><b>The Chemistry of Convenience</b></p>	<p>Molecules &amp; bonding</p> <p>Molecular structure</p> <p>Intermolecular forces</p> <p>Electronegativity</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 constraint, 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>PS1.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: Mechanism and explanation.</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> <li>Constructing explanations and designing solutions</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>Mirror Reflections</b></p>	<p>Atomic Structure: electrons</p> <p>Chemistry Basics: physical properties</p> <p>States of Matter: sublimation</p> <p>Electrochemistry: redox reaction</p>	<p><b>HS-PS1-1.</b> 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><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 constraint, 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>• PS1.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>• Patterns</li> <li>• Structure and Function</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>
<p><b>Can a Vaccine End the Pandemic?</b></p>	<p>Molecules &amp; bonding: Molecular structure</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 constraint, 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>• ETS1.C: Optimizing the Design Solution</li> </ul> <p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>• Cause and Effect: Mechanism and explanation</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> <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>

## Correlations to Common Core State Standards



**Note:** ELA-Literacy **Common Core State Standards** Connections for all articles

- **ELA-Literacy.RST.9-10.1:** Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- **ELA-Literacy.RST.9-10.2:** Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- **ELA-Literacy.RST.9-10.5:** Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).
- **ELA-Literacy.RST.9-10.8:** Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- **ELA-Literacy.RST.11-12.1:** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- **ELA-Literacy.RST.11-12.2:** Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- **ELA-Literacy.RST.11-12.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11-12 texts and topics*.
- **ELA-Literacy.RST.11-12.6:** Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

**In addition**, the teacher could assign writing to include the following **Common Core State Standards**:

- **ELA-Literacy.WHST.9-10.2:** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- **ELA-Literacy.WHST.9-10.2F:** Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
- **ELA-Literacy.WHST.11-12.2:** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
- **ELA-Literacy.WHST.11-12.2E:** Provide a concluding statement or section that follows from or supports the argument presented.