

ChemMatters Magazine December 2021

Chemistry Concepts & Standard Alignments (NGSS, CCSS)

Correlations to Next Generation Science Standards



| Article | Chemistry Concepts | NGSS Connections |
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| <p><i>Bath Bombs: The Chemistry Behind the Fizz</i></p> | <p>Acid-base reactions</p> <p>Strong vs. weak acids/bases</p> <p>Solute/solvent</p> <p>Electronegativity</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>Disciplinary Core Ideas:</p> <ul style="list-style-type: none"> PS.1.B: Chemical Reactions <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Patterns Structure and function Cause and effect <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Constructing explanations and designing solutions <p>Nature of Science:</p> <ul style="list-style-type: none"> Science addresses questions about the natural and material world |
| <p><i>Radiation. The Good. The Bad. And Its Place in Our Modern World</i></p> | <p>Nuclear chemistry</p> <p>Alpha/beta/gamma decay</p> <p>Radioactive isotopes</p> <p>Radiation</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 levels of atoms.</p> <p>HS-PS1-7. 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>Disciplinary Core Ideas:</p> <ul style="list-style-type: none"> PS1.A: Structure and Properties of Matter PS1.C: Nuclear Processes <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and effect Energy and matter Stability and change <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Engaging in argument from evidence |

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| | | <ul style="list-style-type: none"> Constructing explanations and designing solutions <p>Nature of Science:</p> <ul style="list-style-type: none"> Scientific knowledge is based on empirical evidence. |
| <i>Tales of Concrete Forensics</i> | Chemical changes Physical properties Mixtures | <p>HS-ETS1-3. 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>Disciplinary Core Ideas:</p> <ul style="list-style-type: none"> ETS1.B: Developing possible solutions <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and effect Systems and system models <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Analyzing and interpreting data Constructing explanations and designing solutions <p>Nature of Science:</p> <ul style="list-style-type: none"> Scientific knowledge is based on empirical evidence. |
| <i>The Mesmerizing Pull of Ferrofluids</i> | Electron configuration Orbitals Periodic table Physical properties | <p>HS-PS1-1. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of 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-ETS1-2. 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>Disciplinary Core Ideas:</p> <ul style="list-style-type: none"> PS1.A: Structure and properties of matter ETS1C: Optimizing the design solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Patterns Structure and function <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Developing and using models Constructing explanations and designing solutions <p>Nature of Science:</p> <ul style="list-style-type: none"> Scientific knowledge assumes an order and consistency in natural systems |

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.