# *ChemMatters* Magazine April 2021

# Chemistry Concepts & Standard Alignments (NGSS, CCSS)

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**Correlations to Next Generation Science Standards**

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| Article | Chemistry Concepts | NGSS Connections |
| *Beat the Heat… With Paint!* | Physical propertiesEndothermic and exothermicElectromagnetic spectrum | **HS-PS3-3**Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. **HS-ETS1-3** 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.**Disciplinary Core Ideas:*** PS3.B: Conservation of Energy and Energy Transfer
* ETS1.C: Optimizing the Design Solution

**Crosscutting Concepts:** * Cause and effect: Mechanism and explanation
* Systems and System Models
* Energy and Matter
* Structure and Function

**Science and Engineering Practices:** * Developing and using models
* Constructing explanations and designing solutions

**Nature of Science:** Science is a human endeavor. |
| [*How to Make Fashion Sustainable*](https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters/past-issues/2020-2021/april-2021/sustainable-fashion.html) | Molecular structurePolymersSolutionsIntermolecular forces | **HS-PS1-3**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. **HS-ETS1-3** 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. **Disciplinary Core Ideas:*** PS1.A: Structure and Properties of Matter
* ETS1.C: Optimizing the Design Solution

**Crosscutting Concepts:** * Structure and function
* Scale, proportion, and quantity
* Energy and matter

**Science and Engineering Practices:** * Planning and carrying out investigations

**Nature of Science:** Scientific knowledge assumes an order and consistency in natural systems. |
| *What is Ice Cream?* | SolutionsFreezing point depressionMixturesFreezing point | **HS-PS1-3**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. **HS-ETS1-3**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.**Disciplinary Core Ideas:*** PS1.A: Structure and Properties of Matter
* ETS1.C: Optimizing the Design Solution

**Crosscutting Concepts:** * Cause and effect: Mechanism and explanation
* Structure and Function

**Science and Engineering Practices:** * Planning and carrying out investigations

**Nature of Science:** * Science addresses questions about the natural and material world.
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| *Are We Running Out of Helium?* | Electron configurationSeparating mixturesDensityAlpha decayHalf-lives | **HS-PS1-1**Use the periodic table as a model to predict the relative properties of elements based on the patterns of elections in the outermost energy level of atoms.**HS-ETS1-1**Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.**Disciplinary Core Ideas:*** PS1.A: Structure and Properties of Matter
* PS1.C: Nuclear Processes
* ETS1.A: Defining and Delimiting Engineering Problems

**Crosscutting Concepts:** * Patterns
* Stability and Change
* Structure and Function

**Science and Engineering Practices:** * Asking questions and defining problems

**Nature of Science:** * Scientific knowledge assumes an order and consistency in natural systems.
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**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.