

ChemMatters Magazine February 2021

Chemistry Concepts & Standard Alignments (NGSS, CCSS)



Correlations to Next Generation Science Standards

Article	Chemistry Concepts	NGSS Connections
<i>Is Cold Brew Really Different from Iced Coffee?</i>	<p>Gases</p> <p>Molecules & Bonding: Polarity</p> <p>Organic Chemistry: Functional groups; molecular structure</p> <p>Solutions</p>	<p>HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.</p> <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 constraint, 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"> PS1.A: Structure and Properties of Matter ETS1.C: Optimizing the Design <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and effect: Mechanism and explanation Structure and Function <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Planning and carrying out investigations <p>Nature of Science:</p> <ul style="list-style-type: none"> Scientific knowledge assumes an order and consistency in natural systems.
<i>How Safe are Hair Dyes?</i>	<p>Electrochemistry: Oxidation</p> <p>Molecules & bonding: Covalent bonding, intermolecular forces</p> <p>Organic Chemistry: Molecular structure</p>	<p>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.</p> <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 constraint, 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"> PS1.A: Structure and Properties of Matter ETS1.C: Optimizing the Design Solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and Effect: Mechanism and explanation. Structure and Function <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"> Science addresses questions about the natural and material world.

<p><u>Volcanoes: Terror from Below</u></p>	<p>Energy & Thermodynamics</p> <p>States of Matter</p> <p>Quantitative Chemistry</p>	<p>HS-ESS2-3 Develop a model based on evidence of Earth’s interior to describe the cycling of matter by thermal convection.</p> <p>Disciplinary Core Ideas:</p> <ul style="list-style-type: none"> • ESS2.A Earth Materials and Systems • ESS2.B: Plate Tectonics and Large-Scale System Interactions <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> • Cause and effect • Energy and Matter • Systems and System Models • Stability and Change <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> • Analyzing and interpreting data • Constructing explanations (for science) and designing solutions (for engineering) <p>Nature of Science:</p> <ul style="list-style-type: none"> • Scientific knowledge assumes an order and consistency in natural systems.
<p><i>To Mars and Back</i></p>	<p>Electrochemistry: Electrolysis</p> <p>Energy & Thermodynamics: Activation energy</p> <p>Nuclear chemistry: Radioactive isotopes</p> <p>Reactions & Stoichiometry</p>	<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 constraint, including cost, safety, reliability, and aesthetics, as well as possible social, cultural</p> <p>Disciplinary Core Ideas:</p> <ul style="list-style-type: none"> • PS1.A: Structure and Properties of Matter • ETS1.C: Optimizing the Design Solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> • Energy and Matter • Structure and Function <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> • Developing and using models • Planning and carrying out investigations <p>Nature of Science:</p> <ul style="list-style-type: none"> • Scientific investigations use a variety of methods.

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.