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Chemistry Concepts & Standard Alignments (NGSS, CCSS)

Correlations to Next Generation Science Standards

Article	Chemistry Concepts	NGSS Connections
Cow Power!	Chemical Reactions Energy and Thermodynamics Kinetics: catalysts Reactions & Stoichiometry	**HS-LS2-3** Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. **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. **Disciplinary Core Ideas**: • LS2.B: Cycles of Matter and Energy Transfer in Ecosystems • ETS1.C: Optimizing the Design Solution **Crosscutting Concepts:** • Systems and System Models • Scale, Proportion, and Quantity • Energy and Matter **Science and Engineering Practices:** • Constructing explanations and designing solutions • Obtaining, evaluating, and communicating information **Nature of Science:** Science is a human endeavor.
Clearing the Air	Gases: Density Reactions & Stoichiometry	**HS-ESS3-4** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. **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:** • ESS3.c: Human Impacts on Earth Systems • ETS1.B: Developing Possible Solutions **Crosscutting Concepts:** • Cause and Effect: Mechanism and explanation. • Scale, Proportion, and Quantity • Systems and System Models • Stability and Change **Science and Engineering Practices:** • Analyzing and interpreting data • Constructing explanations and designing solutions

		Nature of Science: Scientific knowledge assumes an order and consistency in natural systems.
Capturing Carbon	Chemistry Basics – physical properties Reactions & Stoichiometry – chemical change; conservation of matter States of Matter – phase changes; phase diagram; sublimation	**HS-ESS3-4** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. **HS-ESS3-5** Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems. **HS-ESS3-6** Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. **Disciplinary Core Ideas:** • PS1.A: Structure and Properties of Matter • ESS3.C: Human Impacts on Earth Systems • ESS3.D: Global Climate Change **Crosscutting Concepts:** • Systems and System Models • Cause and Effect: Mechanism and explanation • Stability and Change **Science and Engineering Practices:** • Analyzing and interpreting data • Constructing explanations (for science) and designing solutions (for engineering) • Engaging in argument from evidence **Nature of Science:** • Scientific knowledge is based on empirical evidence. • Scientific investigations use a variety of methods.
Why Avocados Are So Appealing	Chemistry basics – Chemical and Physical changes Kinetics - catalysts Organic Chemistry – molecular structure; saturated vs. unsaturated Reactions & Stoichiometry	**HS-PS2-6** Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. **Disciplinary Core Ideas:** • PS1.A: Structure and Properties of Matter • PS1.B: Chemical Reactions **Crosscutting Concepts:** • Cause and Effect: Mechanism and explanation • Structure and Function **Science and Engineering Practices:** • Constructing explanations (for science) and designing solutions (for engineering) **Nature of Science:** 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.