



Correlations to Next Generation Science Standards

Article	Chemistry Concepts	NGSS Connections
<i>Save It for Later: Batteries Keep Us Energized</i>	Electrochemistry Electrolytic cells Oxidation Reduction Redox reaction Spontaneous vs nonspontaneous reactions	<p>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.</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 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"> PS.3.D: Energy in Chemical Processes ETS1.B: Developing Possible Solutions <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Systems and system models Energy and matter: Flows, cycles, and conservation <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Constructing explanations (for science) and designing solutions (for engineering) <p>Nature of Science:</p> <ul style="list-style-type: none"> Science is a human endeavor.
<i>How Did the Battery Get Its Name?</i>	Anode Cathode Electricity Electrolytic cells Oxidation Reduction	<p>HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy.</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 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"> PS.1.A: Structure and Properties of Matter PS.1.B: Chemical Reactions ETS.1.C: Optimizing the Design Solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Systems and system models Energy and matter Structure and function <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Constructing explanations (for science) and designing solutions (for engineering)

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<p><i>Lithium: The 21st Century Gold Rush</i></p>	<p>Anode Cathode Oxidation Oxidation number Reduction Solubility Precipitate Separating mixtures</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 level of atoms.</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 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"> PS.1.A: Structure and Properties of Matter PS.2.B: Types of Interactions ETS1.C: Optimizing the Design Solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Scale, proportion, and quantity Systems and system models Energy and matter: Flows, cycles, and conservation <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> 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>The Earth's Chemical Fingerprint</i></p>	<p>States of matter Isotopes</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>HS-ESS1-6. Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.</p> <p>Disciplinary Core Ideas:</p> <ul style="list-style-type: none"> PS.1.A: Structure and Properties of Matter ESS1.C: The History of Planet Earth <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and effect: Mechanism and explanation Systems and system models Stability and change <p>Science and Engineering Practices:</p> <ul style="list-style-type: none"> Obtaining, evaluating, and communicating information <p>Nature of Science:</p> <ul style="list-style-type: none"> Scientific knowledge is open to revision in light of new evidence.