

ChemMatters Magazine February 2023

Chemistry Concepts & Standard Alignments (NGSS, CCSS)

Correlations to Next Generation Science Standards



| Article | Chemistry Concepts | NGSS Connections |
|---|---|---|
| <i>The Chemistry of Shaving</i> | Physical properties Mixtures (alloys) Pressure Volume Molecular structure | <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-ETS1-2. 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"> PS.1.A: Structure and Properties of Matter ETS1.B: Developing Possible Solutions ETS1.C: Optimizing the Design Solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and effect Structure and function <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>Electric Vehicles! What's the Chemistry That Makes Them Go?</i> | Atomic mass Electrochemistry Anode Cathode Electrolytic cells Oxidation Reduction Reduction potential Half reaction | <p>HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.</p> <p>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.</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 PS.3.A: Definitions of Energy ETS1.A: Defining and Delimiting Engineering Problems ETS1.C: Optimizing the Design Solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and effect Systems and system models Energy and matter <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>What's in Your Paintbox?</i></p> | <p>Physical properties Chemical change Solutions Solute/solvent Electrons</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-ETS1-2. 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"> PS.1.A: Structure and Properties of Matter PS.3.A: Definitions of Energy ETS1.B: Developing Possible Solutions <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Cause and effect Structure and function Energy and matter <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 models, laws, mechanisms, and theories explain natural phenomena. |
| <p><i>What's Chocolate, and How Does Its Chemistry Inspire Such Cravings?</i></p> | <p>Separating mixtures Molecular structure Saturated vs. unsaturated</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 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 ETS1.C: Optimizing the Design Solution <p>Crosscutting Concepts:</p> <ul style="list-style-type: none"> Structure and function <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. |