ARISE Curriculum Guide

Chemistry: Topic 11—Thermochemistry

ChemMatters
Order a CD with 25 years of ChemMatters, $30

Articles for Student Use


Articles for Teacher Use

Number and Topic: 1. Matter and Change
6. Chemical Names and Formulas/Compounds and Elements
8. Chemical Reactions
10. Phases, Solids, Liquids and Gases (States of Matter)
11. Thermochemistry,
Type of Material: Student Journal Article
Building on: Chemical names and formulas/compounds and elements, chemical reactions and thermochemistry
Leading to: Reaction rates, redox reactions
Links to Physics: Matter, energy, thermodynamics, heat
Links to Biology: Entire article is a “good story”
Good Stories: Article describes the history of the development of the common match, covering early matches and their inherent weaknesses and dangers.
Activity Description: Good review of chemical equations and/or a review or introduction to redox reactions.
Activity Description: Article discusses the chemistry and electron transitions that produce the colors seen in fireworks.

Activity Description: Article deals with explosive nitrogen-containing compounds and the chemical reasons that underlie their explosive nature.

Activity Description: This article is an extension of the article, “Burning Diamonds and Squeezing Peanuts” that precedes it. It goes into more thermodynamic detail regarding the conversion of graphite into diamonds, including the phase diagram for the diamond-graphite-liquid system.
Number and Topic: 8. Chemical Reactions

Type of Material: Student Journal Article
Building on: Chemical reactions
Leading to: Thermochemistry and redox
Links to Physics: Matter, energy, thermodynamics, heat, entropy
Good Stories: Article describes the thermite reaction, its history, the thermodynamics behind it, and some of its practical applications.

Number and Topic: 8. Chemical Reactions

Type of Material: Student Journal Article
Building on: Properties of compounds and elements, chemical reactions, gas laws
Leading to: Redox reactions
Links to Physics: Strong links to motions and forces and kinematics as well as measurement

Number and Topic: 8. Chemical Reactions

Type of Material: Student Journal Article
Building on: Chemical reactions
Leading to: Combustion reactions
Links to Physics: Molecular structure of wood
Good Stories: Article discusses the composition of wood, how and why it burns, and the chemical processes and reactions that are involved.
<table>
<thead>
<tr>
<th>Number and Topic:</th>
<th>8. Chemical Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source:</td>
<td>ChemMatters, Feb. 1987, pp. 7-11, “Hot and Cold Packs”</td>
</tr>
<tr>
<td>Type of Material:</td>
<td>Student Journal Article and Activity</td>
</tr>
<tr>
<td>Leading to:</td>
<td>Thermodynamics of the dissolving process</td>
</tr>
<tr>
<td>Links to Physics:</td>
<td>Thermodynamics, heat, energy, entropy</td>
</tr>
<tr>
<td>Activity Description:</td>
<td>Article discusses both “hot packs” and “cold packs” and how they utilize both chemical reactions and simple crystallization to either release heat or absorb heat from their surroundings.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number and Topic:</th>
<th>11. Reaction rates.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Material:</td>
<td>Student Journal Article</td>
</tr>
<tr>
<td>Leading to:</td>
<td>A discussion of ignition temperatures and reaction kinetics, including activation energy.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number and Topic:</th>
<th>8. Chemical Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source:</td>
<td>ChemMatters, April 1997, pp. 11-13, “Fire in the Hold”</td>
</tr>
<tr>
<td>Type of Material:</td>
<td>Student Journal Article</td>
</tr>
<tr>
<td>Leading to:</td>
<td>Oxidation-reduction, Reaction Rates</td>
</tr>
<tr>
<td>Activity Description:</td>
<td>Tells of the explosion of a Turkish ship in 1996 that was caused by unintended oxidation of porous iron pellets stored.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number and Topic:</th>
<th>11. Thermochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source:</td>
<td>ChemMatters, Feb. 1987, pp. 7-11, “Hot and Cold Packs”</td>
</tr>
<tr>
<td>Type of Material:</td>
<td>Student Journal Article</td>
</tr>
<tr>
<td>Leading to:</td>
<td>Thermodynamics of the dissolving process</td>
</tr>
<tr>
<td>Activity Description:</td>
<td>Article explains the scientific principles that resulted in the spontaneous oxidation of the iron pellets—for example, the large surface area that was exposed because of the porous nature of the particles.</td>
</tr>
</tbody>
</table>
Flinn ChemTopic Labs
Order Flinn ChemTopic Labs

Demo: Acid in the Eye – Safety
Demo: A Burning Candle - Observations
Demo: Classifying Matter
Demo: Flaming Vapor Ramp—Safety Demo
Lab: Observation and Experiment - Introduction to the Scientific Method
Lab: Separation of a Mixture - Percent Composition
Lab: What is a Chemical Reaction - Evidence of Change
Lab: Common Gases—Physical and Chemical Properties
Lab: Preparing and Testing Hydrogen Gas—A Microscale Approach
Lab: Carbon Dioxide - What a Gas—Microscale Gas Chemistry

ICE LABS
Online Descriptions and Experiments

No activities for this topic.

Technology-Adapted Labs

No activities for this topic.