

ARISE Curriculum Guide

Chemistry: Topic 1—Matter and Change

ChemMatters

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Articles for Student Use

Element X: Dec. 1987, pp. 8-9.

Matches. Striking Chemistry at Your Fingertips: Dec. 2002, pp. 14-16.

Polywater: Dec. 1987, pp. 10-13.

Robert Bunsen—more than a burner designer: Oct. 1984, pp. 14-15.

Tapping Saltwater for a Thirsty World: Oct. 2002, pp. 4-7.

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,
Source:	<i>ChemMatters</i> , Dec. 2002, pp. 14-16, “Matches. Striking Chemistry at Your Fingertips”
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:	
Good Stories:	Entire article is a “good story”
Activity Description:	Article describes the history of the development of the common match, covering early matches and their inherent weaknesses and dangers. Good review of chemical equations and/or a review or introduction to redox reactions.

Number and Topic: 1. Matter and Change
17. Water, Aqueous Solutions

Source: *ChemMatters*, Oct. 2002, pp. 4-7, "Tapping Saltwater for a Thirsty World"

Type of Material: Student Journal Article

Building on: Classification of matter, water, aqueous solutions

Leading to: Colligative properties, osmosis

Links to Physics: Matter, energy

Links to Biology: Cells

Good Stories:

Activity Description: Article describes different attempts to obtain potable water from saltwater, including reverse osmosis and distillation.

Number and Topic: 1. Matter and Change (Classification of Matter)
14. Periodicity/Periodic Law/Metals, Non-metals and Families

Source: *ChemMatters*, Dec. 1987, pp. 8-9, "Element X"

Type of Material: Student Journal Article

Building on:

Leading to: Periodic Table

Links to Physics:

Links to Biology:

Good Stories: Although Mendeleev's construction of the Periodic Table is considered to be a brilliant intellectual achievement, he was terribly wrong on other predictions, including predicting the existence of "Element X," which would have an atomic weight nearly one-millionth that of hydrogen, rejecting completely the notion that electrons could exist, and stating that petroleum was not formed from decaying plants and animals, but rather from water seeping through rocks.

Activity Description: Article deals with the work of Dimitri Mendeleev, both his successes and his failures.

Number and Topic: 1. Matter and Change (Classification of Matter)
10. Phases, Solids, Liquids and Gases (States of Matter)
16. Covalent Bonds, Molecular Shapes and Intermolecular Forces,
17. Water, Aqueous Solutions

Source: *ChemMatters*, Dec. 1987, pp. 10-13, "Polywater"

Type of Material: Student Journal Article

Building on: Basic properties of water

Leading to: Discovery of "polywater" and how its existence was disproved

Links to Physics: Density, spectra

Links to Biology:

Good Stories: Entire article is a "good story."

Activity Description: This article relates the story behind the discovery of "polywater." It goes into the evidence for its existence, the excitement and hype that accompanied its reported discovery, the enthusiastic acceptance of its existence by some scientists versus the skepticism of others, and how its existence was eventually disproved. Although the article contains a lot of science content and information about the properties of water, its greatest value may very well lie in its exposition of the fact that at times science may take a wrong turn; it includes self-correcting features that work strongly towards correcting errors and arriving at the truth.

Number and Topic: 1. Matter and Change (Classification of Matter)

Source: *ChemMatters*, Oct. 1984, pp. 14-15, "Robert Bunsen—more than a burner designer"

Type of Material: Student Journal Article

Building on: Familiarity with a Bunsen burner

Leading to: A discussion of Bunsen's real scientific accomplishments.

Links to Physics: Light, heat, electromagnetic spectrum

Links to Biology:

Good Stories:

Activity Description: This article presents many of the accomplishments of Robert Bunsen, who students naturally associate with the Bunsen burner, but whose real accomplishments were much more significant, the burner being a relatively minor contribution which he really shares with others.

Flinn ChemTopic Labs

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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.