

ARISE Curriculum Guide

Chemistry: Topic 14—Periodicity/Periodic Law/Metals, Non-metals and Families

ChemMatters

[Order a CD with 25 years of ChemMatters](#), \$30

Articles for Student Use

Activity: Secret Agents
Demo: Periodic Activity of Metals
Demo: Plotting Trends - A Periodic Table Activity
Demo: Safe Swimming with Sodium
Demo: Solubility Patterns
Lab: All in the Family - The Halogens and Their Compounds
Lab: Density is a Periodic Property - Discovering an Element
Lab: Identifying Chemical Activity
Lab: It's in the Cards - Discovering the Periodic Law
Lab and Demo: It's in the Cards - Investigating Patterns
Lab: Metal or Non-Metal?
Lab: Periodic Trends and the Properties of Elements - Alkaline Earth Metals

Articles for Teacher Use

Number and Topic:	1. Matter and Change (Classification of Matter) 14. Periodicity/Periodic Law/Metals, Non-metals and Families
Source:	<i>ChemMatters</i> , 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:	5. Radioactivity, Fusion, Fission 6. Chemical Names and Formulas/Compounds and Elements 14. Periodicity/Periodic Law/Metals, Non-metals and Families
Source:	<i>ChemMatters</i> , Dec. 1995, p. 12, "Happy Birthday Helium"
Type of Material:	Student Journal Article
Building on:	Elements
Leading to:	Spectroscopy
Links to Physics:	Electromagnetic spectrum, sun, atoms
Links to Biology:	
Good Stories:	Relates how helium was discovered in the sun before it was actually discovered on earth!
Activity Description:	Article relates the discovery of helium, its source on earth, and some of its very unusual properties.

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](#)

Number and Topic:	14. Periodicity
Source:	ICE Laboratory Leadership
Type of Material:	Lab and Demo 4. It's in the Cards - Investigating Patterns
Building on:	3. Problem solving
Leading to:	8. Chemical reactions. 13. Electrons in atoms.
Links to Physics:	Structure of the atom
Links to Biology:	Patterns
Good Stories:	
Activity Description:	In Part I, you will use information provided on cards to organize these cards in a particular pattern. In Part II (teacher demo) you will use periodic properties as a tool for organizing and predicting properties of elements. Then, in Part III, you will conduct a laboratory exploration of some chemical properties of a few elements and examine the regularities in these properties. The properties observed for the elements will be used to predict the properties of other elements.

Technology-Adapted Labs

Number and Topic:	14. Periodicity/Periodic Law/Metals, Non-metals and Families
Source:	<i>ChemCom</i> , Fourth Edition, Unit II, Section A, Lab Activity A.3, p. 97. Bill Grosser, Glenbard South High School
Type of Material:	Lab: Metal or Non-Metal?
Building on:	Physical and chemical properties, elements, atoms.
Leading to:	Periodicity, families, and atomic structure.
Links to Physics:	Builds on basic atomic structure, electrical conductivity and resistance.
Links to Biology:	Heavy metal poisoning.
Good stories:	After the lab is complete, the idea of the development of semiconductors can be discussed with students.
Activity Description:	This is an introductory lab used to begin the exploration of the periodic table. It is a great way to have the students begin to classify the elements into groups that exhibit similar properties. Students measure three physical and two chemical properties of seven different elements. Elements are then classified as metals, non-metals, or semi-metals based on their experimental results. Using an ohmmeter instead of a simple conductivity meter can enhance the lab. This leads to discussions of electrical uses of different metals and semi-metals. This is an outstanding lab that gets students engaged in a lab-based activity that is often introduced and dealt with in lecture format only.

Number and Topic: 14. Periodicity/Periodic Law/Metals, Non-metals and Families

Source: I wish I could credit the teacher who originally conceived this but I do not know where it came from. It is not my work. It is an excellent activity and a very good way to introduce the periodicity of the elements.
Bill Grosser, Glenbard South High School

Type of Material: Activity: Secret Agents

Building on: Physical and chemical properties, elements, atoms

Leading to: Periodicity, families, and atomic structure

Links to Physics: Builds on basic atomic structure and properties

Links to Biology: Understanding the properties of elements is requisite to understanding their behavior in biological systems.

Good stories: An opportune moment to introduce Mendeleev and the struggles he had introducing and promoting his “radical” thinking.

Activity Description: This is an introductory activity used to begin the exploration of the periodic table. Students are given a set of cards with pictures of “secret agents.” Students are asked to arrange the agents into columns and rows based on similarities. When finished, students are then asked to draw the next secret agent in the sequence.