Activity: Periodic Puzzler

FOR THE TEACHER

Summary
In this activity, students will learn about what makes up an atom and how important protons are in the placement of elements on the periodic table. They will reflect on what they’ve learned from their reading and then test their understanding by playing a game that requires them to build elements.

Grade Level
Middle or high school

Objectives
By the end of this lesson, students should be able to

- Understand that atoms are made up of protons, electrons, and neutrons.
- The number of protons determines the identity of an element.

Chemistry Topics
This lesson supports students’ understanding of

- Atoms
- Elements
- Electrons
- Protons
- Neutrons

Time
Teacher Preparation: 30 minutes
Lesson: 90 minute class period

Materials
- “The Cartoon Guide to Chemistry,” chapter 2 by Larry Gonick & Craig Criddle
- Elements Game Board and Elements Game Tiles (pages 64–67), from “Simple Chemistry: Science Works for Kids,” by Evan-Moor Educational Publishers
- Glue

Safety
No safety precautions need to be noted.

Teacher Notes
Introduction: 10 Minutes
- Begin the lesson by assessing students’ prior knowledge about matter through discussion and/or use of Tom Lehrer’s song “The Elements.”
- The Elements - Tom Lehrer (Lyrics and Chords)

Instruction: 40 minutes (35 minutes for reading and discussing)
- Students read Chapter Two: Matter Becomes Electric from “The Cartoon Guide to Chemistry.” Instruct students to pay particular attention to pages 34–39. They will discuss as a small group their understanding of the concepts and illustrations.
When finished, students complete a Quick Write (a very brief timed journal entry) on this reading to state what they understand and recall from the reading.

Students share their Quick Writes with the class.

**Possible Modifications and Adaptations**
- Students can read the selections aloud rather than silently. Students can discuss their impressions about the reading rather than complete a journal entry.

Puzzle activity: 40 minutes
- Students receive a copy of the game board and tiles from “Simple Chemistry.” Students work as a group to put the tiles in the correct spot to complete the puzzle.

**Possible Modifications and Adaptations**
- Students can work in pairs or individually with the help of an aide to complete the puzzle.

What does it “look like” when students have met expectations for this objective?
- You know students are meeting the expectations when they are engaged in the reading and collaborating to complete the puzzle.

How will you evaluate it?
- Evaluation of the students will be based on observation of the students' journal entries and their ability to complete the puzzle.

**CONNECTIONS TO STANDARDS**

**Next Generation Science Standards**
This lesson supports the following Disciplinary Core Ideas:

**PS1.A: Structure and Properties of Matter**
- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

**PS1.B: Chemical Reactions**
- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)