

Teacher Guide: Elements App

USING THE TECHNOLOGY

The Elements app can be used in many ways to teach and engage students. The availability of equipment in your classroom will determine what is possible.

- ▶ If you only have one tablet, project the app for a class discussion or group activity.
- ▶ If you have a classroom set of tablets, students can work individually or in small groups. The app is easy to reset, so different classes can start fresh from the beginning.



IN THE CLASSROOM

The Elements app can be used to complement many topics in biology, geology, physics, astronomy, and—of course—chemistry (see ideas on page 2). Familiarize yourself with the app’s three features and think about how to integrate it into your instruction. Here are some ideas to get you started:

If you have 10 minutes...Build an atom

- ▶ Have students build an atom in the atomic sandbox (either individually or as a class).
- ▶ Discuss what an atom is, what the atomic model looks like in space, and its atomic structure—including the organization of the electrons, protons, and neutrons of an atom.

If you have 20 minutes...Build a molecule

- ▶ Open the “Essential Elements” game and pick one molecule to build (water is quick and applies to a wide range of topics). Build, or auto-assemble, the water molecule and rotate it around.
- ▶ Discuss the structure of the molecule (i.e., VSEPR theory, hybridization), the different types of chemical bonds, and how these bonds occur.



If you have 40 minutes...Play the “Essential Elements” game

- ▶ Ask students to record their observations as they play the game. Do they see any patterns? What was challenging? What did they find surprising?
- ▶ Review observations as a class.
- ▶ Extension: Have students pick some of their favorite things (a cell phone, bike, basketball, T-shirt, etc.) and put pictures of these objects up on the wall or board. Challenge students to research all the elements that are in these different objects. List the elements under the pictures.

If you have 1 to 2 hours...Watch “Hunting the Elements”

- ▶ Afterward, start a discussion with some of the questions below:
 1. It's the year 1900 and you just discovered a new element. How would you place your element on the periodic table? Describe your steps.
 2. Where have you encountered molecules today? What have you done today that does not involve molecules?
 3. Using the properties of the periodic table, compare and contrast two elements (e.g. fluorine and neon, or silver and gold).

CURRICULUM CONNECTIONS

If you teach biology...Build a DNA molecule

- ▶ Watch the segment from the show where David Pogue finds out what he is made of (Chapter 8).
- ▶ In the periodic table, build the atoms discussed in the show that make up humans.
- ▶ Play the “Essential Elements” game and build a DNA molecule.

If you teach earth science...Build rocks and minerals

- ▶ What elements are found in the rocks and minerals of our planet? Research and build them in the periodic table.

If you teach physics...Build an atom

- ▶ Discuss and classify the subatomic particles that make up atoms.
- ▶ Focus on building radioactive elements and notice what is needed to make these larger atoms more stable.
- ▶ Describe the different types of radioactive decay.
- ▶ Explore the electron configurations of elements and their ability to gain, lose, or share electrons.

If you teach astronomy...Build a star

- ▶ Starting with hydrogen, work through the nuclear fusion processes—building all the atoms along the way leading up to a supernova (iron).

If you teach chemistry...Build a molecule

- ▶ Discuss how molecular shape affects polarity, which in turn determines intermolecular forces.

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