# **Chemical Elements Comprehension Check**

1. Matter can be considered an element or a compound. How are these categories different from one another?
2. Describe what is found inside an atom. Use the following vocabulary terms in your response: atom, nucleus, neutron, proton, and electron.
3. Why might some people consider isotopes to be the “limited edition” version of atoms?
4. What is the periodic table and how has it changed and been used over time?
5. What is an atomic number?
6. What is atomic mass? How is mass different from weight?
7. Why do you think the periodic table organizes elements into periods?
8. How are groups (or families) of elements on the periodic table related to valence?
9. The elements on the periodic table are also organized into classes. How are classes of elements similar to clubs students might join?
10. Compare metals, metalloids, and nonmetals.

# **Chemical Elements Comprehension Check Answer Key**

1. Matter can be considered an element or a compound. How are these categories different from one another?
   1. Matter refers to all the materials that make up the universe. Matter consists of atoms and can be categorized as elements or compounds. Chemical elements are matter that is made of only one type of atom. Compounds, on the other hand, are matter that is made of two or more types of atoms.
2. Describe what is found inside an atom. Use the following vocabulary terms in your response: atom, nucleus, neutron, proton, and electron.
   1. Atoms are made of many tiny particles. The center of an atom is its nucleus, which contains protons (positively charged particles) and neutrons (particles with no charge). Electrons (negatively charged particles) move freely around the nucleus and are organized into electron shells.
3. Why might some people consider isotopes to be the “limited edition” version of atoms?
   1. Isotopes are one of two or more atoms of the same chemical element that differ in the number of neutrons they contain. Some people might consider isotopes to be the “limited edition” version of atoms because they are all different versions of the same element. Isotopes are special versions of atoms because their different number of neutrons changes their structure.
4. What is the periodic table and how has it changed and been used over time?
   1. The periodic table is an organization system scientists use to keep track of all the known elements. A periodic table organizes elements based on their properties. This table has changed over time as scientist have discovered new elements.
5. What is an atomic number?
   1. An element’s atomic number refers to its number of protons. Because each element has a unique number of protons, we can use atomic numbers to describe and organize them. The periodic table lists the elements in order according to their atomic number.
6. What is atomic mass? How is mass different from weight?
   1. Atomic mass refers to the amount of matter within an atom. Mass and weight are often used interchangeably but mean different things in science. Weight is the measure of gravity’s force pulling on a substance.
7. Why do you think the periodic table organizes elements into periods?
   1. Students’ answers will vary but will likely reflect on the idea that elements in each period have the same number of electron shells. Elements in the first period have one electron shell, those in the second period have two electron shells, and so on.
8. How are groups (or families) of elements on the periodic table related to valence?
   1. The periodic table is also organized vertically into groups of elements based on the way they form compounds. Groups of elements tend to form bonds in the same way because they have the same number of valence electrons, or electrons ready to be lost, gained, or shared.
9. The elements on the periodic table are also organized into classes. How are classes of elements similar to clubs students might join?
   1. Elements can also be organized into classes based on their physical and chemical properties. Some people might compare classes on the periodic table to clubs students might join. Typically, clubs include students from many grades, and sometimes from many schools, just like classes on the periodic table include elements from a variety of periods and groups.
10. Compare metals, metalloids, and nonmetals.
    1. The largest class on the periodic table are the metals. In general, metals are hard, shiny, solid at room temperature, very dense, highly reactive, and good conductors of heat and electricity. The metals are split into 6 classes: alkali metals, alkaline metals, transition metals, lanthanide metals, actinide metals, and other metals.
    2. Metalloids are a special class of elements. They have both metallic and nonmetallic properties. One of the most well-known metalloids is silicon. Silicon is silvery like a metal but conducts heat and electricity poorly like a nonmetal. People use silicon to conduct just the right amount of electricity in our electronics so they work but do not overheat.
    3. Nonmetals are less dense than metals. They are not good conductors of heat or electricity, so they are often used as insulators. In addition, solid nonmetals are brittle, dull, and cannot be easily shaped. There are 3 classes of nonmetals: noble gases, halogens, and other nonmetals.