IES Grant Module Format

Elements

Grade Level- 8th

PA State Standard (# & short description)

**Explain concepts about the structure and properties (physical and chemical) of matter.**

Eligible Content

S8.C.1.1.1: Explain the differences among elements, compounds, and mixtures.

Module Objective(s) Students will…be able to define and explain characteristics of elements.

Materials/Supplies- Elements slideshow

1. **Do Now:** Pre-test (10 minutes)

2. **Vocabulary:**

   **Element:** simplest pure substance that cannot be broken down any further.

   The students learned that water is made up of the elements oxygen and hydrogen.

   **Atom:** the smallest piece of matter
   Nuclear energy relies on the understanding of atoms.

   **Compound:** two or more elements chemically combined, not easily separated.
Salt is a compound made of sodium and chlorine.

**Mixture:** combination of two or more things that are easily separated.

Kool Aid powder and water makes a tasty mixture.

**Periodic Table:** a place where Elements are organized

The Periodic Table was used in science class for students to identify the elements.

3. **Lecture:**

Elements: What are elements?

Two thousand years ago, people were trying to figure out what things were made of. One idea was that everything was a mix of four basic properties: hot, cold, wet, and dry. If you had just the right mix of hot and dry, that might make a rock. A little less hot and a bit of wet might make wood. The right amount of all four properties might make a leaf. Pure samples of the four properties were fire, air, earth, and water. These four substances were thought to be the elements from which everything was made. Some people had a different idea about what things were made of. Chemists in the 1800’s were busy investigating a lot of different substances. **Please know** that a substance is physical matter. That means a substance is something real. In the old days these chemists would heat substance as hot as they could. They would put acid on them. They ran electric currents through them. Sometimes the substance separated into the new substances when they did experiments. When this happened, they tested the new substance with heat,
acid, and electricity. Some of the substances would not change any more. The called the unchangeable substances elements. **Take note** that elements are the simplest pure substance that cannot be broken down any further. **And also know** that elements, because they are pure, are made of only one type of atom. **Remember**, an atom is the smallest piece of matter and elements are made of atoms. **It's important to know** that elements make up all matter. Everything is the universe is made of one or more atoms. **You should also know** that a compound is two or more elements chemically combined. Salt is an example of a compound because it is a combination of Sodium and Chlorine. When those two substances are chemically combined, they form salt. We use salt on our food every day. When two or more elements are mixed together, but not chemically combined, we call them a mixture. **Take note**, a mixture is two or more elements combined together that can be easily separated. An example of a mixture would be a bag of trail mix. If you don't like, lets say peanuts, then you just easily take them out of the trail mix mixture.

By the middle of the 1800's, about 60 elements had been discovered. A lot was know about them. Scientists knew some of their chemical properties, such as what other elements they combine with. The knew some of their physical properties, such as weight of standard samples of elements. When scientists made a list of elements, they put them in order by weight, starting with the lightest elements they knew about, hydrogen.

In 2013 scientists have discovered or created 118 elements. **This will be on the test.** Elements are organized on the periodic table, which you will learn in another lecture.

Let's Review.

Elements are pure substances made of only one type of atom
Atoms are the smallest pieces of matter
Elements make up everything in the universe
Compounds are two or more elements chemically combined
Mixtures are two or more elements mixed but not chemically combined
The periodic table is how elements are organized

4. **Activity:** Teacher will give examples of Elements and Non-Elements. Students will identify substances as 'an Element' or 'Not an Element'.

5. **Review Notes:** Address Note-taking students, “Go to the last page of your notes and write five lecture points, you may refer to your notes”,
Address all other students, “Fill in any gaps in your notes”.

6. **Post Test:**

7. **Homework/Follow-up** Students will complete Elements Reading Guide