BIG PICTURE

Pure substances that are made of more than one element are called compounds.

BIG IDEAS

A compound is two or more elements chemically combined. An example of a compound is sugar, which is made of the elements carbon, hydrogen, and oxygen.

A molecule is made of two or more atoms chemically bonded together. A molecule is the smallest particle of a compound that has all the properties of that compound.

A combination of chemical symbols is called a chemical formula, which is the shorthand to represent a chemical substance.

When writing a chemical formula, subscripts are used to symbolize the number of atoms of the elements in the compound.

Chemical equations are another example of a chemical shorthand, and is a description of a chemical reaction using symbols and formulas. An example of this is the formation of water: \( H_2O \rightarrow H_2O \)

COOL DETAILS

Compounds can be broken down into simpler substances. Copper sulfide, a compound, can be separated into the elements copper and sulfide by using high temperatures to heat the compound. Another way to break down compounds is by passing an electric current through the compound.

When charcoal burns in a barbecue, you are actually watching a chemical reaction of carbon atoms combining with oxygen atoms forming carbon dioxide.

Atoms can never be destroyed in a chemical reaction. This makes it crucial for chemical equations to be balanced.

When sodium and chlorine are combined, they form sodium chloride, which is what we put in our food and usually called salt.
SCIENTIST
Joseph Black, a Scottish chemist in the 1700's, discovered the presence of carbon dioxide in the atmosphere and in expired breath.

In addition, he also discovered that carbon dioxide combines with other chemicals to form new compounds.

MY LIFE
When I went to Yellowstone National Park, there was a very pungent smell of sulfur, which is an element. Even when I used sink water at the national park, the smell of sulfur was present.

TERMS
- Compound: two or more elements chemically combined to make a pure substance.
- Molecule: smallest particle of a compound with all of the properties of the compound.
- Chemical formula: shorthand way of representing chemical substances.
- Subscripts: number placed at the lower right of symbols to give the number of atoms in the element.
- Chemical equation: description of a chemical reaction using symbols & formulas.

ILLUSTRATION
*DISCLAIMER: MOLECULES ARE THE SAME SIZE THROUGHOUT THE PROCESS.*

\[ 2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O} \]

FORMATION
HYDROGEN + OXYGEN → WATER