

Composition of **Matter**

Look around you. A desk, a rock, a jelly doughnut, your finger, and the school building all have something in common. They are all examples of **matter**. All matter has **mass** and **volume**. Mass is the amount of matter in an object. Mass stays constant, or the same, no matter where we are in the universe whether it's Earth, Mars, or the Moon. Volume is the amount of space taken up by an object.

All matter, regardless of shape, size, or color, is made up of **particles** that are too small to be seen with the human eye. These tiny particles are called **atoms** and **molecules**. All atoms have three main parts: **protons**, **neutrons**, and **electrons**. The neutrons and protons are found in the center of the atom. The center of an atom is called the **nucleus**. The electrons circle around the nucleus in the **electron cloud**.

One type of matter is called an **element**. Scientists have identified over 100 **elements** on Earth. An element is made up of very tiny particles called **atoms**. An atom is the smallest part of an element. All of the atoms in an element are alike. Gold, for example, is an element made up only of gold atoms. An aluminum can is made of the element aluminum. Aluminum is made up only of aluminum atoms. Some common elements include hydrogen (H), oxygen (O), helium (He), carbon (C), sodium (Na), and potassium (K). The known elements are organized in a table called the **Periodic Table of Elements**.

Composition of Matter

Another type of matter is called a **compound**. Most kinds of matter found on Earth are compounds. A compound is formed when *two or more elements* are combined or joined together. The smallest particle in a compound is called a **molecule**. A molecule is made up of two or more *unlike atoms* that are linked together. There are many different types of compounds because atoms can join together in so many different ways.

Water is a common example of a very important **compound** on Earth. Water molecules are made up of two hydrogen atoms joined with one oxygen atom (H_2O). Table salt is another common example of a **compound**. Salt molecules are made up of one atom of sodium joined to one atom of chlorine (NaCl). In the **compound**, carbon dioxide, there is one carbon atom combined with two oxygen atoms (CO_2).

A science called **nanotechnology** is the study of matter at the level of atoms and molecules. At this scale (size), matter is not visible to the naked eye. Scientists are already using this technology in the fields of electronics and medicine. Believe it or not, scientists are even using nanotechnology in products such as sunscreen and scratch-resistant coatings.