

Name

## Chapter 1: Chemistry Matters

### Chemistry and Its Uses

Chemistry is the study of matter and its changes. You may find lengthier definitions in other books, but it is basically the study of atoms as it changes to become matter.

Chemistry breaks down matter into elements and determines its composition. It aims to make us understand the established changes and the potential changes that a matter may undergo.

But, why must we understand all these?

The answer is simple. Everything around us is made of matter and everything is bound to change. The reaction to change by a certain matter can be useful or harmful to another matter. Chemistry helps us categorize and control which reaction can become beneficial or harmful.

Thanks to Chemistry, we can develop medicine to cure sickness. We could develop technologies, and produce a variety of products.

### Matter

Before starting with Chemistry, one should first understand what matter is, its states and its parts.

**Matter** is anything that occupies space and has mass. This includes even the objects that have no weight, such as air, light and gases.

It usually comes in four states. These are solid, liquid, gas, and plasma.

Matters in the **solid** state are those that take definite shapes and volume. Examples of these are wood, stone, and sand.

Those in **liquid** state have definite volume, but do not have definite shapes. They only follow the shape of their container. Examples of these are water and oil.

**Gas** objects are those that have no definite shape and volume. They could not be contained, unless they are compressed. Air and helium are only a few

objects in gas form.

The **plasma** state does not exist in Earth, but in outer space. However, some scientists create artificial objects in this state. Examples of objects in plasma state are lightning and neon lights.

## Elements and Compounds

Matter may be composed of a single element or a combination of elements.

An **element** is the smallest unit of matter, which could no longer be divided. Examples of elements are gold, silver, and oxygen.

As of today, scientists have discovered about 118 different elements. Earth produces or houses 98 of these elements. The scientist, **Dmitri Mendeleev**, started listing these elements in a **periodic table**.

A **compound** is composed of two or more elements. These elements are bonded together chemically, to create another matter.

Water is one of the basic examples of a compound. Two elements, hydrogen and oxygen, are bonded together to create water.

Understanding elements and compounds are essential in Chemistry because changes can occur due to their existence.

## Atoms and Molecules

Matter is also made up of uniform or combined atoms. An **atom** is the smallest unit that creates an element. It has three parts - **the protons, the electrons and the neutrons**. An element changes in form when the number of its protons and electrons are changed.

A group of atoms is called a **molecule**. The number of molecules in an element controls the volume of matter.

## Changes in Matter

Matter can change into different forms when its parts are broken apart or

rearranged. This could happen in two ways - by **physical change**, or by **chemical change or reaction**.

**A physical change** occurs when an object changes only in size or appearance, but the arrangements and composition of atoms remain the same. Examples of these are melted ice, crushed solid foods or broken bottles.

**A chemical change or reaction** occurs when an object loses its original appearance and the composition of its atoms. Chemical change results to a new compound or matter.

A good example of chemical change is burning of wood. The wood loses its appearance as it turns into ash, a different object from the wood.

Below are some experiments that will help you identify physical change or chemical change.

## Experiment 1: Dissolving Salt in Water versus Dissolving Sugar in Water

Requirements:

- 5g sea salt
- 50ml water at room temperature
- 5g refined sugar
- 50 ml water at room temperature
- 2 beakers

Instructions:

1. Mix sea salt and water until the salt is dissolved.
2. Mix sugar and water until the sugar is dissolved.
3. Cover the two beakers and leave for at least an hour.
4. Observe.

Possible outcome:

1. You will not see any salt grain in your beaker.
2. You will see sugar grains settled at the bottom of your beaker.

### ***My Science Experiment Observation Sheet***



**Materials Needed:**

**My Hypothesis:**

**What happened?**

**My Conclusion:**

Which of the two experiment resulted in a chemical change or a physical change?

1. The salt underwent a

Because

2. The sugar underwent a

Because