Chapter Two

Physical And, Chemical Changes, Mixtures and Compounds

- There are two types of changes and these are physical change and chemical change.

Physical change:

- An example of physical change is the changing of water into ice, when we put water which is in the liquid form into a freezer.
- In this case, no new substance is formed after the change.
- This is due to the fact that the ice is water which is in the solid form or state.
- The ice can easily be changed back into liquid water by removing it from the freezer.
- Because the ice can easily be converted or changed back into liquid water, such a change is said to be easily reversible.
- This type of change in which no new substance is formed and which is also easily reversible, is called a physical change.
- Another example of a physical change occurs when plastic is heated.
- If plastic which is a solid is heated, it only melts or changes into the liquid state.
- Since the plastic in the liquid state can easily be changed back into the solid state by allowing it to cool, such a change is also easily reversible.
- In this case also, no new substance was formed, and the change was easily reversible.

Chemical change:

- This is the type of change in which a new substance is formed, and which is not easily reversible.
- An example of chemical change occurs when we burn paper and it changes into soot.
- This is a chemical change because the soot is completely different from the paper.
- And because the soot cannot easily be changed back into the paper, such a change is said to be not easily reversible.
- The rusting of iron into rust is also another type of chemical change.
- In this case also, a new substance is formed, and the change is not easily reversible.

Physical and chemical combinations:

- Elements, substances or items can either be combined physically or be combined chemically.
- An example of a physical combination is the mixing together of stones and sand.
- In such a case, when the stones and sand are combined together, we do not get any new substance being formed.
- Within such a combination, the stones within still remain stones whilst the sand still remains sand.
- Another example of a physical combination is the mixing together of gari and beans.

- If we combine two substances or elements together, and whatever we get is different from these two elements or substances, then such a combination is a chemical combination.
- An example of a chemical combination is the combination of oxygen and hydrogen to form water.
- In this case, a new substance is formed since the oxygen and hydrogen are completely differently from the water.

Mixture:

- This is what is formed when we physically combine two or more substances together.
- Examples of mixtures are:

(1) A combination of sand and stones.
(2) A combination of water and alcohol.

Types of mixtures:

- There are different types and examples are:

(1) Solid – solid mixture:

- This is formed when two or more different solid particles are combined or mixed together.
- An example of this type of mixture is a mixture of sand and stones.

(2) Solid – liquid mixture:

- This type of mixture is formed when solid particles are mixed with a liquid.
- An example of this type of mixture is a mixture of stones and water.

(3) Liquid – liquid mixture:

- This is the type of mixture formed, when two different liquids are mixed together.
- An example is a mixture of water and alcohol.

(4) Gas – gas mixture:

- This is the type of mixture we get when two different gases are combined or mixed together.
- An example is a mixture of hydrogen and oxygen.

Separation of mixtures:

- Some of the methods used in the separation of mixtures are:
  (1) Picking.
  (2) Evaporation.
  (3) Sieving.
  (4) Magnetic separation.

Picking:

- If one of the constituents of the mixture is larger than the other one, then this method can be used to separate the mixture.
- For example, a mixture of sand and stones can be separated by picking the stones from the mixture.
- The constituents of a mixture, refers to those items which make up the mixture.

Evaporation:

- If a solid has been dissolved in a liquid such as water to form a mixture, then the method of evaporation can be used in the separation of the mixture.
- For example salt can be separated from sea water by this method.
- Sea water is a combination or a mixture of salt and water.
- The sea water is placed into a container and heated.
- The water evaporates and the salt particles will be left within the container.
- The evaporated water is then cooled by making it come in contact with the surface of a cold pan, in order to get the water.

Sieving:

- If the size of one of the constituents of the mixture is larger than the other one, then a sieve can be used to separate the mixture.
- For example, a mixture of sand and stones can be separated by this means.

Magnetic separation:

- This method of separation is used when one of the items or constituents of a mixture is a magnetic material.
- For example, a mixture of iron nails and sand can be separated using this method.
-The iron nails is a magnetic material and as such, can be attracted or pulled by the magnet.
- For this reason, a magnet can be used to attract or remove the iron nails from the mixture.

Compound:

- This is what is formed if two or more substances are chemically combined together.
- For example, the chemical combination of oxygen and hydrogen leads to the formation of water.

- Compounds can be represented by chemical formulae, which show the number of atoms of each element in each molecule of the compound.
- Given next are a few compounds and their formulae as well as the elements found in them.

Compound	Formula	Elements
Water	H_2O	H and O
Sodium Chloride	NaCl	Na and Cl
Sulphuric acid	H_2S0_4	H, S and O

Nitric acid	HNO_3	H, N and O
Sodium Hydroxide	NaOH	Na, O and H

Questions:

(1) What is a physical change?

Ans:

- It is the kind of change in which no new substance is formed, and which is also easily reversible.