

Separation of Substances

KNOW THESE POINTS BEFORE YOU START

- ❖ The substances which make up a mixture are called components of that mixture.
- ❖ Handpicking, threshing, winnowing, sieving, sedimentation, decantation and filtration are the methods of separating a mixture into its components.
- ❖ A substance that dissolves in a liquid is called a solute.
- ❖ A substance in which a solute dissolves is called a solvent.
- ❖ The mixture of solute and solvent is called a solution.
- ❖ A solution in which no more solute can be dissolved at a given temperature is called a saturated solution.
- ❖ Water dissolves different substances in different amounts.

... Now, study the chapter in detail.

Learning Objectives

The students will be able to

- + understand the need for separation of substances
- + study and understand different methods of separation like threshing, winnowing, sieving, sedimentation and decantation, filtration, evaporation, etc.
- + know what a saturated solution is.
- + study that different substances dissolve in water in different amounts.

COMPONENTS OF A MIXTURE

Many things that we see and use every day are a mixture of different things. Soil is a mixture of sand, clay, pebbles, wood and rotting plants. Rocks are a mixture of different minerals. Air is a mixture of many gases, mainly nitrogen and oxygen.

The substances which make up a mixture are called its **components**. For example, tea granules, sugar and water are the components of tea.

Separation of the components from a mixture

We also notice that components of some mixtures are separated from the mixtures. For example, tea granules are separated from tea using a

Sieving

The method of separating a mixture of various sized particles by passing them through a suitable sieve is called **sieving**.

Look at the following figures:



(a) Sieving flour



(b) Sieving sand

Fig. 5.4 The process of sieving

In the Fig. 5.4(a), bran and impurities present in the flour are being separated using a sieve while pebbles are being separated from sand using a larger sieve at a construction site in the Fig. 5.4(b).

Could we use this method, if the size of the pebbles and sand was the same? Why? Both the pebbles and sand would pass through the sieve. Thus, we can use sieving as a method of

separation only if the components of a mixture are of different sizes.

Check POINT 1

1. Give reasons.
 - (a) Tea granules are separated from tea.
 - (b) Small stones and husk are separated from dal or rice before cooking.
 - (c) Pebbles are separated from sand.
2. Name the method of separation used to separate a mixture of:
 - (a) uncooked dal and rice.
 - (b) grain seeds and stalks.
 - (c) husk and grains.
 - (d) pebbles and sand at construction sites.

Sedimentation, decantation and filtration

Let's do an activity.

Activity 4

Take three test tubes and make these mixtures.

- Mixture of sand in water (Test tube A)
- Mixture of rice in water (Test tube B)
- Mixture of dal in water (Test tube C)

What is common in all the above mixtures? These are the mixtures of **insoluble solids in liquid**. Now, observe whether sand, rice and dal have settled down in the respective test tubes.

The substance that settles at the bottom of a liquid is called a **sediment**. The process of settling down of a solid at the bottom of a liquid is called **sedimentation**. Now, try to separate the sand from water by slowly tilting the test tube and pouring the water into another test tube, without disturbing the sand. This process of pouring out the liquid (water) is called **decantation**.

So, you have successfully separated sand from water by the method of sedimentation and decantation. Can you now guess how you will separate rice and dal from their mixtures in water.

Observe the water that you obtained by separating the mixture of sand and water. Is it absolutely clear? Do you still find small particles of sand floating in water? Sometimes, you cannot completely separate the insoluble solid components from the mixture.