St. Andrews Scots Sr. Sec. School

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Session: 2022-2023

Subject: Science

Class: VI **L-5: Separation of Substances** **Topic: Back Exercises**

Check Point-1 (Pg- 46)

1. **Fill in the blanks.**
   a. The smallest unit into which something can be divided is known as a/an **atom**
   b. Substances containing atoms of one type are called **elements.**
   c. Substances which have atoms of two or more elements are known as **compounds**.
   d. There are about **118** elements in nature.
   e. Substances of only one type of molecules are called **pure substances**

2. **State whether the following sentences are True or False.**
   a. Atoms of most elements cannot exists independently in nature.
   Ans- False
   b. Atoms combine with each other in fixed ratio to form molecules.
   Ans- True
   c. Common salt is a compound.
   Ans- True
   d. The elements present in mixtures lose their individual properties.
   Ans - False
   e. The elements in a heterogeneous mixture can be easily seen.
   Ans- True

Check Point -2 (Pg- 52)

1. **Fill in the blanks.**
   a) The **centrifugation** method is used to separate cream from milk.
   b) Immiscible liquids are separated by using **separating funnel.**
   c) Sand and water can be separated by **filtration.**
   d) Stones in grain can be separated by **hand- picking.**
   e) Salt and water can be separated by **distillation.**

2. **Match the correct answer:**

a. Hand picking	i. Alum
b. Sieve	ii. Filter paper
c. Loading	iii. Diamond mines.
d. Centrifugation	iv. Flour
e. Filtration	v. Milk

Exercises (Pg- 53)

A. Choose the correct answer.

1. Most of the substances we see around are _____.

a) Elements b) Compounds c) Mixtures ✓ d) Atoms

2. The process of settling down of insoluble solids in a liquid is called_____

a) Decantation b) Sedimentation ✓ c) Filtration d) Loading

3. In winnowing, the components of the mixture are separated due to a difference in their_____

a) Colour b) Size c) Weight ✓ d) Solubility

4. Two miscible liquids are separated by _____

a) Distillation ✓ b) Separating Funnel c)Evaporation d) None of These

B. Very Short answer questions.

1. Which properties are used to check the purity of a substance ?

Ans- Melting and Boiling Point.

2.Name the process by which cream is separated from the milk.

Ans- Centrifugation

3.Name the method by which wheat grain is taken out from the harvested crop.

Ans- Threshing.

4.Name the method used to speed up the process of sedimentation.

Ans- Loading.

5.Name the apparatus used to separate immiscible liquids.

Ans- Separating funnel.

6.What are alums used for ?

Ans- Insoluble fine particles are separated by making them heavier by the use of alum.

7.Name the property of pure substances which remains fixed.

Ans- Pure substances have fixed melting and boiling points.

8. Name the apparatus which is used to condense the vapours during distillation.

Ans- Distillation flask

C. Short Answer Questions.

1. Sky appears clearer after rain. Why?

Ans- Dust particles in the air are very fine. During rain, these dust particles are made heavier by the rain drops. Then these particles fall to the ground along with rain. That is why the sky appears clearer after rain.

2.What is distillation? For which type of mixture is distillation used?

Ans - The method of separating two miscible liquids from their mixture is called distillation. The mixture of two miscible liquids is separated using distillation.

3.Which process is done first – decantation or sedimentation used ?

Ans- Sedimentation is the process of settling down of an insoluble solid in a liquid at the bottom of the container. On the other hand, decantation is the process of separating out the clear liquid on top without disturbing the sediment. Only after the sediments have settled at the bottom can decantation be done to obtain the clear liquid. So, sedimentation is done first, followed by decantation.

4.List three properties of mixtures.
Ans- The three properties of mixtures are as follows.
a. Mixtures are formed when elements mix in any ratio.
b. The elements present in mixtures retain their individual properties.
c. The elements of a mixture can be separated from each other using simple methods.

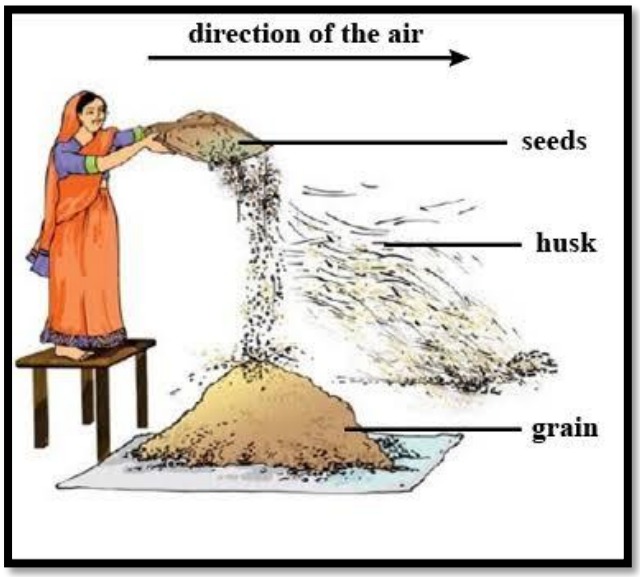
5.Define the following:-
a. Evaporation- The changing of a substance from its liquid state to vapour state below its boiling point is called evaporation. It is a method of separation of soluble solids from liquids. In such mixtures, the liquid evaporates, leaving the solid component behind.

b. Decantation- The process of separating out the clear liquid on top without disturbing the sediment is called decantation. This process is only possible when the solid in the liquid is insoluble in it. Decantation is done only after sedimentation.

c. Loading- The process of sedimentation of insoluble fine particles by making them heavier is called loading. Usually, the fine particles are made heavier by using alum, so that they form sediment easily.

6.What is hand- picking? When is it usually done?
Ans- Removing undesirable substances from a mixture by picking them up and separating them from the rest is called hand-picking. This method is generally used when the substance to be separated is much bigger than the rest, differs on the basis of its shape, size and colour or is present in a small quantity in the mixture. This method is used to separate stones from grains and in diamond mines to separate diamonds from stones.

7.What is winnowing? When do we do it?
Ans- Winnowing is the process of separating the grain from the chaff. It is based on the principle that if one of the components of the mixture is very light in weight, then it can be separated from the other constituents of the mixture by blowing it away. In this process, the threshed grain is placed on a tray and is allowed to fall from a height. The lighter chaff is blown away by the wind while the heavier grain falls straight down and gets separated.



Winnowing

8.Name the components of mixtures of milk and air.

Ans- The components of milk are milk proteins, fats and water. The components of air are nitrogen, oxygen, carbon dioxide, water vapour, other gases and dust particles.

D. Long Answer Questions.

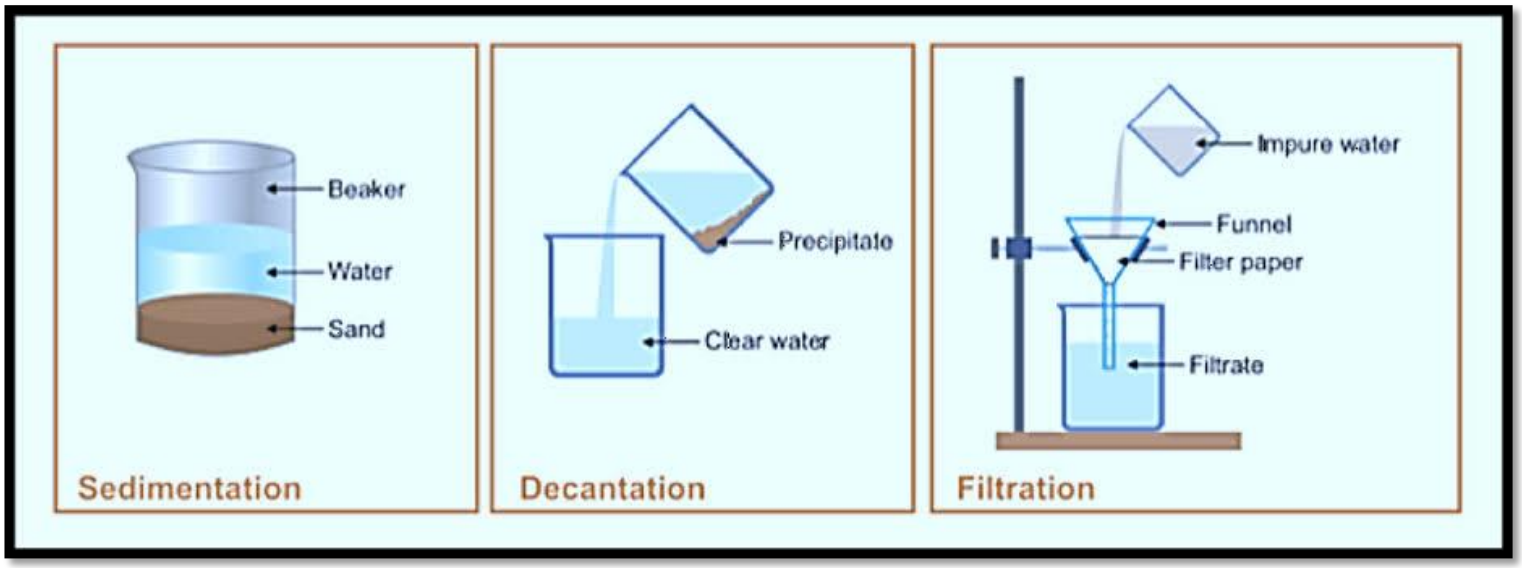
1. How can sand be separated from water ? Explain the procedure with suitable diagram.

Ans- 1. Sand can be separated from water by the following procedure.

a. **Sedimentation**: In this step, sand is allowed to settle at the bottom of the container.Being heavier than water, sand forms a layer at the bottom of the water container.

b. **Decantation**: In this step, the clear liquid (i.e., water) is carefully separated from the sediment (i.e., sand) without disturbing it. The water obtained after decantation is more clear and clean than it was before.

c. **Filtration**: The insoluble solids which cannot be separated by decantation are passed through a sieve, strainer or filter paper. Clear water is obtained as the filtrate. Finer particles of sand are obtained as the residue.



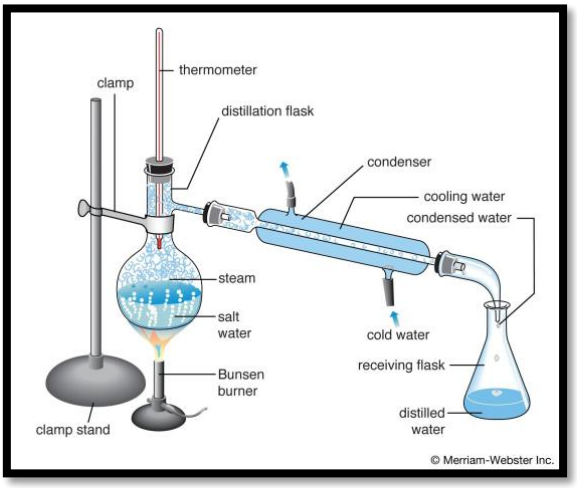
2.How can soluble solids be separated from their solution? Explain by giving suitable examples.

Ans- Soluble solids are separated from their solutions mainly by evaporation and distillation.

a. Evaporation: If a liquid evaporates or is evaporated, it changes into gas or vapour. Seawater, also called brine solution, consists mainly of sodium chloride and other dissolved salts in it. The salt or sodium chloride used in our foodstuffs can be separated from seawater by evaporation. Seawater is first collected in shallow ponds near the sea and is allowed to evaporate in the Sun. Water evaporates leaving salt behind. Another example of evaporation is sugar solution. When the solution is boiled, gradually the whole of water evaporates, leaving sugar behind.

Salt separation near the seawater

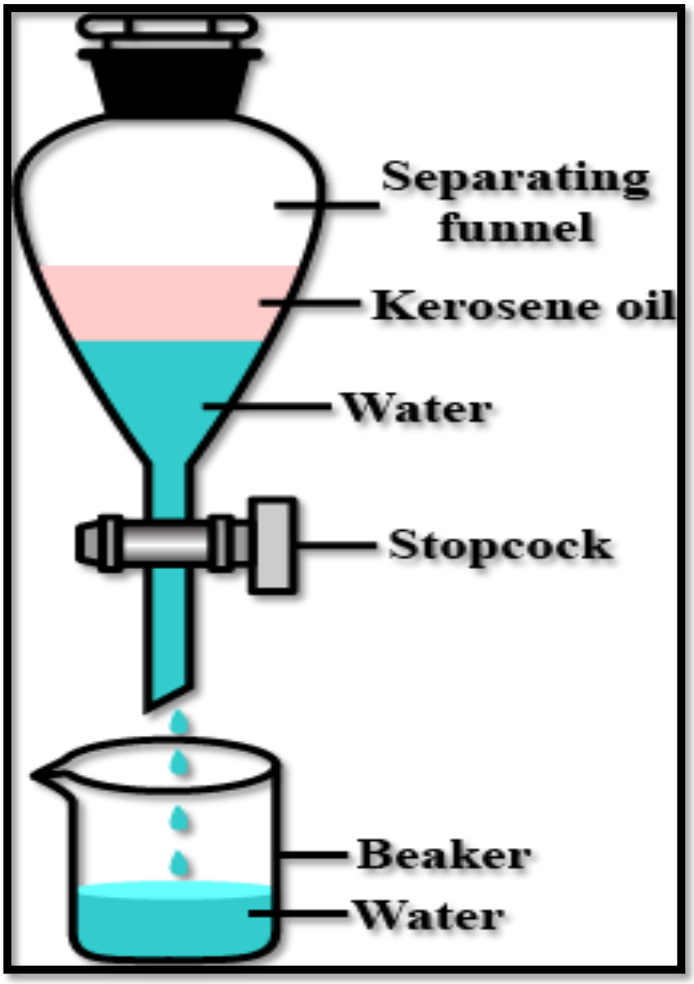
b. Distillation: This method is carried out in a distillation flask. First, the mixture is heated. Once the liquid boils, it starts evaporating. The vapours of the liquid are cooled and condensed to obtain the pure liquid. The dissolved solid is left behind when all the liquid has evaporated.



The process of Distillation

3.How can we separate a mixture of oil and water? Explain and draw a suitable diagram.

Ans- Oil and water are immiscible; they do not mix with each other. Immiscible liquids can be separated easily. In an oil and water mixture, oil forms a separate layer above water. This is because oil has a lower density than water and, hence, it is lighter. The two can be separated by using a separating funnel in which there is an opening and a stopper at the bottom. The lower layer, which is water, is drained out of the opening at the bottom of the apparatus and is collected in a beaker. The upper layer of oil remains in the funnel.



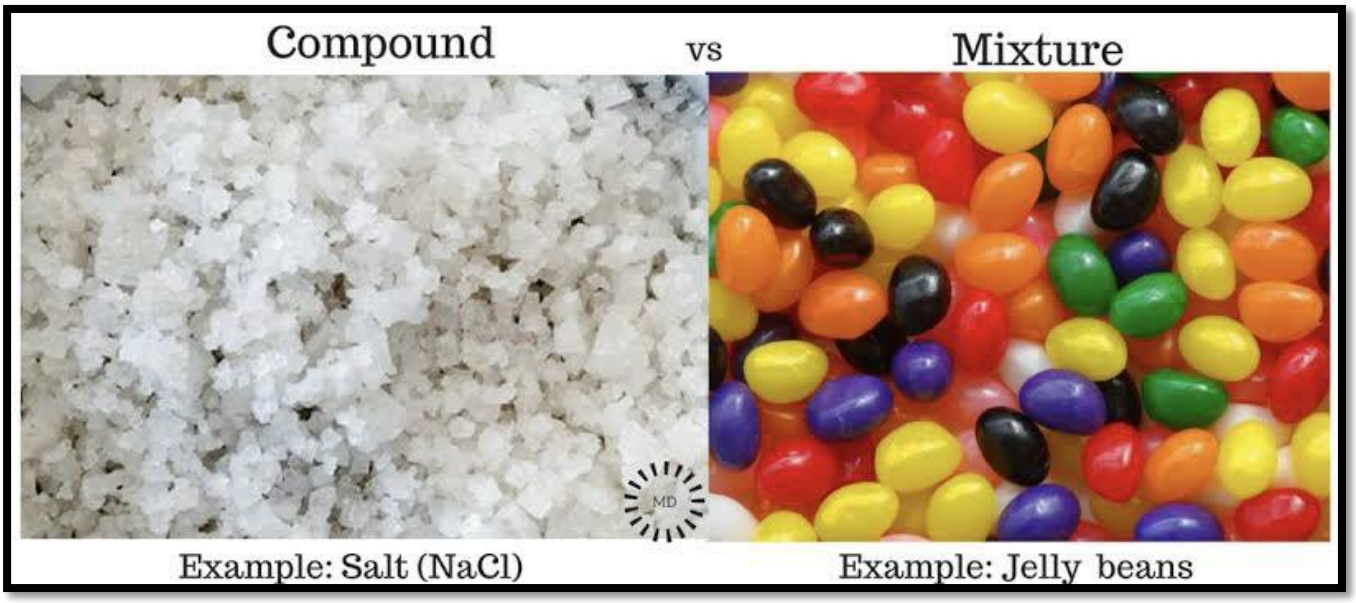
Separation of two immiscible liquids

4.Differentiate between compounds and mixtures.

Ans- The differences between compounds and mixtures are as follows.

Compounds	Mixture
a. Substances which have atoms of two or more elements are known as compounds	a. Substances which have molecules of elements or compounds present together are called mixtures.
b. Examples: water, salt and urea	b. Examples: milk and water
c. Elements combine in a fixed ratio to form compounds.	c. Elements or components mix in any ratio to form mixtures.
d. In compounds, the elements present lose their individual properties.	d. In mixtures, the elements present retain their individual properties.
e. The constituents of a compound	e. The constituents of a mixture can

cannot be separated by simple physical means.	be separated using simple means such as evaporation, distillation and filtration.
f. Pure compounds have fixed melting and boiling points.	f. Mixtures do not have fixed melting and boiling points.



5.Classify mixtures and differentiate between its types.

Ans- On the basis of their components, mixtures are classified into two categories: homogeneous mixtures and heterogeneous mixtures.

a. The mixture whose components can be easily seen is called a **heterogeneous mixture.** For example, a mixture of sand and water is a heterogeneous mixture.

b. The mixture whose components cannot be seen or are not visible is called a **homogeneous mixture**. For example, a mixture of sugar or salt in water is a homogeneous mixture.

6.Explain the principle used in these methods of separation.

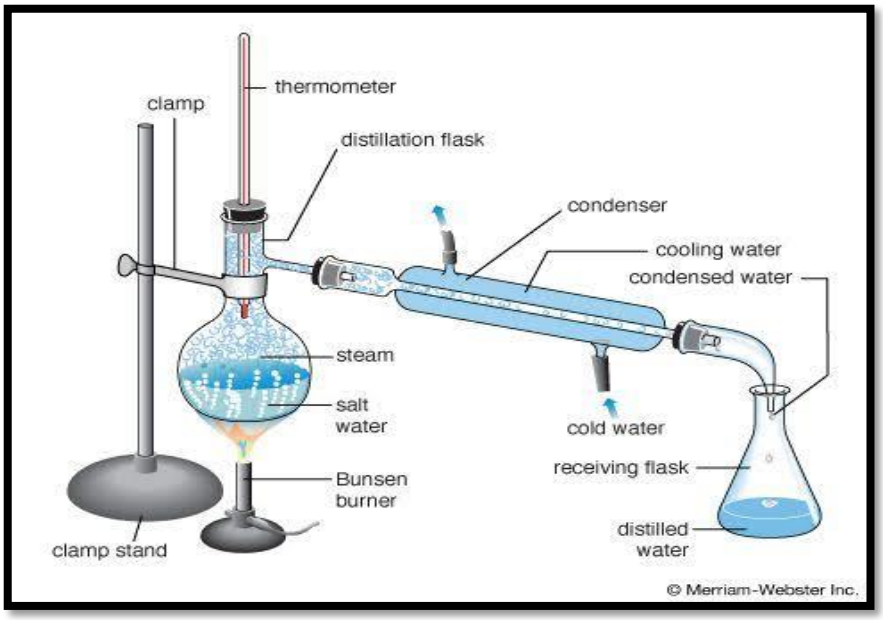
a. Winnowing:- If one of the components of the mixture is very light in weight, then it can be separated from the other constituents of the mixture by blowing it away. While separating grain from the chaff, the lighter chaff is blown away by the wind while the heavier grain falls straight down and gets separated.

b. Filtration:- The insoluble solid particles, being bigger in size than the holes or pores of the filter paper or strainer, cannot pass through it. However, the liquid easily flows through the filter paper. This way the undissolved substances are removed.

c. Sedimentation:-The insoluble solid particles, being heavier, settle down at the bottom of the vessel containing the mixture. The layer of the solid substance formed at the bottom of the liquid is referred to as sediment.

d. Centrifugation:- The lighter and heavier particles of a mixture are separated by rotating the liquid in a machine. This way, heavier particles settle down and lighter particles remain on top. Cream is separated from milk by centrifugation. As cream is lighter, it separates and floats at the top of the milk.

7.Draw a well- labelled diagram for these methods of separating constituents of mixtures.
Ans- a. Distillation



b. Filtration