

## NCERT QUESTIONS WITH SOLUTION

1. Why do we need to separate different components of a mixture? Give two examples.

**Ans.** Different components of a mixture are separated in order to either separate the unrequired components from a mixture or sometimes, to separate more than one useful components from a mixture.

For example, grain purchased from shops can contain several impurities such as pieces of stone, husk, broken grains, etc. Thus, grains are separated from these impurities to make them edible. Similarly, after preparing tea, we strain it to remove the used tea leaves from tea.

2. What is winnowing? Where is it used?

**Ans.** Winnowing is the process of separation of the heavier components from the lighter components of a mixture, by wind or by blowing air. It is generally used by farmers to separate the lighter impurities such as husk particles from the heavier grains.

3. How will you separate husk or dirt particles from a given sample of pulses before cooking?

**Ans.** The dirt particles that are present in the pulses are removed by washing the later with water. Being heavier, the pulses settle down, while the dirt particles being lighter keep floating in water. This process is called sedimentation. The dirty water can be removed by the method of decantation, leaving the pulses at the bottom.

4. What is sieving? Where is it used?

**Ans.** Sieving is the method of separation of fine particles from bigger particles by allowing the finer particles to pass through the holes of a sieve, leaving the bigger particles in the sieve itself. It is generally used in homes to separate flour from impurities such as pieces of stone, stalk and husk. It is also used at construction sites to separate sand from small stones.

5. How will you separate sand and water from their mixture?

**Ans.** Sand is not soluble in water. Hence, the mixture of sand and water can be separated by two methods:

1. Combination of sedimentation and decantation: As sand is insoluble and heavier than water, it settles down at the bottom of the container containing the mixture. This process is called sedimentation. After the process of sedimentation is complete, water is slowly transferred to another container and sand remains in the original container. This process is called decantation.

2. Filtration: the mixture is poured on a strainer or a piece of cloth or a filter paper so that the water goes through the strainer and the sand remains on the strainer.

6. Is it possible to separate sugar mixed with wheat flour? If yes, how will you do it?

**Ans.** Yes. It is possible to separate a mixture of sugar and wheat flour. This can be done by the process of sieving. The mixture of sugar and wheat flour is allowed to pass through a sieve, then the fine wheat flour particles would pass through the sieve, the sugar particles would be retained by the sieve.

7. How would you obtain clear water from a sample of muddy water?

**Ans.** Clear water can be obtained from a sample of muddy water by the method of filtration. In this method, the sample of muddy water is poured through a cloth having fine pores or through a filter paper. Water will pass through the filtering medium, leaving behind the mud.

8. Fill in the blanks:

(a) The method of separating seeds of paddy from its stalk is called\_\_\_\_.

(b) When milk is cooled after boiling and poured on a piece of cloth, cream (malai) is left behind on it. This process of separating cream from milk is an example of\_\_\_\_.

(c) Salt is obtained from seawater by the process of\_\_\_\_.

(d) Impurities settled at the bottom when muddy water was kept overnight in a bucket. Clear water was then poured from top. The process of separation used in this example is called\_\_\_\_.

**Ans.** (a) Threshing (b) Filtration  
(c) Evaporation (d) Decantation

9. True or false

(a) A mixture of milk and water can be separated by filtration.

(b) A mixture of powdered salt and sugar can be separated by the process of winnowing.

(c) Separation of sugar from tea can be done with filtration.

(d) Grain and husk can be separated with the process of decantation.

**Ans.** (a) False (b) False  
(c) False (d) False

10. Lemonade is prepared by mixing lemon juice and sugar in water. You wish to add ice to cool it. Should you add ice to the lemonade before or after dissolving sugar? In which case would it be possible to dissolve more sugar?

**Ans.** We should add sugar before adding ice. Sugar dissolves in warm water more quickly than in cold water. We can dissolve more sugar in warm water.

## EXERCISE-01

## Multiple choice questions

1. Which of the following methods would you use for separating stone from rice?  
(1) Filtration  
(2) Magnetic separation  
(3) Distillation  
(4) Hand-picking
2. The property used in separating a mixture of two solids by winnowing is  
(1) Difference in colour  
(2) Difference in size  
(3) Difference in weight  
(4) Attraction by magnet
3. Which of the following methods would you use for separating iron from sulphur particles?  
(1) Magnetic separation  
(2) Filtration  
(3) Churning  
(4) Distillation
4. The process of settling down of particles of a solid in a liquid is  
(1) Decantation  
(2) Sublimation  
(3) Sedimentation  
(4) Filtration
5. Sedimentation and decantation are useful to separate  
(1) Immiscible liquids  
(2) Soluble solid from liquid  
(3) Insoluble solid from liquid  
(4) Insoluble solid from a liquid where the solid is heavier than the liquid.
6. A commonly used chemical for loading is  
(1) Hydrogen                      (2) Alum  
(3) Sulphur                      (4) Common salt
7. Purification of water by alum is a separation method of  
(1) crystallisation      (2) condensation  
(3) evaporation      (4) loading
8. Which of the following mixture can be separated by sedimentation and decantation?  
(1) Sand and camphor  
(2) Orange and mango  
(3) Sand and water  
(4) Grains from stalks
9. A mixture of water and talcum powder is poured through a filter paper placed in a funnel.  
(1) Talcum powder will form the filtrate.  
(2) Talcum powder will form the residue.  
(3) Both the water and the talcum powder will pass through the filter paper.  
(4) Water will evaporate during filtration
10. The method used to separate the seeds from the fruit juice is \_\_\_\_\_.  
(1) filtration                      (2) evaporation  
(3) crystallization      (4) winnowing
11. Tea leaves can be separated from which process?  
(1) Handpicking                      (2) Evaporation  
(3) Filtration                      (4) Threshing
12. Filter paper is folded in which shape, for the process of filtration?  
(1) Conical                      (2) Cylindrical  
(3) Cubic                      (4) Rectangular

13. Which of the following mixtures would you be able to separate using the method of filtration?

- (1) Oil in water
- (2) Cornflakes in milk
- (3) Salt in water
- (4) Sugar in milk

14. The process of changing vapour into its liquid is called

- (1) condensation      (2) loading
- (3) winnowing      (4) evaporation

15. What is the name of salt solution, if no more salt can be dissolved?

- (1) Unsaturated      (2) Salty
- (3) Saturated      (4) Condensed

#### True or False

1. A raw material does not need to be processed to obtain useful products from it.
2. You always need to use complex laboratory equipment to separate mixtures.
3. Magnetism would be an effective method for separating wood chips from sand.
4. The settling down of insoluble particles in a liquid medium is called loading.
5. Filtration is a process of separation that depends on whether a substance is magnetic or not.
6. Cream can be separated from milk by filtration.
7. Churning can easily separate suspended particles from a liquid medium.

8. Evaporation would be an effective process for getting pure water from ocean water.

9. We have to separate a mixture into its constituents because only pure compounds are useful to us. Mixtures are not of much use.

10. Husk from grains can be separated using hand picking.

11. Heavier and lighter components of a mixture can be separated by winnowing.

12. Sieving is used when the component of mixture have different sizes.

13. Solid insoluble layer during sedimentation is called sediment.

14. Water dissolves different amount of soluble substances in it.

15. More amount of substances can be dissolved in a solution by heating it.

#### Match the separation methods

- |                 |                         |
|-----------------|-------------------------|
| (a) Filtration  | (c) Floatation          |
| (b) Evaporation | (d) Magnetic separation |
| (e) Dissolution | (f) Sieving             |

#### Match the methods given in the box with their descriptions below.

1. Using a container with holes in it, called a sieve, to separate a mixture \_\_\_\_\_.
2. Adding water so that the parts of the mixture that are less dense than water will float, and the other parts will sink \_\_\_\_\_.

3. Using magnets to attract and separate the magnetic parts of a mixture\_\_\_\_\_.
4. Adding liquid to cause the soluble parts of the mixture to dissolve\_\_\_\_\_.
5. Using special paper that allows liquid to pass, but traps solids \_\_\_\_\_.
6. Heating a mixture so that part of it changes to a gas and the other part does not\_\_\_\_\_.

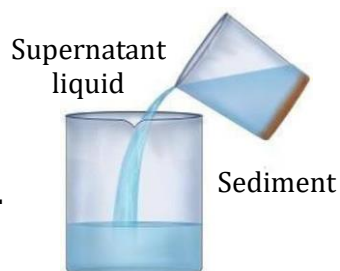
**Identify the method**

Examine the pictures below and identify the type of separation method used.

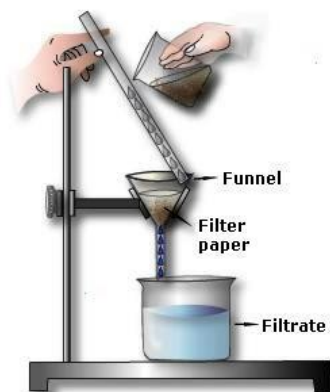
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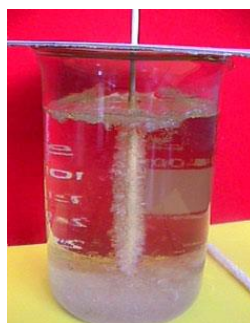
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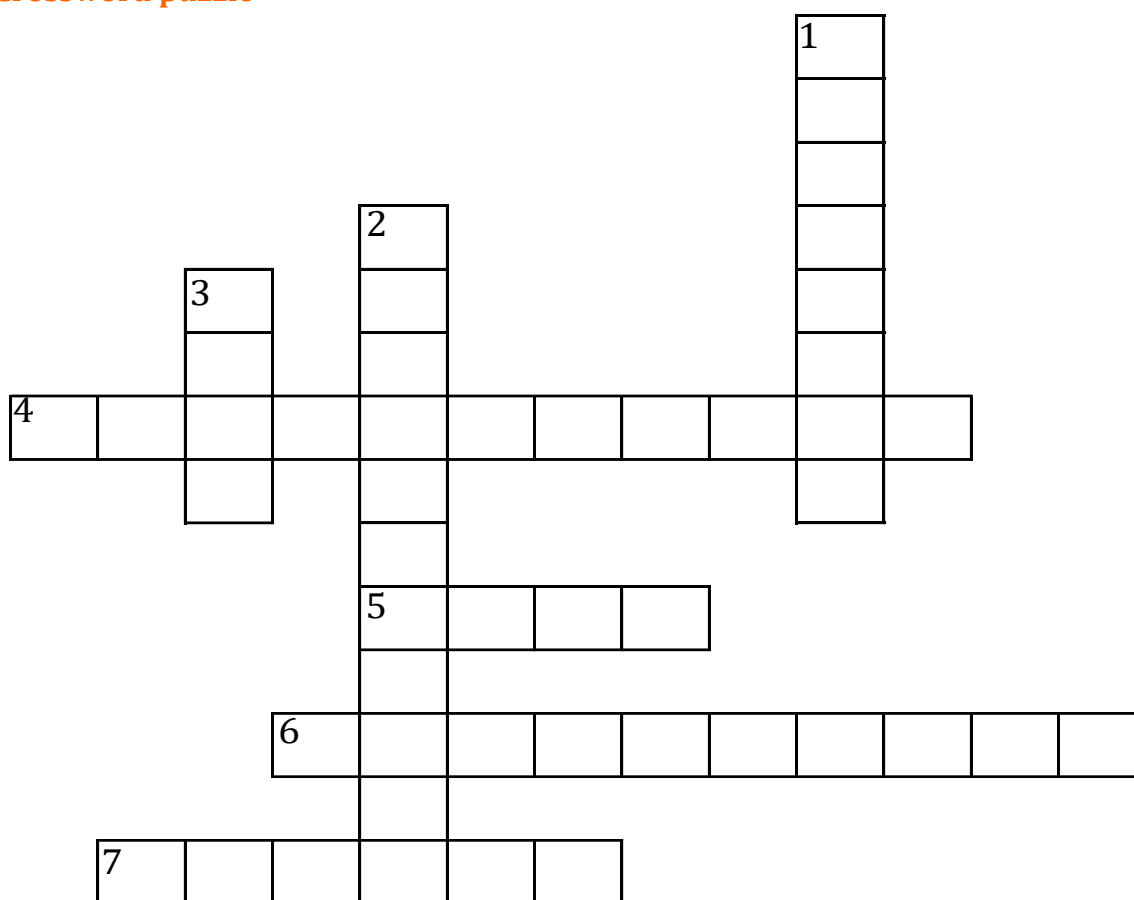
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5.



## Crossword puzzle

**Across**

4. Stones can be separated from rice by \_\_\_\_.
5. It can ease the loading of suspended solid particles in water.
6. This process of separation is similar to straining of tea at home.
7. \_\_\_\_ is used to separated iron from sulphur.

**Down**

1. Washing machine follows the technique of \_\_\_\_.
2. Obtaining soluble salt from its solution.
3. \_\_\_\_ helps in winnowing by blowing away the chaff more easily.

## ANSWER KEY

### Multiple choice questions

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	3	1	3	4	2	4	3	2	1	3	1	2	1	3

### True or False

1. False      2. False      3. False      4. False      5. False      6. False  
 7. True      8. False      9. False      10. False      11. True      12. True  
 13. True      14. True      15. True

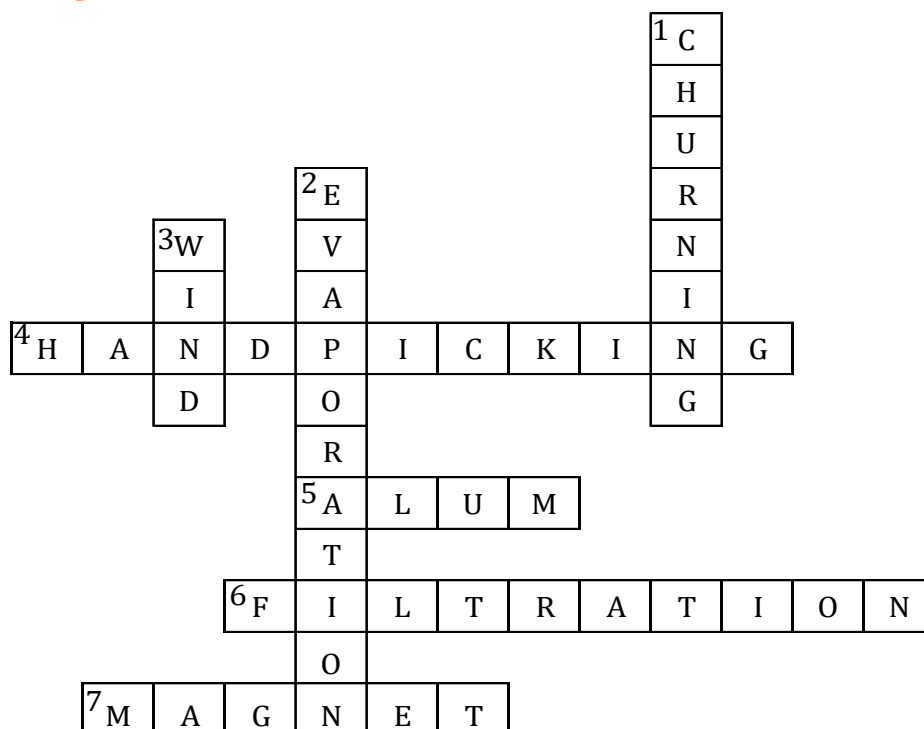
### Match the separation methods

1. Sieving                  2. Floatation                  3. Magnetic separation  
 4. Dissolution              5. Filtration                  6. Evaporation

### Identify the method

1. Sieving      2. Sedimentation and decantation      3. Filtration  
 4. Magnetic separation      5. Crystallisation

### Crossword puzzle



**EXERCISE-02****Very short answer type questions**

1. Is a solution of sugar in water homogeneous or heterogeneous?
2. Can a mixture of sawdust and a water be separated by sedimentation and decantation?
3. Which method gives a better separation of an insoluble solid from a liquid—sedimentation and decantation, or filtration?
4. Name the method which is used to speed up sedimentation.
5. How do we separate wheat grains from chaff after harvesting?
6. Can water dissolve liquids and gases also?
7. Name any two methods used for separation of substances.
8. Which method is used to separate stones from grains?
9. How does the farmer separate grains seeds from bundles of stalk?
10. Which method is used to separate heavier and lighter component of a mixture by wind or blowing air?
11. What is filtration?

**Short answer type questions**

1. Under which condition can hand-picking be used to separate the constituents of a mixture?
2. To use a sieve to separate sand and rice seeds, what should be the size of the holes of the sieve in comparison to the size of sand particles and rice seeds?
3. Which property of a filter paper is used to separate an insoluble solid from a liquid?

4. What do you mean by winnowing? Explain with example.
5. Which of the following is NOT a method of separation of substances: Threshing, filtration, saturated solution, sedimentation and why?
6. What is a saturated solution?
7. What is the difference between evaporation and condensation?
8. Write the name of method for separating—  
a) Salt from salt water solution.  
b) Wheat from mixture of wheat and rice.
9. Why is separating different components of a mixture necessary?
10. How is sieving use to separate particles of a mixture? Give example.

**Long answer type questions**

1. How will you separate a mixture of grass, pebbles and sand?
2. Which method is most suitable to separate mixture of sulphur and iron? Explain it.
3. Explain with labelled diagram to show the arrangement used to filter a mixture of a liquid and an insoluble solid.
4. How will you separate salt from its solution?
5. Paheli was feeling thirsty but there was only a pot of water at home which was muddy and unfit for drinking. How do you think Paheli would have made this water fit for drinking if the following materials were available to her. Alum, tub, muslin cloth, gas stove, thread, pan and lid.



## Exercise-01 Solutions

## Multiple choice questions

## 1. Option (4)

Hand-picking –It is the process of separating solid impurities like pieces of stone, husk from rice, wheat, pulses by hand.

## 2. Option (3)

Winnowing is used to separate two solids of different weights, such as wheat and chaff.

## 3. Option (1)

Magnetic separation will be used as iron is attractive to magnet and will stick to it and we will find left material in the form of Sulphur.

## 4. Option (3)

Solid-liquid mixture in which the solid is heavier than the liquid gets settle down this process is called sedimentation.

## 5. Option (4)

Solid-liquid mixture in which the solid is heavier than the liquid can be separated by sedimentation and decantation

## 6. Option (2)

Alum is a commonly used chemical for loading to speed up sedimentation.

## 7. Option (4)

Loading helps sediments to settle down. Suspended solid particles in water are loaded by the addition of alum.

## 8. Option (3)

A mixture of sand and water can be separated by the process of sedimentation and decantation.

## 9. Option (2)

Talcum powder is insoluble in water. Hence, when a mixture of water and talcum powder is poured through a filter paper placed in a funnel, water will pass through it as filtrate and talcum powder will form the residue. The process is called filtration.

## 10. Option (1)

The process of filtration is used to separate solid seed from liquid fruit juice.

## 11. Option (3)

Filtration is good for separating an insoluble solid from a liquid.

## 12. Option (1)

The filter paper is first to cut into a circular shape and then it is folded into a conical shape so that it can fit the cone shape of the funnel.

## 13. Option (2)

Cornflakes are insoluble in water and milk both. Thus, they can be removed from the milk with filtration.

## 14. Option (1)

Condensation is simply the process of change of the vapor from gaseous state to liquid when comes in contact of cool surface.

## 15. Option (3)

When no more solute (salt) can be dissolved in solvent (water) since there is no space left for the solute particles to occupy the solution is known as saturated solution.

**True or False**

- |  |  |
|--|--|
| <p><b>1. False</b><br/>We require raw materials to obtain good products by doing some process on them without processing on raw materials we cannot obtain any useful products.</p> <p><b>2. False</b><br/>We need to separate different components of a mixture to separate the useful components from the non-useful.</p> <p><b>3. False</b><br/>There is no effect of magnetism for separating wood chips from sand because of absence of iron.</p> <p><b>4. False</b><br/>The settling down of insoluble particles in a liquid medium is called sedimentation.</p> <p><b>5. False</b><br/>Filtration is a process to separate the suspended solid particles</p> <p><b>6. False</b><br/>Cream is separated from the milk by centrifugation.</p> <p><b>7. True</b><br/>During churning the butter separates out from curd and floats up.</p> <p><b>8. False</b><br/>Crystallisation is a better technique than evaporation because some solids decompose on heating to dryness during evaporation.</p> | <p><b>9. False</b><br/>No we have not separate a mixture into its constituents because mostly we use mixtures of compounds and elements. Mixtures are of much use in everyday life.</p> <p><b>10. False</b><br/>Husk is separated from heavier seeds of grains by winnowing.</p> <p><b>11. True</b><br/>Winnowing is a method which is used for separation of heavier components to the lighter components in a mixture using the help of wind.</p> <p><b>12. True</b><br/>Sieving can be used only when the components of the mixture are of different sizes.</p> <p><b>13. True</b><br/>Sediments are the insoluble solids in a solid liquid mixture. Which gets separated during sedimentation.</p> <p><b>14. True</b><br/>Water can dissolve different amount of different soluble substances in it.<br/>Eg. Amount of salt dissolve in water is different from the amount of sugar dissolved in the same amount of water.</p> <p><b>15. True</b><br/>On heating, more of substances can be dissolved in solution.</p> |
|--|--|

## Exercise-02 Solutions

## Very short answer type questions

1. Solution of sugar in water is a homogeneous.  
This solution have same property in all the direction.
2. No, Sawdust is not settle down in water because it is lighter than water so it floats on water. Filtration is a method to remove suspended impurities.
3. Filtration is a better method to separate an insoluble solid form liquid.
4. Loading (Alum) is used to speed up sedimentation.
5. Threshing method is used to separated wheat grain from chaff.
6. Yes, water can dissolve liquids and gases. Water is a universal solvent.
7. Handpicking, Winnowing.
8. Stones are separated from grains through sieving. It is a simple technique for separating particles of different sizes.
9. Threshing → The process that is used to separate grain from stalks etc. is threshing. In this process, the stalks are beaten to free the grain seeds.
10. The method of separation that in used to separate heavier and lighter components of a mixture by wind or by blowing air is winnowing.
11. It is the process of removing insoluble substances from the liquid by allowing them to pass through a filter paper.

## Short answer type questions

1. If constituents of solid mixture are big and visibly different then it can be separated easily by hand-picking method.
2. The size of the holes of the sieve should be smaller than sand and bigger than rice seed so seed will not pass from them while sand will pass.
3. Filter paper allows to pass liquid from it but solid cannot pass from filter paper, this property of filter paper is used to separate an insoluble solid from liquid.
4. Lighter solids are separated from heavier ones by wind is called winnowing. A mixture of chaff and grain is made to fall from a height. The lighter chaff drifts away and the heavier grain falls vertically on the ground. Wind helps in winnowing by blowing away the chaff more easily.
5. Saturated solution is NOT a method of separation of substances.
6. Saturated solutions is the chemical solution containing the maximum concentration of a solute dissolved in the solvent at constant temperature. The additional solute will not dissolve in a saturated solution.

7.

Evaporation	Condensation
1. The process of change of water from liquid to gases state or vapors is called evaporation.	1. The process of conversion of water vapors to liquid water on cooling is called condensation.
2. Evaporation occurs before a liquid reaches its boiling point.	2. Condensation is a phase-change regardless of the temperature.

8. (a) Salt mixes well in water to form a clear salt solution. As we know, salt do not get vaporize on heating hence, we can use the “evaporation” process to separate out salt from mixture.

(b) A mixture of wheat grains and rice flaks can be separated by winnowing.

9. We need to separate different components of a mixture to separate the useful components from the non-useful or some harmful components.

Eg. Tea leaves are separated from tea.

10. If a solid mixture is stirred or shaken on a mesh, particles smaller than the holes in the mesh fall and the bigger ones remain on the mesh. Thus, particles are separated on the basis of their size.

This process is called **sieving** and the mesh (usually fitted into a frame) is called a **sieve**. Sieve is a shallow vessel having small holes at its bottom. The size of the holes of a sieve to be used, depends on the size of the particles of the material, to be separated from the mixture.

Small and fine sieves are used in the kitchen to separate bran and other impurities from flour.

### Long answer type questions

- Grass can be separated from pebbles and sand by winnowing because grass is lighter than pebbles and sand while pebbles and sand can be separated from each other by sieving method.
- Magnetic separation is most suitable method to separate sulphur and iron.



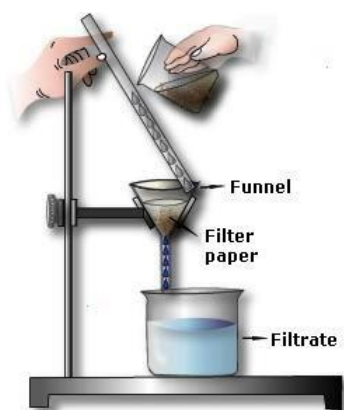
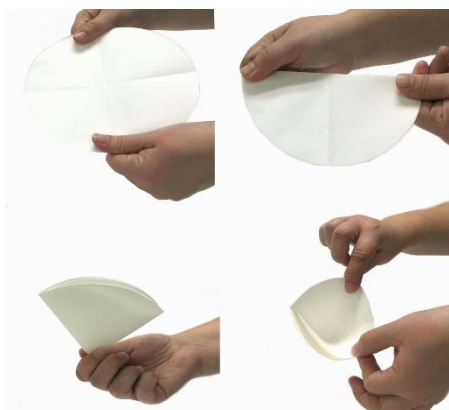
Scrap iron is picked up by huge magnets in

Iron is attracted by a magnet. So, if you move a magnet through a mixture of iron fillings and sulphur, the iron particles clings to the magnet. Sulphur is not attracted by magnet and so particles of sulphur are left behind. This is how a mixture of iron and sulphur is separated. Such a method in which a magnet is used to separate the constituents of a mixture is called magnetic separation.

- By decantation, a liquid is not completely separated from an insoluble solid. **Filtration** is a better method. The process of removing insoluble solid from a liquid by using a filter paper is called filtration.

### Filtration in the laboratory

A circular filter paper is folded along its diameter into two semicircles. It is once again folded into four quarter-circles. Now, a cone is opened by holding three quarter-circles on one side. This cone is fitted into the cone of a funnel and moistened with water so that the filter paper adheres to the funnel.



#### Folding of filter paper and Filtration

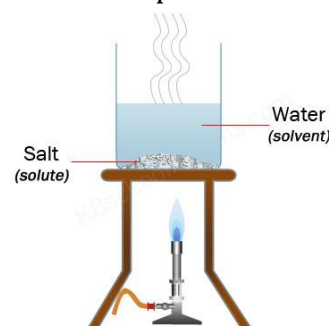
The funnel is fitted to a stand and a beaker is placed below.

The supernatant liquid is slowly poured along a glass rod into the funnel. The solid collects on the filter paper (**residue**), whereas the liquid passes through. The clear liquid thus obtained is called the **filtrate**.

You can easily separate a mixture of sand and water or chalk and water by filtration.

4. A solid can be recovered from its solution by evaporating the solvent.

A solution when heated on a flame for some time, solvent is evaporated and it leaves residue of salt. This method is applied when the solvent is volatile liquid and the solute is non-volatile solid. For example, Sodium chloride can be separated from its aqueous solution by evaporation. Similarly, the coloured dye present in the blue or black ink can be separated by evaporation. The volatile component evaporates leaving behind non-volatile component.



Evaporation

5. **Paheli Making the water fit for drinking:**  
With the available materials, Paheli would have undertaken the following steps to purify water. Firstly, she can filter the muddy water with the help of a muslin cloth, which is mainly used for purification purposes.  
Now, she has to tie the piece of Alum with the help of a thread and submerge it in water and then leave the water undisturbed for some time.  
After resting for a while, the impurities will finally settle down at the bottom and the water from the top can be drained off.  
Now she has to boil the discarded water for 10 minutes by covering it with the pan and making it cool down followed by filtering the water and finally, the water will be purified with filtration that will make it fit for drinking.