Natural Sciences: NATS4
Lesson 7

Unit Standard: 7509

THEME: **Matter and Materials**
TOPIC: **Separation methods of mixtures**

At the end of this unit, you should be able to:

1. Describe and explain separation methods of mixture.
2. Distinguish how each separation method can be applied.
3. Define and identify various terminology of separated components of mixtures.

Mixtures, whether *heterogeneous* or *homogeneous*, can be separated into original components by mechanical means. The following are methods or techniques of separating mixtures

1.   **HAND SORTING**
This is an ideal method of separating solid particles. This is only possible when the particles in the mixture are relatively large and when there are not too many of them to sort.

For example: Raisins and peanuts

2. **SIEVING**
A mixture made up of solids with different sizes can be separated by sieving, where smaller particles will fall through the openings in the sieve, while the larger particles stay behind.
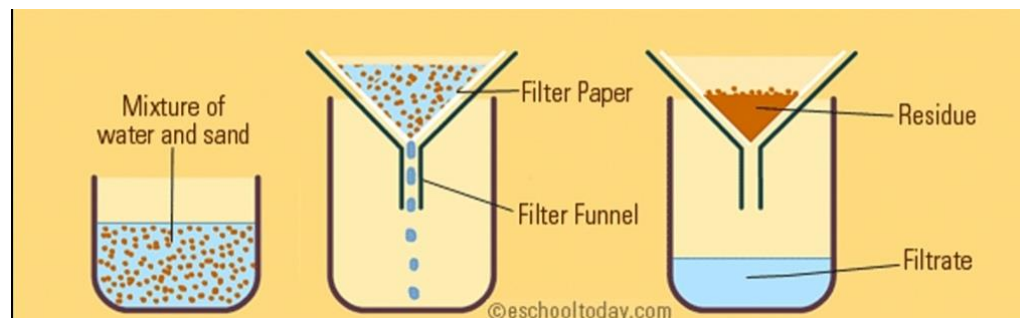
For example: Sand and gravel.

3. **FILTRATION**
When the particles in a mixture are too small to be caught by sieve and when the components are in different states, they can be separated by filtration, using a filter paper.
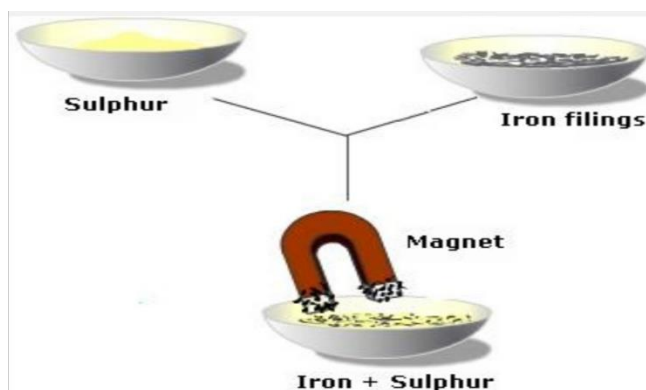
For example: Sand and water – sand will be trapped by the filter paper, as a **residue** and water goes through, as a **filtrate**.

4. **MAGNETIC SEPARATION**
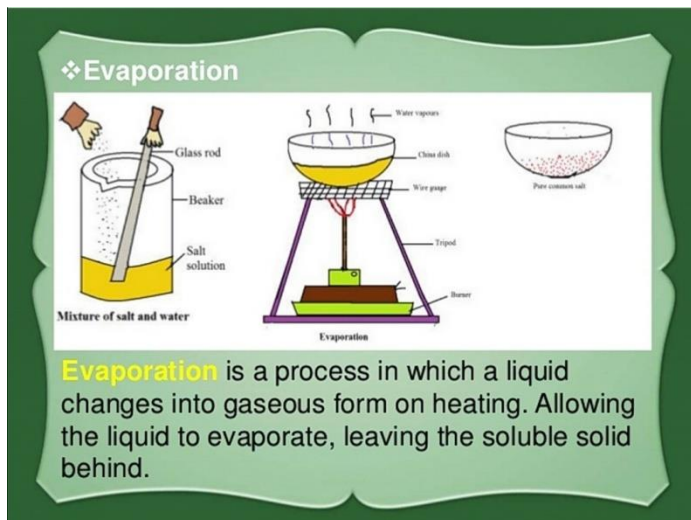This method separates smaller metal particles from other substances.

For example: Iron filings and sulphur powder. The iron filings gets attracted by the magnet and sulphur powder is left behind in the dish.

5. **EVAPORATION**
This method uses slow heating of a mixture to evaporate the one with the lesser boiling point.

For example: Salt and water – water will slowly evaporate out of the container, leaving the salt content in the container.

Evaporation is a process in which a liquid changes into gaseous form on heating. Allowing the liquid to evaporate, leaving the soluble solid behind.

6. **DISTILLATION**
Distillation is a process of separating a mixture of liquids that have different boiling points using an instrument called still. This process involves evaporation and condensation.

For example: Vinegar and water. Vinegar will evaporate quicker than water because it has the lowest boiling point and as such, it will be condensed and collected first.
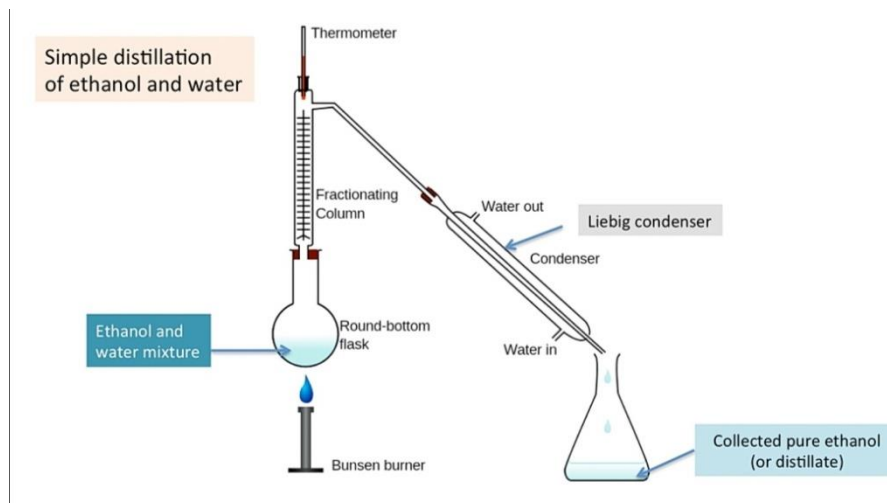
7. **DECANTATION/DECANTING**
This method is used to gradually pouring liquid from one container into another.

For example: Flour and water – water can be slowly transferred to another container, leaving flour in the original container as the **sediment**.
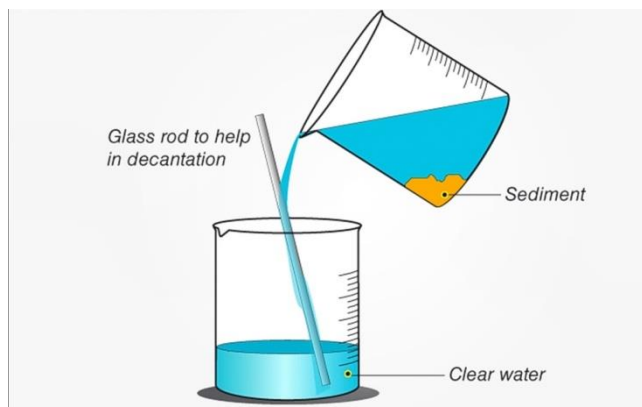
ACTIVITY

1. Copy the table onto your workbook. Identify a separating method for the imaginary mixtures in the table. **N.B: An example is given**.

IMAGINARY MIXTURES		
SOLID AND SOLID	**SOLID AND LIQUID**	**LIQUID AND LIQUID**
E.g. Hand sorting		

2. Some methods are most suitable to separate specific mixtures because of the physical properties of the particles of the mixture components.

   In each of the following…

   (a) Choose ONE method indicated in brackets to separate the given mixture.
   (b) Explain why your choice is most suitable to separate the mixture and retain both the components without losing any.

   2.1 Rice and flour. (Hand sorting or Sieving)
   2.2 Muddy water. (Filtration or Decantation)
   2.3 Oil and water. (Evaporation or Distillation)

3. A mixture is made up of aluminum cans and steel cans. Which can will be magnetized?

4. Define the following terms.

   4.1 Filtrate
   4.2 Sediment
   4.3 Residue

5. Differentiate between a filter paper and a sieve.

Compiler: C Tshabalala