

## Separation of a Mixture Lab

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_ PERIOD: \_\_\_\_\_

### Background:

A mixture results when two or more pure substances (elements, compounds) are mixed together. The components of a mixture are not chemically combined and therefore retain their physical properties which can be used to separate the mixture. For example, a mixture of sulfur and iron filings can be separated by using a magnet since iron has a physical property of being magnetic.

Chromatography, distillation, filtration and decantation are physical separation techniques. Chromatography is based on the ability of a substance to adhere to a surface and can be used to separate ink into its individual components. Distillation is based on substances having different boiling points and can be used to separate alcohol from water. Filtration is based on particle size and can be used to separate a solid from a liquid. Decantation is a fast process of separating a solid from a liquid by gently pouring the liquid down a stirring rod and not disturbing the solid settled at the bottom of the beaker.

A mixture can be heterogeneous or homogeneous. A heterogeneous mixture does not have uniform composition while a homogeneous mixture does have uniform composition. Granite, bean soup, oil-vinegar salad dressing all have a non-uniform composition and would be classified as heterogeneous mixtures. Salt water, syrup and vinegar all have a uniform composition and would be classified as homogeneous mixtures. Solutions are homogeneous mixtures. An aqueous solution contains a solvent and a solute. The solvent, water, is the dissolving medium while the solute is the substance that dissolves. In a glass of lemonade, powdered lemonade is the solute and water is the solvent.

### Procedure:

- 1) Obtain a small beaker (100-150mL) and place a spoonful of table salt and then a spoonful of sand inside. Stir with stirring rod. Observe and record.
- 2) Place a spoonful of rocks inside the beaker and stir. Observe and record.
- 3) Fill the beaker half full with water. Stir. Observe and record.
- 4) Place an "X" in the box to **all** terms that apply to each combination.

Combination	Heterogeneous Mixture	Homogeneous Mixture	Solution
Salt + Sand			
Salt, Sand, Rocks			
Salt, Sand, Rocks, Water			
Water and Salt Ignore the rest.			

Write a step-by-step procedure to separate the contents of the beaker. The procedure must be written so that the rocks, sand and salt will be shown to the teacher separately. You will be able to use the following items: *funnel, filter paper, screen/wire gauze, and hot plate or Bunsen burner*. Once your lab group has written the procedure, get teacher approval to start the separation process.

**Complete the following sentences below. Be specific with equipment and what the step will accomplish!**

The rocks will be separated by...

The sand will be separated by...

The salt will be separated by...

**Conclusion:**

- 1) Components of a mixture are not \_\_\_\_\_ (chemically/physically) combined and can be separated by \_\_\_\_\_ (physical/chemical) means.
- 2) \_\_\_\_\_ is a physical separation process based on boiling points.
- 3) \_\_\_\_\_ is a physical separation process based on particle size.
- 4) Black ink is placed onto a strip of filter paper and the bottom of the filter paper is lowered into a beaker of water. After several minutes other colors appear on the filter paper. The separation technique used here is called \_\_\_\_\_.
- 5) A mixture with uniform composition is called a \_\_\_\_\_ mixture while a mixture with non-uniform composition is called a \_\_\_\_\_ mixture.
- 6) Filtration and \_\_\_\_\_ are both processes used to separate a solid from a liquid. The filtration process is typically much \_\_\_\_\_. (faster, slower)
- 7) Salt water can be classified as a homogeneous mixture or a \_\_\_\_\_ where the salt is the \_\_\_\_\_ (solute, solvent) and the water is the \_\_\_\_\_ (solute, solvent).
- 8) Sand can be separated from water by using a process called \_\_\_\_\_. Separating sand from water is a \_\_\_\_\_ change (physical, chemical).

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Place the rocks, sand and salt that was separated below.

Rocks

Sand

Salt