

Laboratory Techniques: Weighing, Measuring Volume, use of a Burner, Evaporation and Filtration.

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Goals:

To learn the following Lab Techniques:

- a. Use of a Burner,
- b. Weighing,
- c. Measuring volume of a liquid,
- d. Evaporation and Filtration

Students will get trained in the correct usage of these techniques.

Bunsen Burner:

Bunsen burner used in the laboratory has two valves for adjustments and it is important that a burner is adjusted properly for best use. In the Bunsen burner (Fig 1) gas from the gas inlet (a) is admitted to the burner through a needle valve (b) in the base of the burner. It mixes with air from the vents (c) in the barrel (d) and provides a blue "non luminous flame" (e) when ignited. The hottest part of the flame is at the tip of the inner blue Cone (f). Your instructor will demonstrate the correct use of the burner.

The following is the procedure for the operation of a burner.

1. Connect the burner to the gas outlet at the Laboratory bench with rubber tubing and make sure that the tubing is not cracked or cut and the attachment is secure.
2. Open the air inlet about halfway.
3. Open the needle valve (clock wise) and keep it half open.
4. Turn the gas open to the fully on position and light the burner near the top of the barrel using an igniter or a striker.
5. Adjust the air flow valve and the gas inlet valve in such way that the flame will be completely non luminous with an inner cone.

Weighing: An electronic analytical balance is used in the lab for weighing. Depending on the accuracy one can use either a qualitative balance (two decimals) or quantitative balance (4 or 5 decimals).

Keep the object to be weighed on the balance pan and note to the weight as shown on the balance. (Note: never weigh hot or cold objects).

Measuring a liquid: Liquids are measure using graduated cylinders of appropriate size. The proper way to read the level of the liquid is to check the lower meniscus. Record the liquid level to the nearest 0.1 mL or 1.0 mL depending on the cylinder.

Evaporation and Filtration: Matter is classified in to pure substance (element or a compound) or a mixture (homogenous or heterogeneous).

Evaporation is a procedure to remove the volatile component of a homogenous mixture by vaporizing the liquid. For ex. Salt solution.

Evaporation is performed using an evaporating dish and heating the dish on a water bath.

Filtration is a process used to separate a heterogeneous mixture (ex. Sand / water mixture)

or a mixture of a liquid with an insoluble solid. Filtration is performed using a filtration set up with a funnel and a filter paper.

Procedure for evaporation: Use a clean dry evaporating dish and weigh it using a analytical balance. Record the mass of the dish. Measure 5.0 mL of the sodium chloride solution (10%) and transfer carefully in to the dish and evaporate the solution as shown in The Figure 2. When the evaporation is complete, let the dish cool to room temperature and weigh the dish with salt. Record the weight.

Procedure for Filtration: Mix about 2 mL of Barium chloride and 2 mL of Sodium sulfate solutions in s small beaker. The insoluble precipitate formed in the reaction will be separated by filtration. Pour the mixture on to a filter paper set up for filtration (see Fig 3 and 4). After filtration check the insoluble solid (precipitate) on the filter paper and the clear solution (filtrate) in the beaker or Erlenmeyer flask.

Results:

Mass of the empty evaporating dish = _____ g

Mass of the Dish + Salt formed after Evaporation = _____ g

Mass of the salt = _____ g

Questions:

1. What is a homogenous mixture? Give an example?
2. What is a heterogeneous mixture? Give an example?
3. What are the important safety precautions you must follow when you use a burner?
4. Classify each of the following as pure substance (element or compound) or Mixture (homogenous or heterogeneous)
 - a. air
 - b. Carbon dioxide
 - c. copper wire
 - d. glucose solution

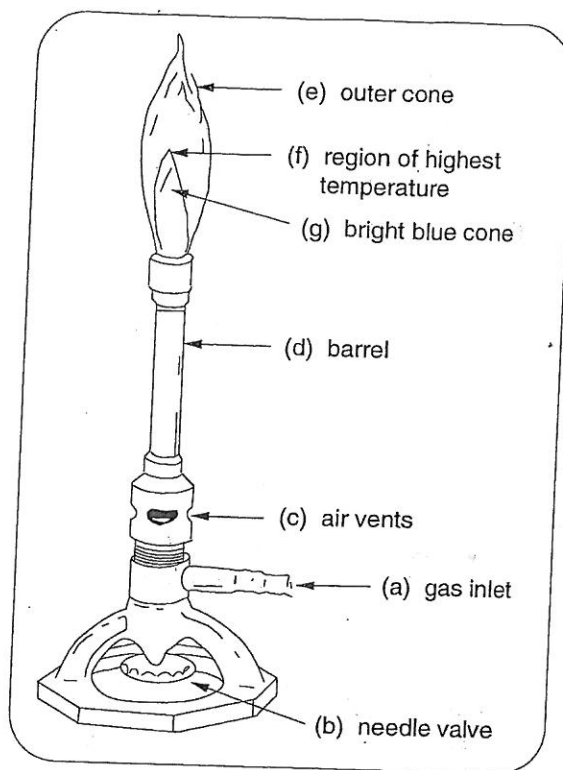


Figure 1

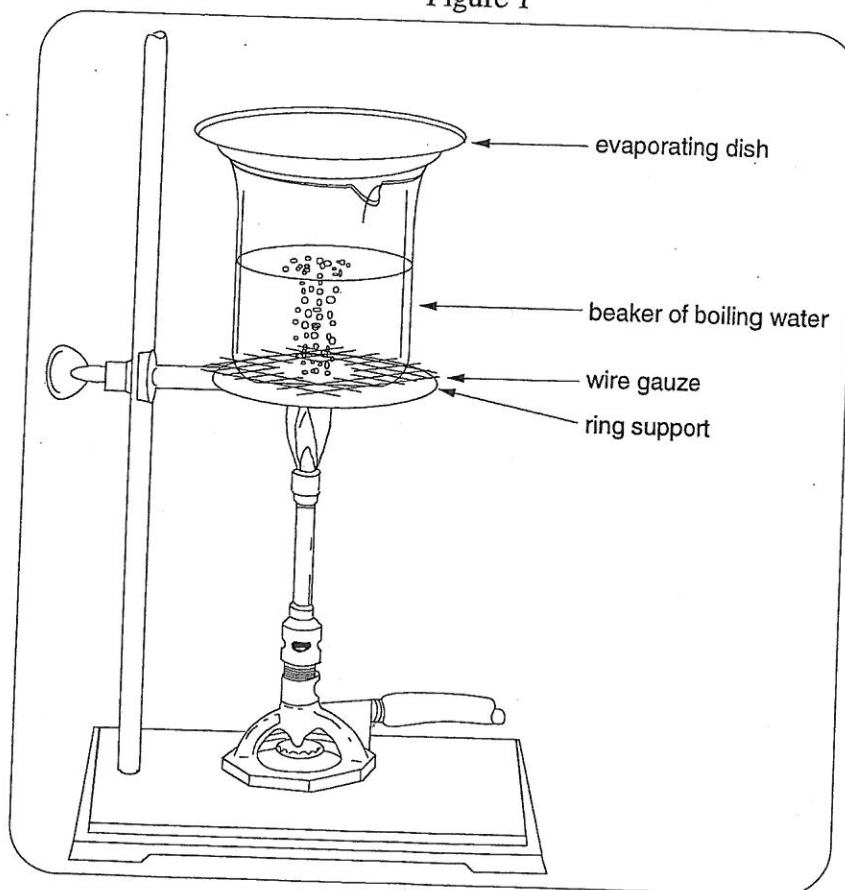


Figure 2 – Evaporation: a simple steam bath

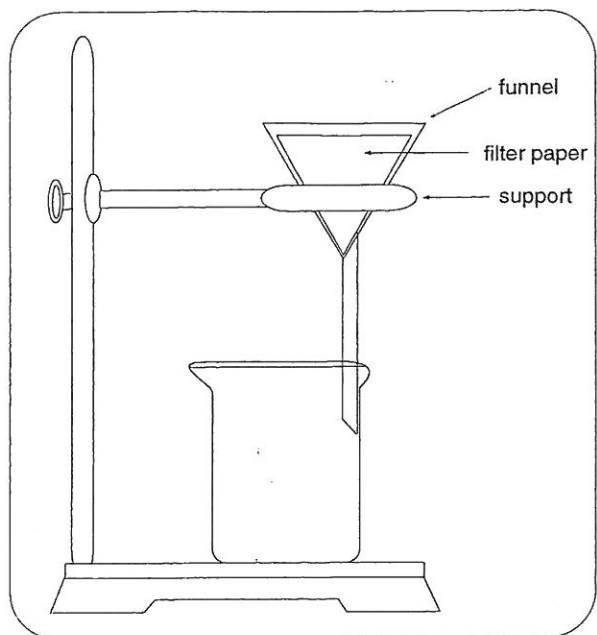


Figure 3 – Filtration set-up

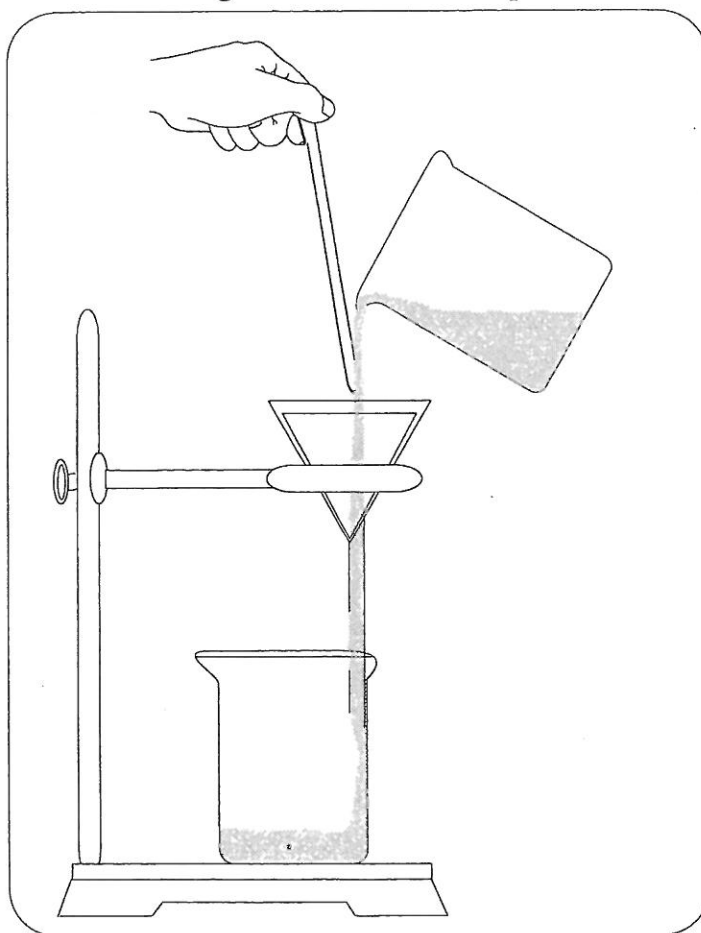


Figure 4 – Filtration: use of stirring rod