Laboratory Investigation Name _____

Chemistry: Form L1.6A Date _____ Period _____

Separating a Mixture

PROBLEM

How can a mixture of sand and salt be separated?

INTRODUCTION

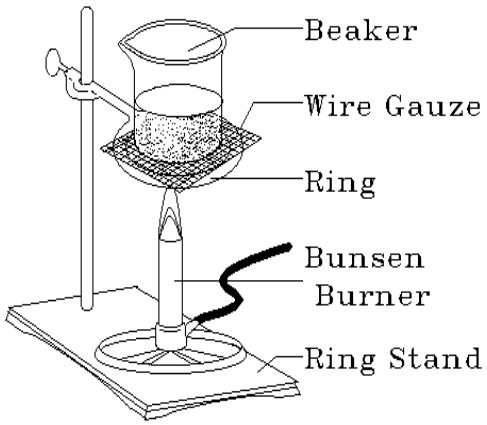
Mixtures are composed of two or more substances that are not chemically combined. Since the substances in a mixture are not chemically combined, it is possible to just pick them apart physically, but this could be very tedious! In this laboratory investigation, you will use an efficient method of physically separating a mixture of sand and salt. Then you will determine the ratio of its components by mass.

MATERIALS (*per group*)

Balance; beaker; Bunsen burner; drying oven; filter paper; flask; funnel; mixture (sand and salt); safety goggles; striker; tongs; wire gauze

PROCEDURE

1. Set up a water bath like the one pictured to the right.



2. Put on safety goggles. *CAUTION: Wear safety goggles whenever you use the Bunsen burner.* Light the Bunsen burner with a striker.

3. While the water bath is warming, measure the mass of a piece of filter paper with a balance. Record the mass of the filter paper in the data table on the next page.

4. Pour a small amount of the mixture onto the filter paper (about 3 g - 5 g). Record the mass of the filter paper plus the mixture in the data table on the next page.

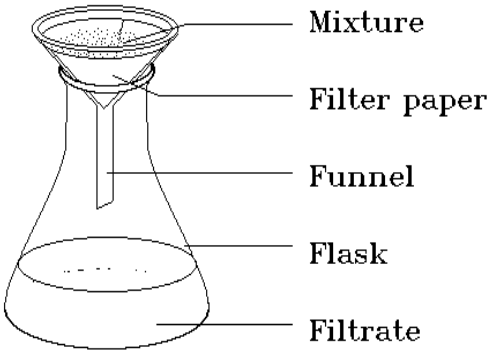
5. Calculate the mass of the mixture by subtracting the mass of the filter paper from the mass of the filter paper plus the mixture. Record the result.

6. Temporarily, pour the mixture onto a second piece of filter paper. Then fold the first piece of filter paper into a cone, as shown in the diagram below, by folding it into quarters and opening it up so one quarter is separated from the other three.

(a) (b) (c) (d)

7. Measure the mass of an empty flask and record it in the data table on the next page.

8. Place a funnel into the flask as shown in the diagram to the right. Put the cone shaped filter into the funnel and pour the mixture back into the filter.



9. Using tongs, grasp the beaker from the hot water bath and pour about 50 mL of hot water through the mixture.

10. Unfold the piece of filter paper and set it aside over night or place it in a drying oven until dry.

11. Evaporate the water from the filtrate in the flask by placing the flask on the ring stand with a wire gauze and heating with a Bunsen burner until dry.

12. After the water is completely evaporated, allow the flask to cool. When the flask is completely cool, measure the mass of the flask plus the salt with a balance and record the result. Calculate the mass of the salt by subtracting the mass of the empty flask.

13. When the filter paper is dry, measure the mass of the filter paper plus the sand and record the result. Calculate the mass of the sand by subtracting the mass of the filter paper.

14. Determine the percentage of the salt by dividing the mass of the salt by the mass of the mixture and multiplying by 100. Determine the percentage of the sand by dividing the mass of the sand by the mass of the mixture and multiplying by 100. Calculate the percentage of the mixture recovered by adding the percentage of salt and the percentage of sand together.

OBSERVATIONS

[a] Mass of filter paper plus mixture . . . . . _____

[b] Mass of filter paper . . . . . _____

[c] Mass of mixture (**a**-**b**) . . . . . _____

[d] Mass of flask plus salt . . . . . _____

[e] Mass of flask . . . . . _____

[f] Mass of salt (**d**-**e**) . . . . . _____

[g] Mass of filter paper plus sand . . . . . _____

[h] Mass of sand (**g**-**b**) . . . . . _____

[i] Percentage of salt (**f/c × 100**) . . . . . _____

[j] Percentage of sand (**h/c × 100**) . . . . . _____

[k] Percentage of mixture recovered (**i + j**) . . . . . _____

CONCLUSIONS

1. After filtering, what is left in the flask? What is left on the filter paper? _____

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2. What percentage of the mixture should be recovered? _____

3. What are some sources of error? _____

4. What properties of sand and salt are used to help separate them? _____

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