Name ___________________________________ / **20 Pts.**

Lab: Separation of a Mixture

Pre-lab Discussion

A dry sample of sand & salt can be separated based on the differences in solubility (ability to be dissolved by water). Salt is soluble, while sand does not dissolve in water. Based on this difference you will separate the two components, determine the mass of dry salt, and calculate the percentage of salt in the original dry mixture.

Purposes

- Develop laboratory skills in measuring & equipment usage.
- Experience one method of separating a mixture into its components.
- Determine the percentage of salt in a mixture of salt & sand.

Procedure

1. Obtain a clean dry 125 mL Erlenmeyer flask. Write your name or initials on it in sharpie marker. Also write your class period on the flask. Take the flask to a lab balance and find its mass. Record this data to the nearest 0.01 g in the data table.
2. Samples of a sand/salt mixture of unknown composition are available near each lab balance. <u>Record the letter</u> of your sample in the data table.
3. Tare a 50 mL beaker. Measure out *about* 3 grams of the unknown sample into your 50 mL beaker and record the mass <u>of this mixture</u> to the nearest 0.01 g in the data table. *Note: To measure only the mixture - not the beaker - "tare" the balance by resetting the balance to zero with the empty beaker on it. Now add the mixture with a spatula. The measured 3 grams does <u>not</u> have to be exactly 3.00 g. However, the amount that you place into your beaker has to be massed & recorded to the nearest 0.01 g.)*
4. Set up a funnel with filter paper in it. Place the funnel into the mouth of the Erlenmeyer flask so that the salty water from the funnel will drip into the flask.
5. Place ~10 mL of water into a 10 mL graduated cylinder. Add this water to the beaker with the sand/salt mixture. Swirl to dissolve the salt. Decant (carefully pour off) the water/salt solution that you just formed through the filter paper in the funnel.
6. Repeat step 5 two more times. Most of the sand should still be in the beaker when you're finished.
7. **Safety glasses!!** Set up a Bunsen burner and a ring stand with an iron ring and wire gauze. Place the flask with salt solution on it. Adjust the ring height so that it is about 5 cm (2 inches) above the top of the burner.
8. Light your Bunsen burner and adjust the flame so that it heats the flask. Evaporate the water in the flask to dryness.
9. Allow the flask to cool to <u>room temperature</u>. **Never mass hot objects! Why?** (Hot air rises, giving an artificially lower mass reading.) Measure the mass of the cool flask + salt to the nearest 0.01 g and record in the data table.
10. Reheat your flask a second time for 1 minute. Cool to room temperature and re-mass. Does this second mass agree with the first, to within 0.05 g? If not, reheat for 1 more minute, cool to room temperature and re-mass.

III. Analysis

A. Data Table (Remember Units and Sig Figs!)

Circle your unknown letter:	A or B
Mass of dry salt/sand mixture:	
Mass of empty Erlenmeyer flask:	
Mass of flask + salt after first evaporation:	
Mass of flask + salt after second evaporation:	

B. Calculations (Always show your calculations and maintain proper units with sig figs. Box final answer)

What is the mass of salt in your flask?
Calculate the mass of sand inn your original mixture.
Calculate the % of salt in your mixture.

IV. Conclusion Questions

1. Why is it necessary to heat the dish a second time in step 10? This procedure is called heating to constant mass.

2. Was the liquid in your evaporating dish (steps 5-7) an element, compound, or mixture? How can you tell?

3. The theoretical composition (not the % that you found) of the dry mixture was ____________% salt by mass. Get this value from the instructor! Calculate your % error. Show your calculation!

4. If the amount of mixture that you analyzed was doubled (about 6 grams instead of 3 grams), how would the percentage of salt be affected? How would the mass of salt recovered be affected? (

5. Describe a method you could use to separate a mixture of styrofoam peanuts and glass marbles. Assume that the sample size is too large to separate them by hand, and that you do NOT want to melt or otherwise destroy the peanuts, and that the peanuts and marbles are too similar in size to use any sort of filter or sieve.

6. Describe a method you could use to separate aluminum cans from steel cans in a recycling facility. Assume that you have to do this too quickly to separate them by hand (weighing them individually).