Name:_____

Lab Partner:_____

Separating the Components of a Mixture

Many different techniques can be used to separate the components of a mixture. In this experiment, you will use the technique of filtration to separate a mixture of sodium chloride and silicon dioxide. After separating and recovering the compounds, you will be able to calculate the percentage of each that is present in the mixture.

Procedure:

1. Determine the mass of a clean, dry large test tube.

2. Fill your test tube with the mixture to about the same level that is shown in the sample tube.

3. Find the mass of the test tube and the mixture. It may be useful to rest the test tube in an empty beaker.

4. Transfer the mixture to a 50 mL beaker.

5. Add 20 mL of deionized water to the mixture and stir it well with a stirring rod for about 3 minutes.

6. Determine the mass of a piece of filter paper.

7. Fold and place the filter paper in a funnel. Wet the paper with a wash bottle so that the paper will stay in place in the funnel. Place an empty, clean 100 mL graduated cylinder under the funnel and decant the solution from the beaker into the funnel.

8. Using your wash bottle, rinse all of the solid from the beaker into the funnel. Keep collecting the filtrate (liquid which passes through the filter paper) in the graduated cylinder.

9. After all of the liquid has drained from the funnel, wash the residue and the filter paper with a **small** amount of water from the wash bottle. Continue to collect the filtrate in the graduated cylinder. Rinse the residue two more times.

10. Carefully remove the filter paper and place it in a 250 mL beaker that has been labeled with your name/initials. LEAVE THE RESIDUE IN THE FILTER PAPER!

11. Add deionized water to your graduated cylinder until the level reaches the nearest multiple of 10 mL (50 mL, 60 mL, 90 mL, etc.). Record the volume. Pour the solution into an Erlenmeyer flask and swirl to mix thoroughly.

12. Find the mass of an evaporating dish with a watch glass (to be used as a cover).

13. Measure **exactly** 10 mL of the solution from the Erlenmeyer flask into a 10 mL graduated cylinder. Place the portion into the evaporating dish.

14. Cover the evaporating dish and place it on a ring stand as demonstrated by the teacher. Heat the solution slowly and carefully to keep from splattering. If you are unsure if all of the water has evaporated, ask your teacher.

15. Allow the evaporating dish and watch glass to cool. Determine the mass of the evaporating dish, watch glass, and sodium chloride.

16. On the next day, find the mass of the dried filter paper and solid silicon dioxide.

Data Table (include units with measurements!!!)

Mass of test tube	
Mass of test tube and mixture	
Mass of filter paper	
Final volume of filtrate	
Mass of evaporating dish + cover	
Mass of evaporating dish + cover + sodium chloride	
Mass of dried filter paper + silicon dioxide	

Calculations (include units with answers and SHOW ALL WORK!):

1. Calculate the mass of the initial portion of the mixture taken.

2. Calculate the mass of the sodium chloride that was recovered by evaporating the 10 mL portion of your filtrate.

3. Based on your answer from calculation 2, calculate the total amount of sodium chloride which was present in your **entire** filtrate.

4. Calculate the percent composition of sodium chloride in the mixture.

5. Calculate the mass of silicon dioxide which was separated from the mixture.

6. Calculate the percent composition of silicon dioxide in the mixture.

7. a. Add together the masses of sodium chloride and silicon dioxide that were present in the entire mixture.

   b. Compare the answer of calculation #7.a. to your answer for calculation #1. Come up with a viable reason that they are not identical.

8. a. If you were to add the percent compositions of sodium chloride and silicon dioxide in your mixture, what value would you expect to obtain?

   b. Perform the calculation from 8.a. using *your* percent compositions

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QUESTIONS CONTINUED ON NEXT PAGE!

Questions:

1. For the following stages in the experiment, state **both**: if the mixture was homogeneous or heterogeneous; **and** what substances were present in each mixture.

a. initial mixture

b. after stirring initial mixture with water in the 50 mL beaker

c. contents of the Erlenmeyer flask.

2. Could you use this same procedure to separate a mixture of salt and sugar? Explain your answer.

3. In steps 13 & 14 in the procedure, you evaporated a 10 mL portion of your solution to determine the amount of solid that was dissolved. Why do you think that we didn't boil all of the solution?

4. Which did the water in the evaporating dish undergo when it evaporated: a physical or chemical change?

5 a. Suggest a technique for separating the contents of a cup containing oil and water into two separate cups.

b. Would this technique be practical for cleaning up an oil spill on the ocean? Why or why not?