NAME_________________________ **SECTION**________________

DATE___________________

PERFORMANCE TASK #1

Be sure to read this entire lab before you come to class to perform the activity. Part II requires outside work that must be completed before you can start the task.

You will work alone in lab this week. You may not consult with your classmates or the instructor about what to do. Follow the directions as indicated and hand in this complete task before you leave lab today. This task carries a total of 50 points credit value. The individual parts of the task are labeled with their point value. Relax and good luck!

Part 1 Measurement

1. Determine the density of the object given to you by your instructor. Describe the object and your method. Be sure to record all data here. Remember significant figures and units. (10pts)

2. Determine how many of your objects from question #1 it would take to fit (end to end using the largest dimension) across a distance specified by the instructor. Show work and label everything. Explain in words how you reached your answer. Return the unknown to your instructor when you are finished. (5 pts)

Part II Separations II: Designing a Method of Separation

Be sure to read this entire part before you come to class.

- ♦ Make sure that you have your scheme approved BEFORE lab.
- ♦ You must hand in ALL lab sheets at the end of class. Please write your name on each page before you leave.
- ♦ This section will be graded with the following considerations and points.

Scheme: Done before lab, clarity, completeness, logic	(10 pts)
Pre-lab Queries: Correctness	(3 pts)
Data Table: Accuracy, labels, significant figures	(5 pts)
Results: Accuracy, labels, significant figures, completeness	(10 pts)
Post-Lab Questions: Correctness, completeness	(3 pts)
Proper Lab Behavior: Goggles on, glassware used correctly and cleaned	(4 pts)

PRE-LAB QUERIES

1. To review from a previous laboratory, complete the table below. Describe the physical characteristics of the components that allow the separation, not the separation process.

SEPARATION METHOD	CHARACTERISTICS OF COMPONENTS THAT CAN BE SEPARATED
Filtration	
Decantation	
Extraction	
Sieving	
Flotation	
Sublimation	
Magnetism	

OBJECT

This activity involves the design of a separation scheme that can be used to quantitatively isolate the original components of a mixture.

PROCEDURE

A **mixture** is a combination of two or more substances, such that the substances maintain their chemical identity. Mixtures can be separated by physical methods, which depend on differences of physical properties (color, solubility, particle size) of the components. If the components are isolated quantitatively, the mass percentage can be determined.

$$\text{Percent of component by mass} = \frac{\text{mass of component}}{\text{total mass of mixture}} \times 100$$

1. Develop a detailed separation scheme for the separation and determination of the percent composition of your sample which will be a mixture of **NaCl, NH_4Cl,** and **sand**. You are expected to use the properties of the components listed below and some of the techniques listed in the table in the pre-lab queries (and used in Separations I). Keep in mind that any chemistry student should be able to pick up your scheme, understand it, and use it to complete the separation and calculation of % composition. Place the scheme on a separate sheet of paper. **Have your instructor approve your scheme before beginning the separation.**

Component	Solubility (@25°C)	Melting Point	Hardness
sodium chloride, NaCl	35 g/100 mL water	801°C	soft
ammonium chloride, NH_4Cl	37 g/100 mL water	sublimes 350°C	soft
sand, SiO_2	insoluble	1600°C	hard

Some helpful hints on equipment use:

- ➢Use an evaporating dish for heating solids directly (heat with a hot plate, slowly at first);
- ➢Be careful when evaporating liquids, they may splatter (use low heat on a hot plate);
- ➢If any fumes other than water vapor are going to be produced, do the heating **IN THE HOOD**;
- ➢Mortar and pestles are available for crushing the sample;
- ➢Filter paper and sieves are available for separation;
- ➢When dissolving a substance for filtration, keep the volume of water to a minimum.

2. Once your scheme has been approved, your instructor will provide you with a sample. If you make a mistake the instructor *may* allow you to begin with a new sample for a significant penalty in grade, so be careful. Use your entire sample of sand, sodium chloride, and ammonium chloride to be sure the results are representative. **Measure all amounts as accurately as the balances allow**. Be sure to include all data recorded in the lab in the space provided.

   Construct a **data table** making sure to label everything. You must use the space on the next page. Data is information (qualitative and quantitative) that is collected in the lab and is not modified by any calculation.

   Place the results in the **results section** provided. Results include information that is obtained by manipulating the data in some manner. Show all calculations to receive credit.
3. Calculate the percentage of each isolated the components in the mixture and record.

4. Answer all questions and post-lab queries

DATA

Unknown number: _______________

Record all lab data here. Be sure it is clearly labeled.

RESULTS

Show **all** calculations with units in the space next to the line.

mass of whole mixture: _______________

mass of sodium chloride: _______________

mass of ammonium chloride: _______________

mass of sand: _______________

percentage of sodium chloride: _______________

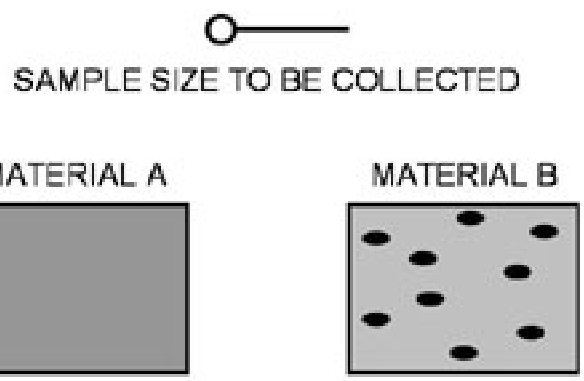
percentage of ammonium chloride: _______________

percentage of sand: _______________

Discuss any problems you encountered in carrying out the separation. Also indicate whether or not you would change any part of your scheme if you were to carry out the separation again.

POST-LAB QUESTIONS

A representative sample of a mixture is one that has the same composition as the total mixture. Collecting a representative sample is extremely important in any measurement. Knowing if a sample is representative is sometimes a difficult question to answer. Consider collecting a sample of the size shown by the circle below (THIS IS THE SCOOP SIZE) from each of the two labeled samples. Assume both boxes are filled and that white represents a component.



1. What is the difference between the two materials?

2. Can you collect a representative sample from each material? Explain why or why not.

3. In the example above, you can see the mixture in the boxes. Suppose the contents were not visible. How could you sample or modify the sampling procedure to increase the probability that a representative sample is obtained?