

LAB: SEPARATING A MIXTURE, HONORS



In this experiment, you will carry out a laboratory procedure for separating components in a mixture of sand, salt and iron, carry out the separation, and calculate the percent concentration of each as well as percent error. You and your partner will work together to type this up as a formal lab report.

Question:

Can a mixture be separated to find the percent concentration of sand, salt and iron?

Hypothesis:

Write a hypothesis based on the question above.

Materials:

This should be a complete list of everything you will need to complete this investigation. Be sure to include quantities.

Procedure:

You're group will be given a small sample of a mixture. You must come up with a procedure for separating the mixture into separate piles of sand, salt and iron in order to determine the percent composition of each in the original mixture. You should use minimal materials and check with your teacher about availability of materials.

A procedure should be written so that anyone reading it can completely understand what to do and how to do it. The writing should be free of all personal references (we, you, us, etc.) and should be present tense.

Incorrect: My partner and I poured the water in the beaker.

Correct: Pour the water into the beaker.

Data:

In your science notebook, record the following information.

1. Mass (in grams) of the entire mixture of sand, salt, and iron (not including the bottle).
2. Any other masses you collected during your investigation that will be helpful when calculating your percent concentrations. Think carefully about this!!

Analysis:

The following information must be included in your analysis.

1. Calculate the percent concentration of sand, salt and iron you found in your sample. Each should be calculated and nothing should be inferred (i.e. just because you found the percent concentrations of two components doesn't mean you can just subtract to find the third – cannot use process of elimination!!). Show your mathematical calculation; do not just give an answer.

Example: mass percent of sand = (mass of sand/mass of entire sample) x 100%

2. What were the true mass percents of sand, salt and iron as reported by your teacher after you had completed your procedure?
3. Calculate the percent error of each sand, salt and iron. Show your mathematical calculation, do not just give an answer.

% error = [(determined value – actual value)/actual value] x 100, in absolute value

For example, if you estimate that there are 90 jelly beans in a jar when there are actually 130 your percentage error is:

$$(90-130)/130 * 100 = -40/130 * 100 = -0.308*100 = -30.8\%$$

After absolute value, the answer is simply 30.769, or 30.8%.

4. What do you think was your most significant source of error in determining the mass percent of sand? Why? How could you have improved this measurement?
5. What do you think was your most significant source of error in determining the mass percent of salt? Why? How could you have improved this measurement?
6. What do you think was your most significant source of error in determining the mass percent of iron? Why? How could you have improved this measurement?

Conclusion:

Answer the original lab question and provide actual data obtained to support your answer. Did the data support your hypothesis?

Formal Lab Report: see lab report handout