Separation of a Mixture Lab

Name: __________________
Date: _____________

Objectives
- Observe the chemical and physical properties of a mixture.
- Relate knowledge of chemical and physical properties to the task of purifying the mixture.
- Analyze the success of methods of purifying the mixture.

Materials

<table>
<thead>
<tr>
<th>Aluminum foil</th>
<th>Plastic forks</th>
<th>Plastic spoons</th>
<th>Distilled water</th>
<th>Test tubes and rack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forceps</td>
<td>Filter funnel</td>
<td>Filter paper</td>
<td>Sand</td>
<td>Iron Filings</td>
</tr>
<tr>
<td>Salt</td>
<td>Seeds</td>
<td>Salt</td>
<td>Paper clips</td>
<td>Hot plates</td>
</tr>
<tr>
<td>Paper towels</td>
<td>Magnet</td>
<td>Pipets</td>
<td>Wooden splints</td>
<td>Ask if you need more</td>
</tr>
</tbody>
</table>

Introduction
The ability to separate and recover pure substances from mixtures is extremely important in scientific research and industry. Chemists need to work with pure substances, but naturally occurring materials are seldom pure. Often, differences in the physical properties of the components in a mixture provide the means for separating them. In this experiment, you will have an opportunity to designing, develop, and implement your own procedure for separating a mixture. The mixture you will work with contains salt, sand, iron filings, and spinach seeds. All four substances are in dry, granular form. The group(s) that is closest to the original mass will receive 2 points extra credit.

Safety
Always wear safety goggles to protect your eyes.

Preparation
You task will be to plan and carry out the separation of a mixture. Before you can plan your experiment, you will need to investigate the properties of each component in the mixture. The properties will be used to assist you in the mixture separation. Copy the data table into your lab report and use the data table to record your observations.

Procedure
1. Obtain separate samples of each of the four mixture components from your teacher. Use the equipment you have available to make observations of the components and determine their properties. You will need to run several tests with each substance, so don’t use your entire sample on the first test. Look for things like whether the substance is magnetic, whether it dissolves, or whether it floats. Record your observations in your data table.
2. Make a DETAILED plan for what you will do to separate a mixture that includes the four components from step 1. Include safety material. Review your plan with your teacher and make changes as you complete the lab.
3. Obtain a sample of the mixture from your teacher. Using the equipment you have available, run the procedure you have developed.
Separation of a Mixture Lab

Clean up and Disposal
4. Clean your lab station. Clean all equipment, and return it to its proper place EACH DAY. Salvage all materials possible. Place the materials in the proper beaker if possible; otherwise it can go in the trash.

Data and Observations

<table>
<thead>
<tr>
<th>Original weight</th>
<th>Final weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>Iron Filings</td>
</tr>
</tbody>
</table>

Mass after separation

<table>
<thead>
<tr>
<th>Properties</th>
<th>Sand</th>
<th>Iron Filings</th>
<th>Salt</th>
<th>Seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissolves</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Observations:

Analysis and Interpretation
1. Evaluating Methods: On a scale of 1 to 10, how successful were you in separating and recovering each of the four components: sand, salt, iron filings, and spinach seeds? Consider 1 to be the best and 10 to be the worst. Justify your ratings based on your observations.

2. Roles: What was your role in separating the mixtures? Part of your grade will be based on how active you were during the lab. Be as detailed as possible. Each group member needs to have a role.

Conclusion
3. Compare and contrast the terms mixture, element, pure substance, and a compound. Give an example of each from this lab.

4. How did you decide on the order of your procedural steps? Would any order have worked?

5. Name two material or tools that weren’t available that might have made your separation easier.

6. What is the difference between a physical and a chemical property? Give an example of each.

7. For each of the four components, describe a specific physical property that enabled you to separate the component from the rest of the mixture.

8. What methods could be used to determine the purity of each of your recovered components?

9. How could you separate each of the following two-part mixtures? State whether each item is a mixture, compound, or element.
   - Lead filings & iron filings
   - Sand & gravel
   - Sand & finely ground Styrofoam
   - Salt & sugar