Name: _____

Period: ____ Subject: _____

Date: _____

Separating Mixtures
Sand, Salt, and Iron Lab

Objectives:

- to use the physical properties of the components in a mixture to separate those components
- to practice finding percent composition by mass and percent error

Equipment:

- triple-beam or electronic balance
- small magnet
- small plastic bag
- 3 beakers (100 ml)
- bunsen burner
- warming plate
- filter paper
- funnel
- graduated cylinder (100 ml)

Procedure:

1. Find the mass of your sand, salt, and iron mixture (remember to subtract the mass of the container!) and record that value in your data table..
2. Carefully empty all of the mixture into a 100 ml beaker.
3. Place the magnet in the plastic bag and carefully move it through the sand to collect the iron filings. Carefully place the bag in a second beaker and remove the magnet leaving the iron behind in the second beaker. You may need to do this 2 or 3 times.
4. There may be some sand/salt mixed into the iron in your second beaker. If so, repeat the actions you did in step 3, moving the iron to a third beaker. Then pour the residual sand/salt from beaker 2 back into the original beaker with the sand/salt mixture.
5. Measure the mass of your iron filings (be sure to deduct the mass of any container you use) and record that value in your data table.
6. Use a graduated cylinder to measure out 50 ml of distilled water. Add this to the salt/sand mixture and swirl to mix thoroughly.
7. Measure the mass of an empty 100 ml beaker and record the value. Fold the filter paper into a cone and place in funnel. Put the funnel over the 100 ml beaker to collect the water (and salt).
8. Swirl and pour the water/sand/salt mixture into the filter paper.
9. Use a water bottle to carefully clean out the sand/salt beaker into the funnel. Use as little water as possible to do this.

10. Carefully place the filter paper with the sand on a warming plate set to between 2 and 3 on the dial. Do not leave the filter paper on the warming plate too long or set the heating element too high: either will burn the paper.
11. When the sand is dry, carefully pour it into a container, measure its mass, and record the value.
12. Put a ring clamp on your ring stand and position it approximately 25 cm above the base. Place a screen on the ring clamp.
13. Place 100 ml beaker with salt water solution on screen/ring clamp assembly. Place bunsen burner on base of ring stand and light bunsen burner. (***Caution: beaker and ring stand will be very HOT.***)
14. Heat water until all water evaporates. Salt will collect as a residue on sides of beaker. If you see spots of salt appearing on lab bench, turn down bunsen burner. As the water finishes evaporating, turn off the flame completely. After waiting approximately 10 minutes, check to see if beaker is cool enough to move. Then find mass of beaker with salt. Record mass of salt in your data table.

Data:

Sample: total mass:	**Mass (g)** (measured)	**% Composition by mass**	**Mass (g)** (actual)	**% Error**
iron				
salt				
sand				

Analysis/Results:

1. What physical properties were used to separate the different components of your mixture?

2. In Step 4, you may have seen some sand/salt contaminating your iron. So, you repeated the previous step. Did this seem to help?

3. Do you think "purification" processes always yield 100% pure product? Keeping Question #2 in mind, if you had a process that got rid of 90% of the impurities present in a sample, and you started with 50% impurities, how pure would your product be after the first run through the purification process? How pure would it be if you ran it through the process a second time? A third time?

4. Add up the masses of your individual ingredients. Do they match the mass of your original mixture? Discuss reasons this might happen. Be specific (refer to a step in the lab and discuss what might have happened).