

### Waste No Matter, Want No Matter

**Purpose:**

In this activity you will investigate what happens to the total mass of two reactants after they undergo a chemical reaction.

**Safety Precautions:**

- You must wear safety goggles at all times!
- Some of the solutions that you will be using can burn your skin - handle them carefully

**Materials:**

Solution of NaOH	Four small plastic cups
Solution of $\text{CuSO}_4$	Three large plastic cups
Solution of $\text{NH}_4\text{OH}$	Graduated Cylinder
Solution of $\text{Zn}(\text{NO}_3)_2$	Electronic Balance

**Procedure:**

1. Measure 60 mL of the NaOH solution in a graduated cylinder and then pour into a small, clean plastic cup
  2. Rinse the graduated cylinder before making your next measurement
  3. Measure 60 mL of  $\text{CuSO}_4$  solution and pour into a clean, large plastic cup
  4. Carefully place both cups with solutions on the balance, making sure the solutions do not mix
  5. Record the mass of the solutions and cups together and record in the data table
  6. Carefully pour the NaOH into the big cup with the  $\text{CuSO}_4$  allowing the solutions to mix
  7. Record your observations in the data table below
  8. Mass both cups and the mixture again, record in the data table
  9. Repeat steps 1-8 for the combinations of solutions listed in the data table below.
- \* Remember not to let the solutions mix before taking the initial mass!

**Data Table:**

Reaction	Initial Mass (g)	Observations	Final Mass (g)
NaOH and $\text{CuSO}_4$			
$\text{NH}_4\text{OH}$ and $\text{CuSO}_4$			
$\text{NH}_4\text{OH}$ and $\text{Zn}(\text{NO}_3)_2$			

**Analysis Questions:**

1. How did your initial mass and final mass compare in each reaction?
2. After the solutions were allowed to mix, did you end up with the same solutions you started with?
3. What happened in each of the chemical reactions?
4. If the initial and final masses were the same, explain why this is so. If they were different, explain where the missing mass went.