

**Introduction:**

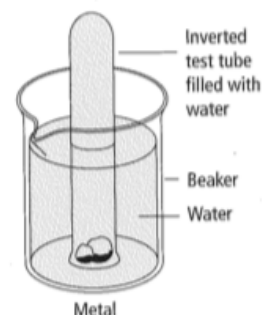
Observations are an important component in the scientific method, a means whereby scientists solve problems. In chemistry, you will constantly be checking for changes when you do experiments. Sometimes you will observe that no change occurs. This type of observation is just as important as one in which a change does occur. Observations are classified into two types: qualitative and quantitative. Qualitative observations tend to be rather general and use words, not numbers, to describe an object or event. Qualitative observations in the lab uses your senses of sight, smell, and hearing to describe what you observe. Quantitative observations are more specific and usually describe something in terms of numbers. Quantitative observations in the lab require the use of equipment such as thermometers, scales, and a variety of volume measuring glassware.

**Objectives:**

1. To make observations while watching materials interact and undergo change
2. To record and classify these observations as qualitative or quantitative

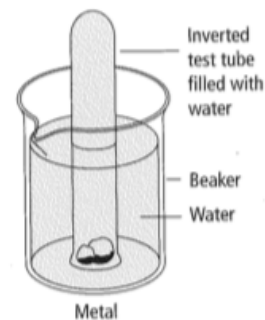
**Procedure:****Part I: Zinc metal with Water**

1. Put on safety goggles
2. Fill a 250 mL beaker with about 150 mL of tap water
3. Fill one test tube with tap water to the brim so that no air remains inside
4. With your thumb covering the open end, invert the test tube into the beaker. Leave the test tube filled with water upside down in the beaker, as in the figure on the right. Make qualitative and quantitative observations on your data table ("Before")
5. Obtain a piece of mossy zinc. Make qualitative and quantitative observations on your data table ("Before")
6. Place the piece of mossy zinc into the beaker and immediately shift the test tube over to cover the metal. Hold the test tube in place. Record qualitative and quantitative observations on your data table ("During")
7. Add 2 drops of phenolphthalein to the beaker and record your observations ("During")
8. Once the reaction has progressed for 3-4 minutes, record qualitative and quantitative observations on your data table ("After")
9. All solutions may be carefully poured down the sink and any leftover zinc metal may be placed in the beaker labeled "Zinc Waste" in the fume hood



## Part II: Calcium metal with Water

1. Fill a 250 mL beaker with about 150 mL of tap water
2. Fill one test tube with tap water to the brim so that no air remains inside
3. With your thumb covering the open end, invert the test tube into the beaker. Leave the test tube filled with water upside down in the beaker, as in the figure on the right. Make qualitative and quantitative observations on your data table ("Before")
4. Obtain a piece of calcium. Make qualitative and quantitative observations on your data table ("Before")
5. Place the piece of calcium into the beaker and immediately shift the test tube over to cover the metal. Hold the test tube in place. Record qualitative and quantitative observations on your data table ("During")
6. Add 2 drops of phenolphthalein to the beaker and record your observations ("During")
7. When no further changes appear, record qualitative and quantitative observations on your data table ("After")
8. All solutions may be carefully poured down the sink and any leftover calcium metal may be placed in the beaker labeled "Calcium Waste" in the fume hood



## Part III: Aluminum metal with Copper (II) chloride

1. Fill a 100 mL beaker with 25 mL of copper (II) chloride. Make qualitative and quantitative observations of the solution on your data table ("Before") (**Copper (II) chloride is poisonous. Do not get any into your mouth**)
2. Cut a square of aluminum foil (approximately 7 cm x 7 cm) and loosely roll it into a tube. To form the tube, you can roll the foil on a pencil. Make qualitative and quantitative observations of the aluminum on your data table ("Before")
3. Place the tube of aluminum foil in the beaker containing copper (II) chloride solution as in the figure on the right and immediately make qualitative and quantitative observations on your data table ("During")
4. When no further changes appear, record qualitative and quantitative observations on your data table ("After")
5. Dispose of both the solution and solid in the beaker labeled "Aluminum + Copper (II) Chloride Waste" in the fume hood
6. Wash your hands with soap and water.
7. Give your partner(s) a compliment

