

Dougherty Valley HS Chemistry
Observing a Single Chemical Reaction
Qualitative vs. Quantitative Observations

Lab # 1

Introduction: The purpose of this experiment is to help you to sharpen your observation skills. Observation is an important tool of chemistry and includes noticing more than just the way something looks or appears. In this experiment you will view and record the changes that occur when a blue crystal, copper chloride, reacts with aluminum foil. We will distinguish between **qualitative** and **quantitative** observations. You will use such equipment as a thermometer, centimeter ruler, and a graduated beaker for making quantitative observations. In addition we will learn the distinction between **observation** and an **interpretation**.

Pre-lab Questions: [To be completed in your lab notebook]

Before going into the laboratory, complete the **Background** info with the following definitions: **qualitative, quantitative, observation, and interpretation**. You will need to understand what these terms mean while carrying out the procedure of the experiment. (this will be collected at the beginning of class)

On the next page: Read the lab procedure and set up your data tables using the information on the back as a guide. Notice that the numbers for each step in the procedure and analysis correspond to the numbers for your responses.

Materials:

Copper Chloride (CuCl_2)
Stirring Rod
Thermometer

Aluminum Foil
Plastic Spoon

100 ml Beaker
Ruler

The experiment requires that you wear goggles and aprons during your time in the lab.

Procedure: Record your observations as you perform the steps below. Be certain to record at least the minimum number of each type of observation as required. For example, "**QL**" means qualitative observation and "**QN**" means quantitative observation.

[1] You need a bottle of copper chloride, a square of aluminum foil, small beaker such as 100 ml or 150 ml, stirring rod, plastic teaspoon, and centimeter ruler. These items may be organized for you at near your lab station. Check out a thermometer from your teacher.

[2] Observe the copper chloride crystals and the aluminum foil. Make three (3) qualitative observations for the copper chloride. Make two (2) qualitative observations and one (1) quantitative observation for the foil. Be complete in your descriptions. For example, your description could be, "*the foil is shiny,*" is more complete than, "*shiny*" or "*it is shiny.*"

[3] Measure approximately 20 ml of tap water using the beaker and record the temperature of the water.

[4] Add one LEVEL teaspoon of the copper chloride to the water and let it stand for several minutes without stirring. Make two (2) qualitative observations and one (1) quantitative observation. Support your written descriptions with a labeled diagram.

[5] Stir the water until the crystals dissolves and then add the loosely wadded square of aluminum to the solution. Observe what happens. Make at least two (2) qualitative observations and one (1) quantitative observation. After the reactions appears to stop, record the final temperature, a quantitative observation.

[6] We try to limit the amounts of kinds of chemicals that are dumped down the drain. For this reason, pour the contents of the beaker into the container provided in the fume hood. Write down one final qualitative observation of the sediment in the bottom of the beaker as you dump the contents into the container.

[7] Use the liquid cleaner in the dispenser to scrub all equipment. Rinse well with tap water and reorganized your equipment neatly as you found it. Return the thermometer to the teacher. Return your aprons and goggles to their proper place. Make sure you wash your hands before leaving the lab area.

Discussion:

- [1] From your list of observations, select two that is clearly qualitative and explain why.
- [2] From you list of observations, select a clear example of two that is quantitative and explain why.
- [3] Write your interpretation of what your saw take place during step #5. (At least one paragraph)
- [4] After completing this experiment, describe the distinction between an observation and interpretation.
- [5] Explain what you should have learned from this experiment.
- [6] Explain what errors you ran into and how they affected your results.
- [7] What should you have learned regarding observations?

Sample data table: [Always give your data table a title – *you fill in*]

Data Table: Create a data table in your lab notebook (Make larger than this and separate it)

Step 2	Qualitative Observation	Quantitative Observation
Blue Crystals		
Foil		
Step 3	Quantitative Observation:	
Step 4	Qualitative Observation	Quantitative Observation
Add CuCl ₂		