Chem Honors LAB [25 pts] **Name** _____
Evidence of an Interaction **Lab Partner(s)** _____
$CuCl_2$ + Aluminum **Period** _____ **Date** _____

Introduction: This experiment provides you with an opportunity to carefully observe a simple reaction. Try to think of conditions that matter. Be alert to questions that come to mind as you observe. Afterwards, we will try to answer some of your "why" questions. It is important that you make your observations as specific and complete as you can.

Purpose: To observe blue crystals ($CuCl_2$) added into water and observe what happens when aluminum foil is added to the solution.

Write-up: Observations [7 pts] *(Complete sentences are **not** needed)(at least 3 per section)*
Post-lab questions [18 pts] *(Complete sentences **are** needed)*

** *Work together with your lab partner(s) because only one lab will be collected per group.*

Procedure:

1. [2 pts] Fill a 100 mL beaker about half full with water. Ask me to add about one teaspoon of blue/green crystals ($CuCl_2$) to the 100 ml beaker. Allow the water/crystal mixture to stand undisturbed for a short time.
   Observations when added blue crystals (no stirring):

2. [2 pts] Stir the water until all the crystals dissolve.
   Observations after stirring blue crystals:

3. [3 pts] After I have checked your observations, place a piece of **loosely** crumpled *aluminum* foil into the liquid. Record observations until the reaction is completed. Write down any questions that have occurred to you during this experiment.
   Observations after adding aluminum foil:

   Questions which have occurred to you while watching this reaction:

4. When your reaction is complete, pour the contents of your beaker into the waste beaker. (Do not throw mixture down the sink). Clean your beaker and stirring rod (with soap!!) and place them back in your lab drawer. Make sure your lab area is clean and lab drawer is in proper order. Wash your hands with soap and water, remove goggles and start working on the post lab questions.

Post Lab questions: [18 pts] *Answer in complete sentences on a* ***separate sheet*** *of paper.*

1) [3 pts] **CER: Did a physical change or a chemical change take place when you stirred the $CuCl_2$ crystals into the water?** Answer this question in complete sentences using CER method. Please make a bullet list as below:

   - **Claim**: *an answer to the question that is asked*
   - **Evidence**: *evidence and observations (must be included above) that were gathered in the lab*
   - **Reasoning**: *a logical connection that uses scientific principles i.e. definitions/laws/rules to show why the evidence supports the claim*

2) [3 pts] **CER: When the aluminum foil was added to the solution, did a chemical reaction take place?** Again, answer this question using CER format. (use at least 3 observations in your evidence section.)

3) [1 pts] Many people think that the red solid that forms is rust. Why is it impossible for the red solid to be rust? *(Hints: Think about when you see rust. There is only one element that actually rusts)*

4) [3 pts] **CER: Now, think about what substances you began with-- $CuCl_2$ and Al. What is the most likely identity of the red solid?** Use the CER format, drawing from your knowledge of the reactants, chemical changes, and prior knowledge. *(Hint: In chemical reactions, atoms are not created or destroyed.)*

5) [2 pt] As a class, we will determine the overall chemical reaction that takes place when $CuCl_2$ reacts with aluminum. Write down the chemical equation for the reaction (using chemical formulas and states of matter) Then below each formula give a physical description of each substance (the color and the state).

6) [4 pts] When the reaction was complete, everyone's reaction mixture did not look the same. There were basically two different possibilities for the final reaction mixtures:
   case 1— green solution, red solid (no aluminum).
   case 2— colorless solution, red solid, and aluminum.
   Please check the front of the room for visual beakers of case 1 and 2 to help you
   In both cases, the reaction had stopped. However, they stopped for different reasons.

   a) Why did the reaction stop in case 1? Next list every substance that is left in the final mixture for case 1? (Give evidence.) Don't forget the reaction DID occur, so think about the products too!

   b) Why did the reaction stop in case 2? Next list every substance that is left in the final mixture for case 2? (Give evidence.) Don't forget the reaction DID occur, so think about the products too!

7) [2 pts] Water is not necessary for this reaction to take place.
   a) What did I do to prove that water is not necessary to do this reaction? Describe the experimental results of what I did.

   b) Though water is not necessary for the reaction to occur, it is helpful. Why?