**Lesson Plan**

**Teacher: Holland Sloan**

**Subject: Chemistry**

**Lesson: Ionic and Covalent Bonds**

**Standards: CHEM1.PS2.1.** Draw, identify, and contrast graphical representations of chemical bonds (ionic, covalent, and metallic) based on chemical formulas. Construct and communicate explanations to show that atoms combine by transferring or sharing electrons.

SEP: Constructing Explanations (Science)

CCC: Structure and Function

DCI: Motion and Stability: Forces and Interactions

**Objectives:** Students will construct explanations using evidence in order to illustrate the nature of ionic bonding within the Copper (II) chloride compound, highlighting the structure and properties of ionic compounds.

**Materials and Resources:** The students will be completing a hands-on laboratory experiment that will allow them to formulate explanations based on data collected during the experiment. A projector will be needed to show videos to the whole group. Students will need the following materials for the lab:

* 50 mL beaker
* graduated cylinder
* distilled water
* Copper (II) Chloride
* balance
* spatula
* pencil lead
* 9-volt battery
* 9-volt battery connector

**Student Handout:** <https://docs.google.com/document/d/1Di4VFFRUAEgWlZDUZ3Ut1qZHBW-ghiIhUIycXDXmMtI/edit>

**Instructional Procedure:**

Beginning: The teacher will begin with basic instruction on how circuits work and safety procedures for the lab activity. Students will begin activity by creating a solution of Copper (II) chloride. Students will then compare the solid Copper (II) chloride to the solution Copper (II) chloride. Students will then set up an electrolysis apparatus (directions given in students’ handout) and begin the experiment. While the experiment is taking place, students will be making observations.

The following are examples of probing questions the teacher might ask: Is the reaction different at the positive and negative electrodes? What evidence do you have for this? Students should create a hypothesis for what they think is collecting on one piece of lead.

Once experiment is completed, teacher will bring students back together and complete two experiments as a whole group. The teacher will perform an experiment using tap water and the electrolysis apparatus. Teachers should ask students the following: Why does tap water conduct electricity while the distilled water does not?

Then teacher will perform an experiment using solid Copper (II) chloride and electrolysis apparatus. Teachers should ask students the following: Why does the solution Copper (II) chloride conduct electricity while the solid does not?

Middle: Teacher will show online videos from the links below to describe and/or illustrate what happens when an ionic compound dissolves in water.

<https://www.youtube.com/watch?v=EBfGcTAJF4o>

<https://www.youtube.com/watch?v=aKGJm6OGJNs>

The students will then take the information from the videos and apply this concept to Copper (II) chloride. Students will illustrate the ions of Copper (II) chloride after they have dissolved it in the water.

End/Closure: Students will use previous illustrations as evidence for their observations during the electrolysis activity. Students will create an evidence poster to show understanding of how current flows and how ions dissolve in solution. Students may complete gallery walk to evaluate and/or provide feedback on classmates’ posters.

**Grouping:** Students will be in groups of two to three based upon heterogeneous mixtures. Students will assign roles within their group and make sure the roles are being followed. Suggested roles are as follows: facilitator, communicator, and reporter. The facilitator is responsible for collecting materials and keeping the group on task. The communicator is the only person within the group allowed to ask the teacher questions. Group communication must happen first before the teacher is asked questions. The reporter is responsible for recording data to share with the group and submits any final paperwork required by the teacher.

**Exit Ticket:** Explain how the structure of the ionic compound Cooper (II) chloride is related to today’s activity.