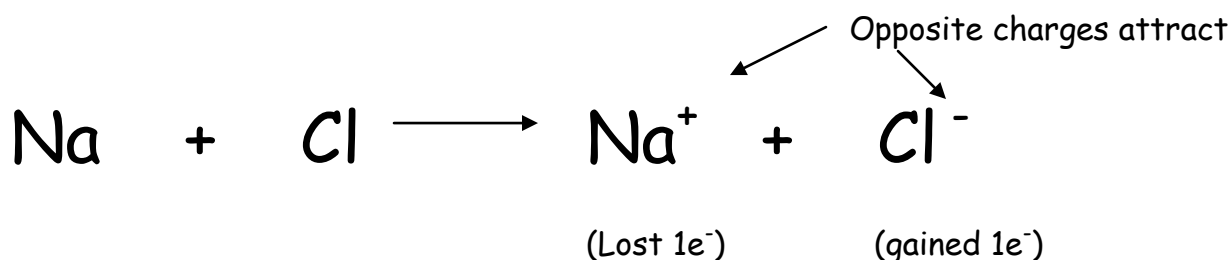


Due the day you come back from Thanksgiving Break

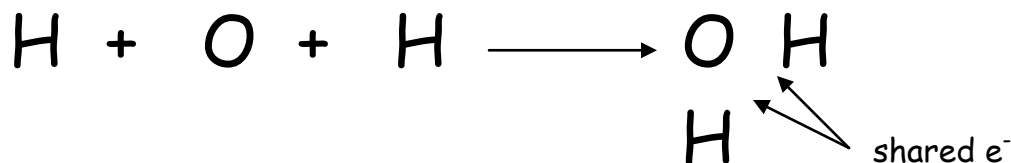
Purpose: To compare the melting point, solubility, and conductivity of different compounds and classify the compounds as ionic or covalent.

Introduction: Chemical compounds are combinations of atoms held together by chemical bonds. These chemical bonds of two types: **ionic** and **covalent**.

Ionic Bonds result when one or more electrons from one atom (or group of atoms) are *transferred* to another atom. Positive and negative ions are created through the transfer of electrons. The atom that loses the electron becomes positively charged. The atom that gains the electron becomes negatively charged. The two oppositely charged ions are then held together by electrostatic attraction.



In covalent compounds, no electrons are transferred. Instead, the atoms share an electron. The atoms are held together because the atoms are both “holding on” to the same electron.



The physical properties of a substance, such as melting point, solubility, and conductivity, can be used to predict the type of bond that binds its atoms together into molecules. In this experiment, you will test eight compounds to determine their properties. Based on those properties, you will then classify the compounds as ionic or covalent.

Background:

1. Define each of the underlined terms from above.
2. Is the bond that holds HCl together ionic or covalent? Explain your reasoning.
3. Are the bonds that hold CH₄ together ionic or covalent? Explain your reasoning.

Procedure:

1. Describe each of the six solid substances in your data table.
2. Place a metal sheet on an iron ring, attached to a ring stand. Position the ring so that it is just above the tip of the candle flame. Light the candle for a moment to check that you have the correct height, then blow it out.
3. Place a few crystals of each compound in separate locations on the metal. Each compound should be the same distance from the candle flame. Draw a diagram that shows the position of each compound.
4. Light the candle and observe. The metal will continue to get hotter as it is heated, so the order of melting will give relative melting points. Note the substance that melts first by writing a 1 (one) in the Data Table. Record the order of the melting for the other substances. After 2 minutes, record an *n* in your table for each substance that did not melt. Extinguish the candle flame. Allow the metal to cool while you complete the remainder of the experiment. Turn in your candle to get the ethanol you need for step five.
5. Put a few crystals of each of the white solids in the top row of your well plate. Repeat with the second row. Add 10 drops of water to each well in the top row. Add 10 drops of ethanol to each well in the second row. Record the solubility of each substance in your data table.
6. Determine the conductivity of each solution with the conductivity apparatus.
7. When you have completed this lab, clean the metal sheet and well plate by rinsing them with water into the sink. Wash your hands when done.

Date Table: [Make a title and then just fill in the boxes on this chart]

Compound	Description	Melting Point	Solubility in water	Solubility in Ethanol	Solution conductivity
Calcium Chloride					
Citric Acid					
Naphthalene					
Potassium Iodide					
Sodium Chloride					
Sucrose					

Question Set: [Copy and Answer]

1. Group the substances into two groups according to their properties. Explain why you placed each substance into its group.
2. List the properties of each group.
3. Use your textbook and experimental data to determine which of the groups consists of ionic compounds and which consists of covalent compounds. Support with evidence.
4. Write a statement to summarize the properties of **ionic compounds** and another statement to summarize the properties of **covalent compounds**.
5. Based on your results, explain why ionic and covalent compounds exhibit different properties.
6. How does the type of bonding affect the properties of each compound?
7. What should you have learned from this experiment regarding bonding?