EXPLORING CHEMICAL BONDS

Date: ______/______/_______  Partner(s):

Challenge
Classify unknown compounds into groups of ionic and covalent compounds.

Materials Available to You
- Unknown #1
- Unknown #2
- Unknown #3
- Unknown #4
- Unknown #5
- Unknown #6
- Test Tubes
- Conductivity Tester
- Aluminum foil
- Hot plate
- Spot plate
- 10 mL graduated cylinder
- Water
- 250 mL beaker

Collecting your Knowledge
Remember to organize your thoughts into tables, charts, graphs and diagrams.

1. Compare the characteristics of ionic and covalent compounds below.

<table>
<thead>
<tr>
<th>Ionic</th>
<th>Covalent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

Rewrite the statements below into proper format to create a hypothesis.
2. Ionic compounds have a higher melting point than covalent compounds.
3. Ionic compounds are soluble in water.

My hypothesis:

What You’ll Do
Draw your process in your lab notebook. Use words as labels where appropriate, but keep statements brief and to a minimum.

1. Put on safety goggles.
2. Read the process below, and create a table to organize the information you will gather.
3. Begin heating about 150 mL of water on a hot plate (to be used as a hot bath).
4. Write a brief description of each of the physical properties of the unknown substances in the table.
5. Using the foil like a plate, place a few crystals of each compound on the foil. Put the foil pieces on the hotplate. (Be sure your crystals are separated enough that they will not run together.) Draw and label a diagram that shows the position of each compound.
6. Turn on the hot plate. Make observations about the melting ability of the compounds. **Question:** Which ones dissolved first? What does that tell you?

7. Put a few crystals of each of the white solids in separate test tubes and add 5 mL of distilled water. Record the whether it dissolved in **the table.** If it did not dissolve, put the test tube in a hot water bath. Note if it dissolved in hot water. **Question:** Why did we do this?

8. Using the solutions from Step 7, put a small amount of each sample into a spot plate. Test the conductivity of each substance using the provided testers. Record this in **the table.** **Question:** Why has it been important to use distilled water?

9. Clean the spot plate and test tubes by rinsing with water. Boiling water may be used to clean stubborn glassware. Wash your hands thoroughly before you leave the lab and after all work is finished.

**Information I gathered:**

**Diagram 1. Unknowns on the spot plate**

![Diagram 1](image)

**Table 2.** ______________________________
Reflective Questions:
Step 6 Question: Which ones dissolved first? What does that tell you?

Step 7 Question: Why did we put test tubes of undissolved unknowns in a hot water bath?

Step 8 Question: Why has it been important to use distilled water?

Final Conclusions:

Table 3. ____________________________________________

<table>
<thead>
<tr>
<th>Unknown Number</th>
<th>Ionic or Covalent?</th>
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On the next page of your notebook, analyze the lab by doing the following:
1) Write a short paragraph (2-4 sentences) that address any deviations from the patterns you established, with justification as to why that happens. Then discuss any errors that may have been present in this lab.
2) Write a conclusion paragraph that addresses the following:

<table>
<thead>
<tr>
<th>Purpose restated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major findings stated, refers to graph or data table</td>
</tr>
<tr>
<td>Revisits hypothesis (supported or not supported)</td>
</tr>
<tr>
<td>Suggests improvements to lab procedure</td>
</tr>
<tr>
<td>Suggests extension to lab</td>
</tr>
</tbody>
</table>