**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Properties of ionic and Covalent Bonds**

Guiding Question: Can properties such as phase, melting points, and conductivity be tested in order to discover the types of bonds household chemicals have?

Pre-Lab Questions:

1. Under what conditions will the light bulb light?
2. Does pure water light the light bulb? Why?
3. Circle the word that best describe your understanding of bonds. Then write a scientific explanation to defend the prediction you chose.

**Prediction**: Properties (can/cannot) be used to distinguish between types of compounds without knowing the compounds chemical formula.

**Reasoning**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Procedure: Your teacher will demonstrate several properties of various compounds. As tests are preformed, record the results in your data table.

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| --- | --- | --- | --- | --- | --- |
| **Chemical** | **Phase**  **(S, L, or G?)** | **Melting point (ºC)** | **Conductivity (Y or N?)** | **Solubility**  **(Y or N?)** | **Aqueous conductivity**  **(Y or N?)** |
| Salt |  | 801 |  |  |  |
| Sugar |  | 186 |  |  |  |
| Oil |  | -33 |  |  |  |
| Acetone |  | -95 |  |  |  |
| Baking soda |  | 50 |  |  |  |
| Starch |  | none |  |  |  |
| Vinegar |  | 16 |  |  |  |
| Rock Salt |  | 772 |  |  |  |

Questions:

1. Sodium Chloride is an ionic substance because it contains a metal and a nonmetal. It is not always easy to determine the types of elements in a compound based on the name. Record other properties of sodium chloride that were tested, which make it ionic.
2. Based on the properties you listed in question one, record other substances that may be ionic.
3. The substances that are not ionic on this list are covalent. List these chemicals and explain their common properties.
4. Water is a polar compound because its structure is asymmetrical (it seems that there are two distinct sides of the molecule). Covalent substances that dissolve in water are also considered polar. Determine which substances that we tested are polar.
5. The rest of the covalent compounds are non polar. List these substances and explain why they are non polar.
6. The melting points of the ionic compounds are much higher than those of the covalent compounds. What does this imply about the strength of ionic and covalent bonds?
7. Explain in terms of particles why ionic compounds can conduct electricity while covalent compounds cannot.
8. Construct a **claim** that supports or contradicts the prediction made in the pre-lab questions.
9. Provide **evidence** that supports your claim. Use your **reasoning** skills to explain why your evidence is relevant.

