## Ionic vs. Covalent Lab Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Problem:**

You have been given 4 known and 4 unknown substances. What type of bonds are present in each substance?

**Procedure:**

* Put on safety goggles. Rotate through each station and follow the directions accordingly.

**Part 1: Melting Point**

* Make a cross out of two squares of tin foil and label each section with a sharpie.
* Put HALF a spoonful of each substance into each section of the cross and place the foil on a hotplate.
* Wait for the substances to melt and record the melting order of the substances in your data table.
* While you wait for your substances to melt, continue on to Part 2.

**Part 2: Physical Description**

* Observe each substance, both known and unknown. Do your best to describe them (like you would over the phone). You may touch them and feel their texture. Write these qualitative descriptions in your data table.

**Part 3: Solubility (Did it dissolve?)**

* Using the graduated cylinder, place 100mL of water into the 400ml beaker.
* Put HALF of a spoonful of ONE substance into the water and stir.
* After 1 minute check to determine if the unknown substance is soluble or not. Determine if the substance dissolved record the solubility of each substance in your data table.
* Continue on to Part 4. DO NOT RINSE YOUR BEAKER.

**Part 4: Conductivity  
  
OPERATE WITH EXTREME CAUTION. DO NOT PUT YOUR HANDS ON THE ELECTRODES OR INTO THE SOLUTION. DOING SO WILL RESULT IN YOU BEING ELECTROCUTED.**

* Test the conductivity of the sample in water solution by dipping both electrodes of one of the conductivity testers into the 400ml beaker. If the bulb of the conductivity apparatus lights up, the solution conducts electric current. Record the results in the data table.
* Rinse out the 400ml beaker with water to wash out any of the substance. Repeat Parts 3 and 4 with the next substance.

**Pre-Lab Questions**

1. What are the characteristics or properties of an ionic compound? You should have at least 4.
2. What are the characteristics or properties of a covalent compound? You should have at least 4.
3. Look at the data table for this lab. What 4 characteristics are we testing today to determine the type of compound?
4. Why are we testing 4 different characteristics and not just 1?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Compound** | | **Description** | **Melting Point**  (Put in order. Put N if it did not melt) | **Dissolve in H2O**  (Yes or No) | **Conductivity**  (Yes or No) | **Ionic or Covalent?**  # of data that support that… |
| Vegetable Oil | |  |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |
| Salt | |  |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |
| Sugar | |  |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |
| Baking Soda | |  |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |
| Unknown 1 |  | |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |
| Unknown 2 |  | |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |
| Unknown 3 |  | |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |
| Unknown 4 |  | |  |  |  | Ionic or Covalent  \_\_\_\_\_\_\_\_ of the 4 tests support that statement |

**Post-Lab Questions:**

Label the following ionic or covalent. Then, write the corresponding name or formula (write clearly!).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Formula | Ionic/Covalent | Name | Name | Ionic/Covalent | Formula |
| NH3 |  |  | Ammonium Chloride |  |  |
| CO |  |  | Aluminum Nitrate |  |  |
| Al2S3 |  |  | Iron (III) Fluoride |  |  |
| Ca(NO3)2 |  |  | Carbon Trihydride |  |  |
| H3O |  |  | Sulfur Heptanitride |  |  |
| C3H3 |  |  | Nickel (II) Phosphate |  |  |
| MgSO4 |  |  | Sodium Hydroxide |  |  |
| Ba(OH)2 |  |  | Cobalt (II) Carbonate |  |  |
| KCl |  |  | Lead (II) Sulfite |  |  |
| P5O8 |  |  | Tetraphosphorous Pentoxide |  |  |

Write a paragraph explaining your results. Be sure to include the following in your paragraph:

* What your claim was for each substance.
  + Which type of bonds held the atoms of each substance together?
* Evidence to support or refute your claim.
  + Use your observations.
* Reasoning
  + Explanation of what you saw happen. (Explain data and use science to explain what you know about compounds, elements, and bonding)