Name _____ *Date* _____ *Period* _____

Ionic or Covalent Bonding Lab

Purpose: Some properties may be useful to predict the type of bonding in a substance. These properties are phase at room temperature, melting point, solubility in water, and electrical conductivity. In this experiment you will find how these properties vary in ionic and covalently bonded substances.

Hypothesis:_____

_____

_____

Materials:

Procedure: Part One

1.) Place a tiny amount of each sample (<1g) of each substance in each well of the dish provided. Put one sample in one well only. Do not put in the distilled water.
2.) In the data table **record the phase** at room temperature.
3.) Test each substance for **electrical conductivity** using the meter provided. Record your results in the data table. DO NOT add water until the dry substances are tested first.
4.) Place several drops of distilled water into the wells with a solid sample**. Do not put water into the liquid samples.** Mix the samples so that each has a chance to dissolve in the water.
5.) **Determine which substance is soluble**. HINT: which substances dissolved in the water and which did not? Record this in the data table under "solubility". The substance dissolves if the original substance is no longer visible. The water solution may have a color but should be transparent.
6.) Test each substance a second time using the conductivity meter provided. Record which substance will conduct electricity in the data table.

Part Two: Testing the Melting point of the solid substances. **TEST Substances B,C,D and H!**

1.) Make a 2 small foil cups by wrapping a piece of aluminum foil around your thumb. Your cups should be about the size of the end of your thumb.
2.) Put a small amount (1 gram) of one solid into a small foil cup.
3.) Heat each cup over the Bunsen burners for about 30 seconds. Record in the data table which substance melts, carmelizes, decomposes or in which nothing happens at all.

Substance	Phase at $20^{O}C$ (solid or liquid)	Melting Point (high or low)	Electrical Conductivity **without** water (Yes or no)	Electrical Conductivity **with** water (yes or no)	Solubility Does it dissolve (yes or no)	Type of Bond (Ionic or Covalent)
a.) Distilled water						
b.) NaCl						
c.) KCl						
d.) Sugar						
e.) Oil						
f.) Ethanol						
g.)Glycerine						
h.) $CaCl_2$						

Questions:

1.) What properties in general do **covalent-bonded** substances have? Describe at least four properties based on information from your experiment. See your data table.

a.

b.

c.

d.

2.) What general properties do **ionic-bonded** substances have? Describe at least four properties based on information from your experiment. See your data table.

a.

b.

c.

d.

3.) Which compound melted most easily-salt or sugar? Explain why one melts easily and the other does not melt at all.

4.) Using the Periodic Table explain how the position of the elements that make up sugar (the formula for sugar is $C_{12}H_{22}O_6$ and Ethanol is C_2H_5OH) can be used to tell if the bonds are ionic or covalent. (HINT: ionic compounds are made of a metal plus a non-metal; covalent compounds are made of non-metals combined with other non-metals)

5.) Using the Periodic Table explain how the position of the elements that make up the salts (NaCl, $CaCl_2$ and KCl) can be used to tell if the bonds are ionic or covalent. (HINT: ionic compounds are made up of two or more elements that are far apart on the Periodic Table)