Ions or Molecules? Polymer Gels Can Tell

**Purpose:** To observe solubility properties of ionic and covalent compounds.

**Materials:**
Beaker, scoopula or spatula, distilled water, plastic overhead sheet, graduated cylinder
Possible compounds: MgSO$_4$, CuSO$_4$, Na$_2$CO$_3$, CaCl$_2$, NaCl, SiO$_2$, (NH$_2$)$_2$CO, C$_{12}$H$_{22}$O$_{22}$, long chain hydrocarbon, NaHCO$_3$

**Procedure:**
1. Place a scoop of sodium polyacrylate into a beaker.
2. Add about 5 mL of distilled water to your sample. Observe the color, volume and texture.
3. Add 40 mL more water and stir. Observe again.
4. Add up to one more 40 mL portion until you have a fluffy, gel product.
5. Scoop the resulting mixture onto your plastic sheet.
6. Separate the mixture into 8 smaller mounds. The piles should be 7-9 cm away from each other and from the edge of the sheet.
7. Choose 3 ionic and 3 covalent compounds to test.
8. To test each compound, put a half scoopula of compound onto one pile of gel. Observe and have a paper towel ready.
9. Continue until you have tested all 6 known chemicals. Be sure not to contaminate any of your samples.
10. Choose an unknown and test it. Identify it as an ionic or covalent compound.
11. Take a small amount of each chemical and dissolve it in water in the little tray.
12. Test this “solution” with the small conductivity tester.

**Data**
Prepare a table with the following headings:

<table>
<thead>
<tr>
<th>Formula</th>
<th>Name</th>
<th>Polyacrylate result</th>
<th>Conductivity result</th>
<th>Type of bond</th>
</tr>
</thead>
</table>

**Analysis**
1. State how the gel is used to distinguish between ionic and covalent compounds.
2. Sodium polyacrylate is used in a common baby product. What product and why?
3. Some students may say that the gel “melted”. Explain why this is not an accurate use of the term “melt”.

**Conclusion**
Use the article The Absorbing Story of the Thirsty Polymer to help you write your conclusion. This means you will need to explain the results of your lab.