Lab 2: Everything Changes!

Background
Everything you see and touch has the ability to change. Sometimes substances change to form new substances. This is called a chemical change. Other times substances change but keep the same identity. This is called a physical change.

For a change to be chemical, the material must actually change form. You start with one substance and turn it into another. When a steel garbage can is rusting it is undergoing a chemical change. That rusting happens because the iron (Fe) in the metal reacts with oxygen (O₂) in the atmosphere. When a refrigerator or air conditioner cools the air, there is no reaction between the air molecules. This change in temperature is a physical change. When you melt an ice cube, it is a physical change. When you put bleach in the washing machine to clean your clothes, a chemical change, or chemical reaction, breaks up your stains.

A Temperature change can occur during a Chemical Change (Chemical Reaction). A change in temperature is a sign that a chemical reaction has occurred. In an endothermic reaction the temperature decreases or goes down. In an exothermic reaction the temperature increases or goes up.

Objective
You might ask yourself, “Why are we mixing vinegar and baking soda again?? I KNOW what is going to happen!!” Yes, you do but let’s take a closer look.

Materials
- 100mL beaker
- 50mL graduated cylinder
- ½ teaspoon measuring spoon
- Baking soda
- Thermometer

Safety
- Always wear safety goggles when handling chemicals in the lab.
- Wash your hands thoroughly before leaving the lab.
- Follow the teacher’s instructions for cleanup of materials and disposal of chemicals.

Procedure
1. Using your graduated cylinder measure 50mL of vinegar, then pour it into your beaker.
2. Use your thermometer to measure the temperature of the vinegar in degrees Celsius. Record the temperature in the data table below.
3. Add ½ teaspoon of baking soda. Check the temperature of the thermometer. Watch it closely for one minute and record the new temperature below.
Data

<table>
<thead>
<tr>
<th>Starting Temperature of Vinegar</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Temperature after adding Baking Soda</td>
<td></td>
</tr>
</tbody>
</table>

Analysis & Conclusions

1. Did the temperature of the vinegar change after you added the baking soda?

2. If the temperature changed, did it go up or down? By how much?

3. Is this an example of a physical change or a chemical change? Explain how you know.