Determining a Chemical or Physical Change

**Background**
Matter can undergo both Physical and Chemical Changes.

Examples of these changes include:

<table>
<thead>
<tr>
<th>Physical Changes</th>
<th>Chemical Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the size of an object</td>
<td>Burning/Combustion</td>
</tr>
<tr>
<td>Phase Changes</td>
<td>Mixing acid and base</td>
</tr>
<tr>
<td>Dissolving substances (salt into water)</td>
<td>Digesting food</td>
</tr>
<tr>
<td>Changing the color of an object with a dye/marker</td>
<td>Cooking meat</td>
</tr>
<tr>
<td>Breaking an object into pieces</td>
<td>Baking bread</td>
</tr>
<tr>
<td></td>
<td>Oxidation of metals</td>
</tr>
</tbody>
</table>

**Prelab Questions**
1. In what case would heating a substance cause a physical change to occur? Explain how you would know.

2. In what case would heating a substance cause a chemical change to occur? For each example, explain how you would know.

**Purpose**
To determine if a physical change or chemical change occurs as you heat copper(II) sulfate pentahydrate crystals in a test tube.

**Hypothesis**
I think heating Copper(II) Sulfate Pentahydrate crystals will:

- Produce a physical change OR Produce a chemical change (circle your choice)
- Because (explain why):

**Materials**
- Copper(II) Sulfate Pentahydrate
- Scoopula
- Test Tube Rack
- Test Tube
- Test tube holder
- Bunsen Burner
- Striker/Matches

**Procedure**
1. Place one or two crystals of Copper(II) Sulfate Pentahydrate in the bottom of a clean, dry test tube.
2. Observe the crystals and record the color and appearance in the data table provided.
3. Heat the crystals gently with a low flame while inclining the test tube on its side. *Your teacher will demonstrate this set-up.*
4. Record your observations of the crystals and the inside of the test tube while heating it.
5. Heat the whole test tube until no more changes occur.
6. Make a detailed observation of the remaining substance in the test tube.
7. After the test tube has cooled, add 2 drops of water to the crystals and observe any changes that occur.

**Data**

<table>
<thead>
<tr>
<th>Process</th>
<th>Observations of crystals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to heating</td>
<td></td>
</tr>
<tr>
<td>During heating</td>
<td></td>
</tr>
<tr>
<td>After heating has ended</td>
<td></td>
</tr>
<tr>
<td>Addition of water</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

Did the heating of the Copper(II) Sulfate Pentahydrate crystals produce a chemical or physical change? Give evidence for your conclusion:
Post-lab Questions
1. Do you think that the amount of crystals would have an effect on what took place? **WHY?**

2. What was the major change in the crystals that you observed?

3. What do you think is the reason for the crystals changing colors (as a result of the heating)?

4. Discuss how your conclusion addressed your hypothesis? Did you change your mind after adding water to the crystals in your test tube?

5. What does it mean to have “dehydrated” milk (or other food) and how does this relate to the crystals in our lab activity?

6. What is something new you learned when completing this activity?