**Activity C: Thermal stability and conductivity of plastic materials.**

**Part 1: Thermal stability of plastic materials**

Thermoplastic (plastomers) are plastic materials that become soft and plastic (soluble by heat) when exposed to heat. Polyethylene (PE), polypropylene (PP), polyvinylchloride (PVC), polystyrene (PS) belong to this group.

**Materials:** Beaker, burner, matches, cotton, metal, wood, samples of different plastic materials (PE, PP, PS, PVC)

**Procedure:** Carry out an experiment in which you will observe the change of shape of thermoplastic in boiling water. Compare the change with that of selected natural materials. Put the appropriate plastic, cotton, metal and wood into boiling water and close the container. Take them out of water some minutes later and write your findings into the table.

**Findings:** Complete the following table with your findings

|  |  |  |  |
| --- | --- | --- | --- |
| **Materials** | **Structural change in boiling water** | **Materials** | **Structural change in boiling water** |
| **Polyethylene (PE)** |  | **Cotton** |  |
| **Polypropylene (PP)** |  | **Metal** |  |
| **Polystyrene (PS)** |  | **Wood** |  |
| **Polyvinyl chloride (PVC)** |  |

1. Which plastic materials used in everyday life cannot be exposed to high temperatures? Justify your answers

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2. Have you come across “melting” of a plastic product in everyday life?

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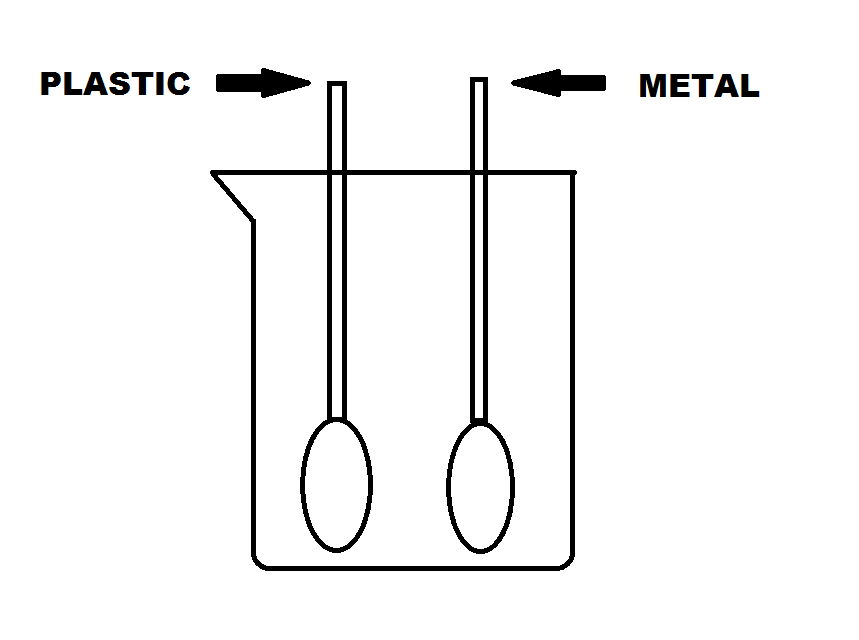
**Part 2: Thermal conductivity of plastic materials**

Imagine the following situation. Your mum was cooking soup in two pots. She stirred the soup in one pot with a metallic ladle and the one in the other pot with a plastic ladle. She left both ladles in the hot soup and left. She returned half an hour later and wanted to take the ladles out of the pots. Something went wrong, however. She got burnt by one of the ladles. Do you know by which one? Carry out an experiment using a beaker, burner, metallic and plastic spoon. Compare chemical composition of metals and plastic materials and based on that prove or contradict your hypothesis on the thermal conductivity of the materials.

**Hypotheses:**........................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................

**Materials:** Beaker, burner, plastic spoon, metallic spoon

**Procedure:** Devise and carry out an experiment to test thermal conductivity of plastic materials. The picture below may help you with that:



**Findings:**

State 1 minute later: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

State 2 minutes later: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

State 3 minutes later: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

State 5 minutes later: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What could you say about thermal conductivity of plastic materials?

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