

B3 ACTIVITY 4: BOILING WATER IN A PAPER CUP

Background

This is another demonstration of the capacity of water to absorb heat energy. The water boils, but the cup is not even scorched. The water absorbs the heat transferred to the paper and begins to boil at a temperature of 100°C. The water does not get any hotter, so the paper does not reach a high enough temperature to burn.

Equipment required:

- Paper cup with small amount of water
- Wooden skewer or similar (i.e. knitting needle)
- Supports as shown in Figure 14
- Thermometer or data logger sensor

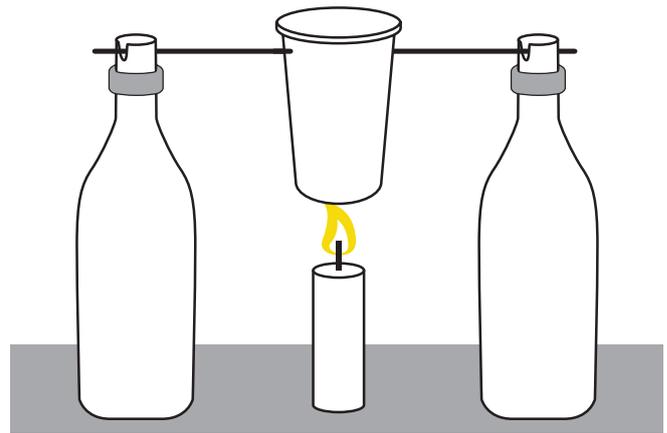


Figure 14

What to do:

1. Put a small amount of cold water in the paper cup.
2. Push the skewer through the rim of the paper cup.
3. Hang it between the two supports as shown in Figure 14.
4. Place the thermometer or data logger in the water and note the initial temperature.
5. **Predict** what will happen when the burning candle is placed under the paper cup.
 - ② *Will the cup burn immediately?*
 - ② *Will the thermometer or data logger register a temperature rise or a fall?*
6. Place the burning candle under the cup.
Observe what happens and record these observations.
7. After two to three minutes quench the candle.
Compare your observations with your predictions.
 - ② *Were there any surprising outcomes?*
 - ② *Do you think the outcome would be the same if a polystyrene cup was used instead?*

B3.4 Discussion points: Water Coolant

1. Water is used as a coolant for car engines. List all the advantages of water that make it an ideal coolant.
2. Some industries rely heavily on water as a coolant but this can present problems for local communities. What might these problems be?
3. Research these industries in Ireland.
 - ② *Where are they situated?*
 - ② *Who is tasked with monitoring them?*
 - ② *Why might monitoring be required?*