B4 ACTIVITY 5: TRANSFERRING HEAT

Background

In this investigation the students examine the role played by convection currents in transferring heat. The movement of warm water can be observed using either thermofilm or food colouring. Plastic tubing represents the piping system and warm water is passed through it. If students have not used thermofilm before, **B1 ACTIVITY 3 (II): CALIBRATING THERMOFILM** should be carried out before this activity.

Equipment required (per group):

- Two boiling tubes
- Two-holed bungs to fit the tubes
- A boiling tube rack
- Plastic tubing and glass tubing to fit into bungs
- A strip of thermofilm (10 cm x 5 cm) or food colouring
- 100/250 cm^3 beaker
- Boiling water
- Thermometer or temperature sensor

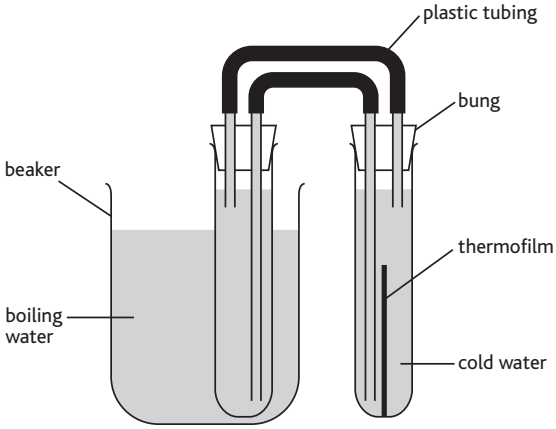

Figure 25: Using thermofilm

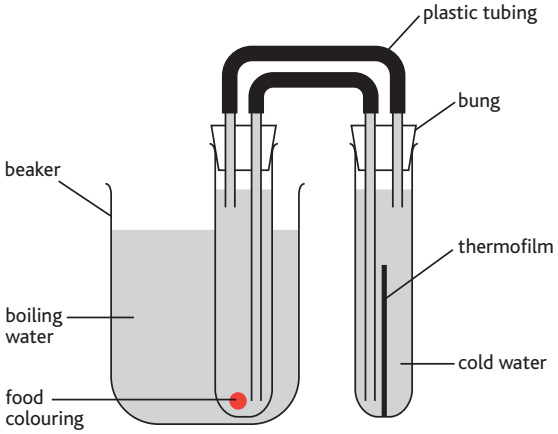

Figure 26: Using food colouring

What to do:

1. Set up the apparatus as shown in Figure 25 and connect the tubing as shown.
2. Place the thermofilm in one of the tubes, as shown in Figure 25 or add a few drops of food colouring as shown in Figure 26.
3. Fill both tubes with cold water and bung them, ensuring that there are no air bubbles in the system.
4. Support the boiling tube with the thermofilm using the rack and put the other one into the beaker. If using food colouring, put the boiling tube with food colouring in the beaker.
5. Fill the beaker with boiling water.
6. Use the thermometer or sensor to monitor the temperature of the plastic tubing while at the same time **observing** what happens to the film or the food colouring.

   ? ***Why was the boiling tube with food colouring put into the beaker rather than placing it in the support rack?***

   ? ***What was the point of monitoring the temperature of the plastic tubing?***

Resources:

- Click here to view the activity Harnessing Energy, available from The National Stem Centre, UK.