B5 ACTIVITY 1 (I): WHAT COLOUR SURFACES ABSORB HEAT?

Background

After this investigation the students will have a better understanding of the effect that colour has on heat absorption.

Equipment required (per group):

- Two used food cans of similar size and similar external surfaces
- Different coloured paper to cover the outside of the cans
- Digital thermometer
- Stopwatch
- A source of heat (i.e. an infrared (IR) bulb, heater or lamp)

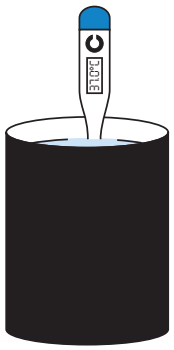

Figure 28

Figure 29: heater or IR lamp

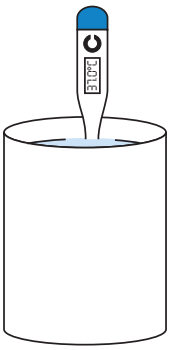

Figure 30

What to do:

1. Fill both containers with water of the same temperature.
2. Place both cans at equal distances from the heater or IR bulb (but not too close).
3. Record the temperature of both cans at two-minute intervals until they arrive at the same final temperature.
4. Graph the results and compare them with the results of other pairs who used different contrasting colours.

B5 ACTIVITY 1 (II): HOT BOXES (ALTERNATIVE ACTIVITY)

Equipment required (per group):

- Four ice cubes
- Four sheets of coloured paper (if possible use the same colours as in the previous activity)
- A few sheets of newspaper
- Heater (or warm sunlight)
- Pair of scissors
- Sellotape or glue
- Timer

What to do:

1. Using the template shown in Figure 31, make four boxes of different colours. Each one must be big enough to hold one ice cube. Fold and cut as indicated. Glue corners A and C to side 1. Glue corners B and D to side 2.
2. Place the sheet of newspaper near a heater or in a sunny spot and lay the boxes side by side with the opening facing away from the heat source.
3. Place an ice cube in each box and start the timer.

   ? ***Predict which ice cube will melt first.***

   Record the time each ice cube takes to completely melt.

   ? ***Compare these results with your predictions – were they similar or quite different?***
4. Construct a suitable graph which compares the melt times of the different colours.

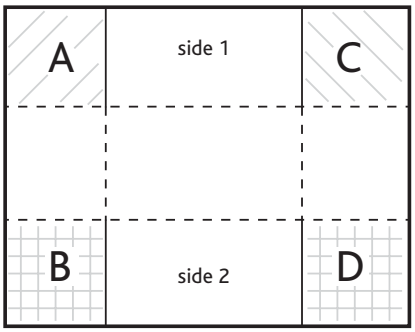

Figure 31

B5.1 Discussion points: Hot Colours

1. Should we wear white or black clothes on a hot day?
2. Should the exterior of a house be brightly painted?
3. What colour should a flat roof be painted?
4. Space shuttles are exposed to intense heat radiation on return to Earth. To protect them from these high temperatures, the surface is covered with tiles. The colour of these tiles is critical. Do you think the tiles are black or white? Give a reason for your answer.
5. What about solar panels? What colour are they?
6. White is the predominant building colour in some Mediterranean countries. Why do you think this is?