

Black or white?

Some colours reflect heat and some colours absorb (take in) heat. What do you think are the coolest colours to wear on a hot day? How about the best colours to absorb heat in winter? Let's investigate!

We use a thermometer to measure temperature. The units we use in Australia are degrees Celsius ($^{\circ}\text{C}$). For example, water freezes at 0°C and boils at 100°C .



Task:

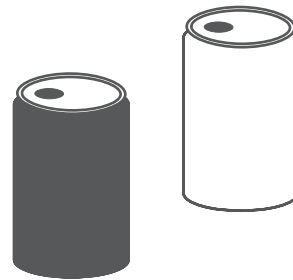
Work in small groups to investigate if different colours absorb or reflect heat from the sun.

What you need:

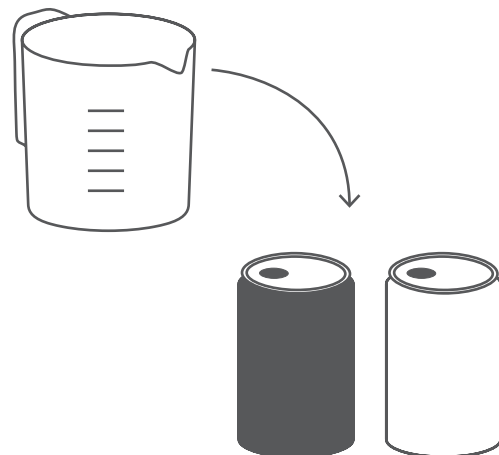
- Thermometer
- Two aluminium drink cans the same size
- Black paint
- White paint
- Watch or clock
- Cardboard
- Measuring jug
- Water

Instructions:

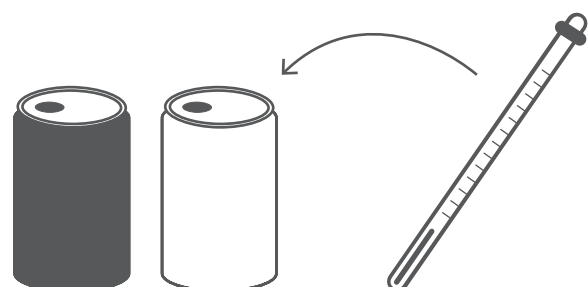
Step 1: Paint the cans – one black and one white. Let the paint dry.



Step 2: Use a measuring jug to fill each can with the same amount of water.

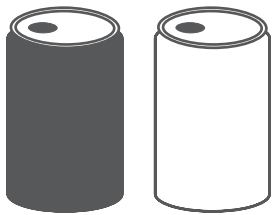
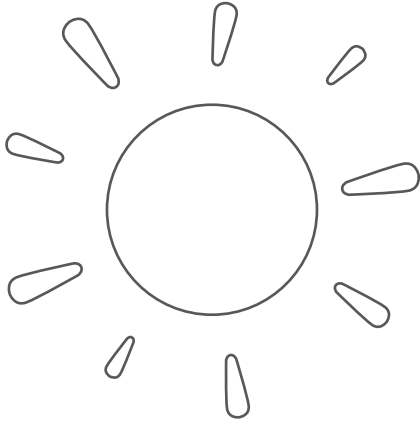


Step 3: Measure the initial (starting) temperature of the water in each can and record in the table.



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Step 4: Place both cans in a position that has full sun.



Step 5: Make a prediction about the temperature each can will reach in 60 minutes.

I predict the black can will reach
____ °Celsius in 60 minutes.

I predict the white can will reach
____ °Celsius in 60 minutes.

Step 6: Measure the temperature of the water in each can every 20 minutes. Record the temperatures in the table.

Step 7: Answer the questions on the activity sheet.

Black or white?

Name: _____

Record the results of the experiment in the table below.

You can draw a graph of your results using the template provided on the next page.

Can	Starting temperature (°Celsius)	20 minutes	40 minutes	60 minutes
White				
Black				

1. What was the maximum (highest) temperature reached in each can?

White _____

Black _____

2. Were these temperatures higher or lower than you had predicted?

White _____

Black _____

3. Discuss whether anything besides the colour could have affected the results:

– Did the cans receive the same amount of sunlight?

– How accurate were your measurements – was the thermometer placed at the same depth in each can?

4. What did you learn from this experiment? Write your conclusion.

5. Think of another experiment you could do to explore colour and heat.

Black or white?

Name: _____

Draw a column graph of your results.

First discuss the best scale to use for the temperature. This will depend on the temperature range you need to fit on the graph.

Remember that whatever scale you choose, it should go up by the same amount each time, for example, 0, 2, 4, 6, 8, 10 and so on.

Can you come up with more than one possible scale? Which one is best for showing your results clearly?

Which absorbs the most heat – black or white?

