

# Edexcel Physics GCSE

## Topic 5.19: Light and the Electromagnetic Spectrum

Practical notes

(Physics only)

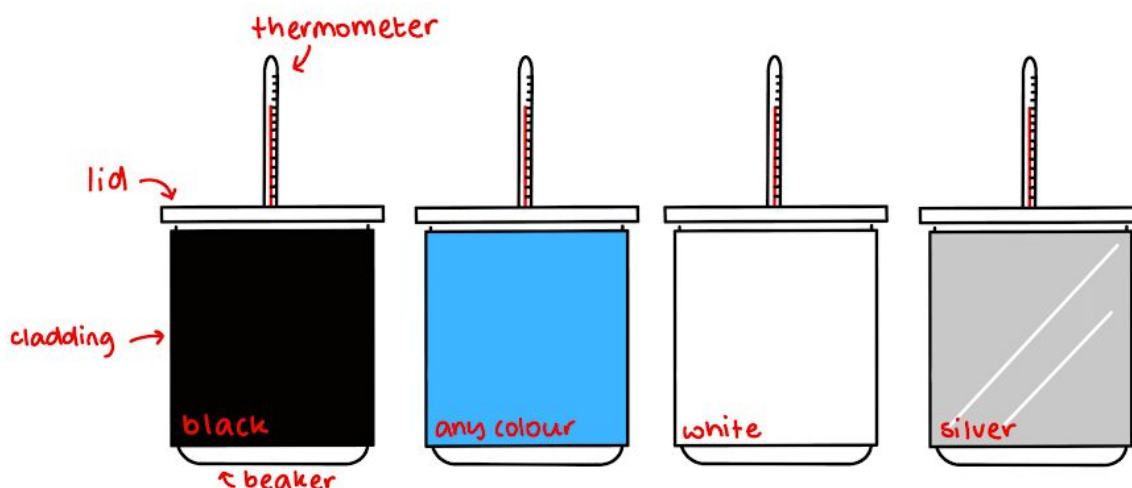


## Core Practical 4: Investigate how the nature of a surface affects the amount of thermal energy radiated or absorbed

### Equipment:

- Beakers (at least four)
- Kettle
- 1 thermometer for each beaker
- Different-coloured materials to clad each beaker.
  - Ideally, these would be the same thickness and material so that the test is reliable
  - Colours should include **matt black, white and silver** - and any other colours for the rest of the beakers
- A lid for each beaker (with a slit for the thermometer).
- Stopwatch

### Diagram



### Method

1. Set up the experiment as shown in the diagram.
2. Boil the kettle and pour water into each of the beakers, ensuring that they all have the **same volume**, and cover each beaker with a lid.
  - You can ensure the volume is the same by using a measuring cylinder or markings on the side of the beakers (provided all the beakers are exactly the same)
  - The lid is important to minimise heat loss through the top of the beaker
3. Record the initial temperature of each beaker and start the stopwatch.
  - You may need to leave some time before starting to ensure the thermometers are all acclimatised and reading the temperature correctly
4. Record the temperature of each beaker at regular time intervals (eg. example, every two minutes for a total of 20 minutes or until the water has reached room temperature).
  - It may be helpful to take a picture of all the beakers and read the temperature off of that so that you can take all readings from the same precise time



5. Plot a graph of temperature against time, drawing a different line for each beaker, making sure each is clearly labelled.
  - The gradient will show the rate of cooling for each of the beakers

The results of the experiment should show that the **matte black beaker cools the fastest** and the **silver beaker cools the slowest**.

### Tips

- A digital thermometer will make the results more accurate as it has a much smaller resolution than a normal thermometer.

### Safety Precautions

- Take care when pouring the water from the kettle as spilled water can cause burns.
- Handle the beakers carefully so they do not smash and cause cuts.

