

WJEC England Physics GCSE

Specified Practical Specific Heat Capacity

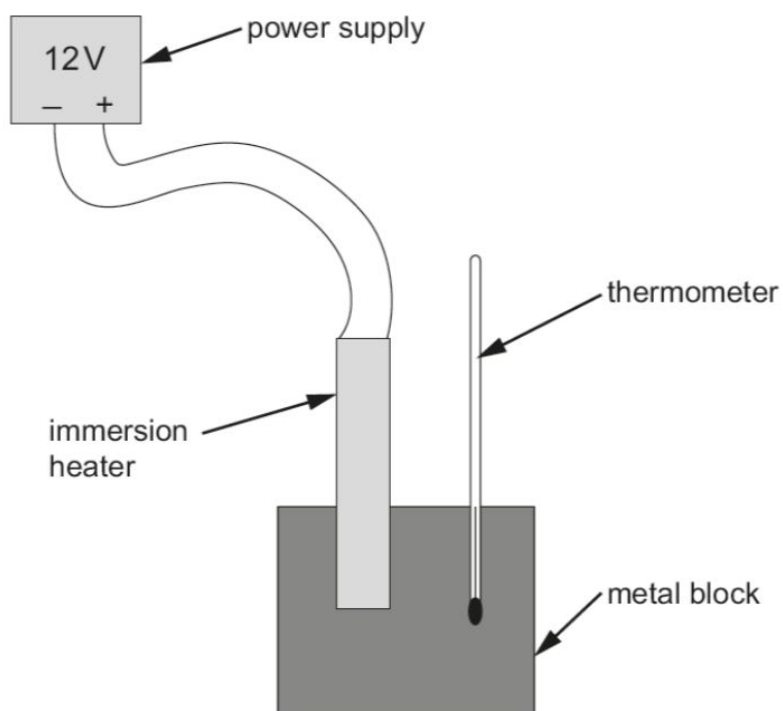


SP1.1 Determination of the specific heat capacity of a material

Equipment

- 1kg block of copper, iron, or aluminium with two holes (one for the thermometer and one for the heater)
- Thermometer
- Pipette
- 50W 12V immersion heater
- 12V d.c. power supply
- Connecting leads
- Stopwatch
- Heatproof mat

Diagram



[Image: Eduqas](#)



Method

1. Ensure the power supply is switched off.
2. Use the pipette to **add a drop of water to the thermometer hole** to improve thermal contact, then **measure the initial temperature** of the block.
3. Switch on the power supply and heat the block.
4. Ensuring the block is insulated to reduce heat loss, **heat the block** for 10 minutes, recording the temperature **at 1 minute intervals**.
5. Calculate the heat energy transferred to the metal by the heater using the formula:
$$\text{Energy} = \text{Power} \times \text{Time}$$
 - Time must be in **seconds**, not minutes
6. Calculate the specific heat capacity of the metal using $Q = mc\Delta\theta$, where Q is the energy transferred (calculated above), m is the mass of the block (1kg), θ is the change in temperature and c is the specific heat capacity of the block.

Tips

- There is some thermal inertia as the block begins to warm up, so to ensure that your graph gives a straight line it is best to start after the block is already slightly warm (the initial temperature of the block should still be the temperature right before you start the stopwatch).

Safety Precautions

- Avoid touching the heater when it is on or the block during/after heating as they may cause a burn.
- Ensure the block is on the heatproof mat to avoid damaging the desktop.

