

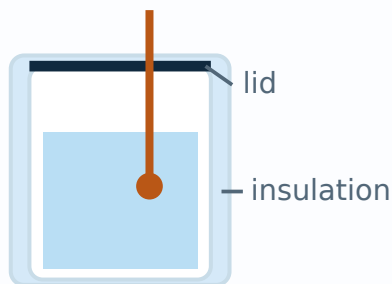
P1 Thermal insulation practical

Separate Physics extras | AQA 8463 | CORE

Use alongside the shared topic notes. Foundation + Higher content.

Plan a fair comparison

Required practical 2: compare insulating materials or investigate one factor, such as insulation thickness.



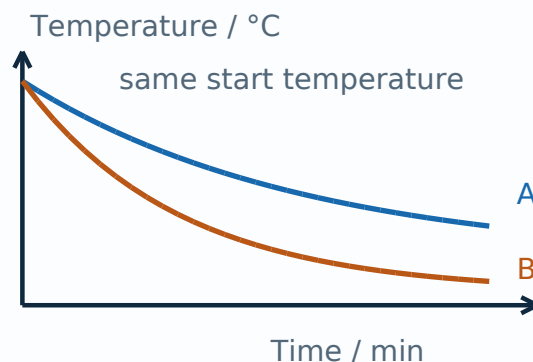
Measure temperature at fixed times

Use identical containers and lids, equal masses of water, the same initial temperature and the same room conditions. Change only the chosen factor.

Keep the thermometer position fixed. Use hot water carefully and support containers securely.

Measure and interpret

Record temperature at regular intervals for the same duration. Repeat trials and calculate a mean temperature drop.



A smaller temperature fall in the same time indicates better insulation. Curve A cools more slowly than B in this example.

Compare at the same temperature difference from the room: cooling usually slows as this difference decreases.

Evaluate the evidence

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Variables: material or thickness is independent; temperature change is dependent. Water mass, start temperature, exposed area and time are controls.

A lid reduces energy transfer by evaporation and convection. Insulation reduces transfer through the container; it does not prevent every transfer.

Repeat readings reduce the effect of random variation. Use the spread of results to judge how convincing a small difference is.

$$\Delta\theta = \theta_{\text{start}} - \theta_{\text{end}}$$

Example: 75 °C to 61 °C is a fall of 14 °C. Another material falling by 9 °C is more effective under the same conditions.

Explain: thicker walls or lower thermal conductivity reduce the rate of conduction.