

AQA Physics GCSE

Required Practical 2

Thermal Insulation

Method taken from [AQA Required Practical Handbook](#)

This work by [PMT Education](#) is licensed under [CC BY-NC-ND 4.0](#)



Aim:

To investigate the effectiveness of different materials as thermal insulators and the factors that may affect their insulating properties.

Equipment List:

- Five 100cm³ beakers
- Five 250cm³ beakers
- Five thermometers
- Kettle (to heat water)
- Piece of cardboard
- Scissors
- Stopwatch
- Insulating materials (e.g. newspaper, bubble wrap, polystyrene, cotton wool)
- Rubber bands
- Heatproof mat

Method 1 - Testing Different Types of Materials:

1. Set up your equipment, wrapping four of the five beakers with a different insulating material (using the rubber bands to secure the insulation, ensuring as small an air gap between the beaker and insulation as possible).
2. The beaker with no insulation wrapped around it is the control beaker.
3. Cut circles of cardboard (larger than the mouth of the beaker) to form lids for each beaker.
4. Fill each beaker with warm water from the kettle and record the initial temperature of each.
5. Start the stopwatch and measure the temperature of the beakers every 3 minutes.
6. Calculate the change in temperature for each beaker (initial temperature - final temperature).

Method 2 - Testing Different Thicknesses of Insulator:

1. Wrap five beakers in varying thicknesses of one insulating material e.g. wrap each beaker in newspaper using one more sheet per beaker.
2. Fill each beaker with warm water, record the initial temperature and cover each beaker with paper lids.
3. Repeat the experiment as before, measuring the temperature every 3 minutes.
4. Record your results and calculate the change in temperature for each beaker (initial temperature - final temperature).



Safety Precautions:

- Don't handle the beakers whilst or after heating
- Keep the beakers on a heatproof mat
- Take care handling glass. If the beaker appears cracked, don't use it. If the beaker breaks, inform a supervising adult.

Blank Table of Results:

Time (min)	Type of Insulation				
	No Insulation	Bubble Wrap	Newspaper	Cardboard	Cotton Wool
	Temperature of Water (°C)				
0					
3					
6					
9					
12					
15					
Change in Temperature					

