Energy Changes in Systems

AQA GCSE Physics · Energy

REQUIRED PRACTICAL

Specific Heat Capacity

Apparatus

Draw or write two more measuring devices you would need:

1. _____
2. _____

Results table

time / s	temperature / °C

Power of the kettle = _____ W

You'll find this printed on the kettle.

Graph of _____

(use the two words from the results table headings)

Analysis — specific heat capacity of water

1. Find the gradient of the straight part of your graph: $gradient = \Delta\theta \div t$ = _____ °C/s

2. Energy supplied by the kettle: $E = P\,t$ Energy gained by the water: $\Delta E = m\,c\,\Delta\theta$

3. The kettle's energy heats the water, so: $P\,t = m\,c\,\Delta\theta$

4. Rearrange for c: $c = P\,t \div (m\,\Delta\theta)$

5. Replace $\Delta\theta \div t$ with your gradient: $c = P \div (m \times gradient)$

c = _____ J/kg°C

Evaluation

Is your value higher or lower than the true value? _____

The true specific heat capacity of water is **4200 J/kg°C**.

Where is the extra energy transferred to, if not to the water?

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Specific Heat Capacity

This is the energy required to raise the temperature of 1 kg of a substance by 1 °C.

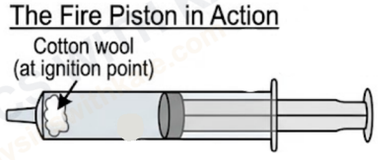
Formula in words

Formula in algebra

Example

Question

A fire piston is a special syringe used to start a fire: when the air inside is compressed and gets hot enough, some cotton wool in the syringe catches fire. The energy transferred to the air in the syringe is 0.035 J. The mass of the air in the syringe is 4.6×10^{-7} kg. The specific heat capacity of air is 1.03 kJ/kg°C. Calculate the temperature change of the air.



Prose question

Describe the energy transfer as the syringe is pushed down.

[2 marks]

Calculation question

Calculate the temperature of the air afterwards, if it started at 21 °C.

[4 marks]