# Specific heat capacity: energy calculations

Teacher / technician

YEAR 11 / LESSON 70 / PHYSICS ONLY

Staff preparation and answer guidance. Keep separate from student sheets. Record actual measurements separately from labelled practice examples.

## Coverage and delivery

Physics only: 5.2P, 5.12P, 5.13P. $\Delta Q = mc\Delta T$ and specific heat capacity.

Allow about 60 minutes. Follow the student sequence and use the answers to check reasoning.

## Requisition • class of 30, working in 15 pairs

| Item | Per pair / setup | Class total |
|---|---|---|
| Booklets | 1 per learner | 30 |
| Calculator and energy-card set | 1 per pair | 15 sets |

## Immediate safety

Calculation and model work only. No heaters, hot blocks or boiling water are used.

# Preparation and delivery

Read alongside the student method

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**1.** Prepare the exact stated practice values and distinguish supplied electrical energy from energy gained by the sample.

**2.** Check units and rearrangements; explain that the water and metal values are specified approximations, not class measurements.

## Close of lesson

• Return cards and calculators and retain worked solutions.

## Check before teaching

Check the cards, reference data and quantities against this requisition. Keep the staff answer guide separate until the checking stage. Supplied numerical practice datasets are labelled examples; they are not class measurements.

# Answers and teaching notes

Expected explanations • do not give as experimental observations

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- Energy per kilogram per degree of temperature rise under the stated conditions.
- 9000 J.
- About 4.29 °C.
- 800 J $kg^{-1}$ $°C^{-1}$.
- The energy depends on the change, not the chosen temperature zero.
- Using all supplied energy as sample energy can overestimate c when some energy escapes or heats apparatus.

## References and provenance

Pearson Physics specification

Prepared 22 November 2026. Original wording, tables and questions. Sources inform the concepts and technique; the lesson scope and classroom quantities are explicitly described here. No laboratory trial or final school risk approval is claimed.