Electrical power, energy and fuse-choice reasoning

Teacher / technician

YEAR 10 / LESSON 50 / PHYSICS + SCIENCE (DOUBLE AWARD)

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

Coverage and delivery

Shared Physics / Double Award: 2.1, 2.3–2.5, 6.1. P = IV and E = IVt.

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
Calculators and rating-card sets	1 each per pair	15 of each

Immediate safety

Calculation activity only. Do not operate high-power appliances, remove plugs, replace fuses or create heating faults. Use the stated numbers on paper.

Preparation and delivery

Read alongside the student method

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1. Prepare 15 rating-card sets with the exact fictional values. State that 230 V is a problem input, not a local supply specification.

2. Teach the simplified fuse-choice reasoning alongside the requirement to use the manufacturer-specified replacement in real equipment.

Close of lesson

• Return calculators and retain corrected calculations.

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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- 5.0 A.
- 138 000 J.
- About 0.0383 kWh.
- 7 A under the stated simplified assumptions.
- Real equipment requires its specified fuse type/rating and consideration of startup current and protected wiring.
- No; power is the rate of energy transfer.

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.