Reactor roles and energy transfer

Teacher / technician

YEAR 11 / LESSON 102 / 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: 7.17, 7.21–7.22. Moderator, control rods, shielding and reactor energy transfer.

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
Role-card sets and rulers	1 set per pair	15 sets

Immediate safety

Desk-based diagram activity. No heat source, pressurised system, radioactive material or reactor equipment is used.

Preparation and delivery

Read alongside the student method

YEAR 11 / LESSON 102 / PHYSICS + SCIENCE (DOUBLE AWARD)

1. Provide an original simplified thermal-reactor diagram with distinct labels.

2. Correct the common substitutions of control rods for moderators and shielding for cooling.

Close of lesson

• Retain the labelled system and collect cards.

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

YEAR 11 / LESSON 102 / PHYSICS + SCIENCE (DOUBLE AWARD)

- Slows neutrons in a thermal reactor.
- Absorbs neutrons to control the chain reaction.
- Reduces radiation exposure outside the shielded region.
- Transfers thermal energy away from fuel.
- A turbine driven by steam.
- Radioactive products continue releasing decay heat.

References and provenance

Pearson Physics specification

IOP: teaching radioactivity

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.