Fusion and fission: comparing nuclei

Teacher / technician

YEAR 11 / LESSON 103 / 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, 7.23–7.24. Fusion, fission, mass decrease and energy release.

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
Label sets and calculators	1 set per pair	15 sets

Immediate safety

Paper calculations and models only. No hydrogen, tritium, radioactive material, plasma apparatus or high-voltage equipment is used.

Preparation and delivery

Read alongside the student method

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1. Label the mass-change extension as invented and separate from the real reaction identity.

2. Require checks of both nucleon and charge numbers and distinguish nuclear from chemical reactions.

Close of lesson

• Collect labels and retain 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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- Light nuclei.
- A heavy nucleus.
- 2 + 3 = 4 + 1 = 5.
- 1 + 1 = 2 + 0 = 2.
- No; rest mass can decrease while nucleon number is conserved.
- 1.8×10^{-12} J.

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.