Radiation penetration: a paper simulation

Teacher / technician

YEAR 11 / LESSON 93 / PHYSICS + SCIENCE (DOUBLE AWARD)

Staff preparation and answer guidance. Keep separate from student sheets. Original paper simulation with invented counts; no source handling, physical shielding test or dose assessment.

Coverage and delivery

Shared Physics / Double Award: 7.5–7.6. Radiation nature, ionisation and penetration investigated using a simulation.

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 and data sheets	1 each per learner	30 of each
Ruler and calculator	1 set per pair	15 sets

Immediate safety

Paper simulation only. Do not obtain radioactive sources, dismantle smoke alarms, handle lead sheets or test shielding on people. No radiation exposure or dose measurement is performed.

Preparation and delivery

Read alongside the student method

YEAR 11 / LESSON 93 / PHYSICS + SCIENCE (DOUBLE AWARD)

1. Supply the exact labelled invented counts and keep all intervals at 60 s. Prepare the no-absorber reference separately from absorber cases.

2. Explain that simplified school penetration rankings are not instructions for selecting real radiation shielding.

Close of lesson

- Retain corrected counts and return calculators.

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 93 / PHYSICS + SCIENCE (DOUBLE AWARD)

- To estimate signal attributable to the model source.
- 180 counts.
- 0.90, or 90%.
- No; the corrected signal is 60 counts.
- Alpha.
- It omits random statistics, energy distributions, real geometry and detector response.

References and provenance

Pearson Physics specification

IOP: teaching radioactivity

Japan Ministry of the Environment: penetration

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.