Refraction through a rectangular block

Teacher / technician

YEAR 10 / LESSON 55 / 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: 3.9, 3.14, 3.16. Refraction and ray diagrams.

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

Requisition • class of 30, ten groups of three

Item	Per pair / setup	Class total
Block and LED ray box with low-voltage source	1 set per group	10 sets
Paper, ruler and protractor	1 set per group	10 sets; 40 paper sheets
Booklets	1 per learner	30

Immediate safety

Use smooth acrylic blocks and low-voltage LED ray boxes. Keep light on the bench and out of eyes; no laser is required. Check blocks for sharp damage, secure leads and switch off before rearranging equipment.

Preparation and delivery

Read alongside the student method

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1. Pilot the single beam and ensure rays leave the opposite parallel face at the selected angles.

2. Prepare fresh tracing areas and demonstrate how boundary crossing points reconstruct the internal path.

Close of lesson

• Switch off, collect and store blocks without scratching, and retain labelled traces.

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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- From the local normal.
- Towards the normal, from air into acrylic.
- Away from the normal, from acrylic into air.
- No bending, although speed changes.
- Generally no; it is parallel but laterally displaced.
- Frequency.

References and provenance

Pearson Physics specification

IOP: reflection and refraction

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.