Investigating the refractive index of glass

Teacher / technician

YEAR 10 / LESSON 60 / 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: 3.18, 3.19. Investigate refractive index using a glass block.

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
Glass block and LED ray box with source	1 set per group	10 sets
Ruler, protractor and calculator	1 set per group	10 sets
Tracing and graph paper	6 traces and 1 graph per group	60 tracing sheets; 10 graph sheets
Booklets	1 per learner	30

Immediate safety

Staff inspect glass for chips and remove damaged blocks. Handle blocks flat on the bench and away from edges. Keep beams below eye level and do not look into the LED source. No laser is used. Switch off before moving apparatus and keep leads clear.

Preparation and delivery

Read alongside the student method

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1. Pilot all five angles to ensure a visible ray exits the opposite face. Check protractors and calculators.

2. Provide six tracing sheets per group and show how entry angles differ from exit angles. Keep the same glass block for each group's series.

Close of lesson

- Switch off, collect glass blocks in protective storage and retain raw traces with the graph.

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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- Air-to-glass entry.
- sin i.
- The glass refractive index relative to air.
- It includes repositioning and tracing uncertainty.
- sin 0°/sin 0° is indeterminate.
- A systematic measurement or alignment error; investigate instead of silently forcing the line.

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.