Required Practical Light

GCSE Physics · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Describe how to measure the angle of incidence and the angle of refraction for a ray passing into a glass block. (4 marks)

Step 1 · Trace

Place the block on paper and draw round it. Shine a narrow ray from a ray box at the block and mark the incident and emerging rays with small crosses, far apart.

Step 2 · Join

Remove the block and join the crosses with a ruler; join the entry and exit points to show the ray inside the block.

Step 3 · Normal

Draw the normal at 90° to the surface where the ray enters.

Step 4 · Measure

Use a protractor to measure both angles from the normal.

Answer: Trace rays with crosses, draw the normal, measure from the normal with a protractor

Check: Angles are always measured from the normal, never from the surface.

2. Now try one with the steps

Use the example data to compare how glass and water refract light at an angle of incidence of 40°. (2 marks)

Step 1 · Read the data

Step 2 · Compare

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Name the equipment used to produce a narrow ray of light. [1]

2. Describe how the angles in this practical are measured. [2]

3. A ray hits a plane mirror with an angle of incidence of 30°. State the angle of reflection. [1]

4. Give one safety precaution for this practical. [1]

5. Explain why a narrow ray of light is used. [1]

6. Use the example data to state the angle of refraction in glass when the angle of incidence is 40°. [1]

7. Explain why the room is dimmed during this practical. [1]

8. Use the example data to compare refraction by glass and by water. [2]

9. Explain why the crosses marking each ray should be far apart. [2]

10. Explain why there is no change of direction when the angle of incidence is 0°. [1]

11. Describe the relationship between angle of incidence and angle of refraction for the glass block. [2]

12. Suggest why each angle should be repeated. [1]

13. A student measures an angle of reflection of 60° for an angle of incidence of 30°. Explain the mistake. [2]

14. Suggest why a semicircular glass block is sometimes used instead of a rectangular block. [2]

4. Before you hand it in

Measuring angles from the surface of the block or mirror
Draw the normal first, at 90° to the surface, then measure from it.

Marking rays with crosses very close together
Space the crosses at least 5 cm apart along each ray.

Moving the block while marking
Draw round the block first and keep it still; check it lines up before marking.

Saying angle of refraction is proportional to angle of incidence
It increases with the angle of incidence but not in direct proportion.