MR SULLY UNFOLDS PHYSICS

Reflection and refraction

AQA 4.6.1.3 · 4.6.2.2 · RP9

Waves · Paper 2

Foundation & Higher · Required practical 9 (Physics only)

Name _____ Class _____ Date _____

When a wave reaches a boundary between two materials, it can be reflected, absorbed or transmitted. If it changes speed, it **refracts**.

KEY IDEAS

- The **normal** is a line drawn at 90° to the surface. Angles are always measured from the normal.
- Reflection: angle of incidence = angle of reflection.
- Refraction: light slowing down (e.g. air → glass) changes direction **towards** the normal; speeding up changes direction **away** from it. Light doesn't bend: the change of direction happens at the boundary because the speed changes. Along the normal, the direction doesn't change.

Section A · Recall

Grade 4–5

1 State three things that can happen to a wave at a boundary between two materials. [3]

2 What is the normal? [1]

3 Light hits a mirror at an angle of incidence of 35°. State the angle of reflection. [1]

Section B · Ray diagrams

Grade 5–6

4 Complete the ray diagram to show light entering a glass block at an angle and leaving it again. Label the normals and the angles of incidence and refraction. [4]



5 Explain what causes refraction. [1]

Section C · Stretch

Grade 7+

6 Use the idea of wavefronts to explain why light changes direction towards the normal when it enters glass at an angle. (Higher) [3]

7 The student also shines the ray at a mirror, at a sheet of shiny metal and at matt white paper. Describe and explain the differences in the reflected light. [3]

Exam-style question

AQA style

8 A student investigates how light is refracted by a glass block using a ray box. (Physics only)

a Describe how the student should measure the angle of refraction. [3]

b Suggest why the student should use a narrow ray of light. [1]

c Give one hazard and how to reduce the risk. [1]

Total: _____ / 21

How confident am I?	Not yet	Nearly	Got it
I can draw ray diagrams for reflection and refraction	☐	☐	☐
I can explain refraction using speed and wavefronts	☐	☐	☐
I can describe the light practical	☐	☐	☐