Waves and rays: review and corrections

Student activity • observation and reasoning

YEAR 10 / LESSON 56 / PHYSICS + SCIENCE (DOUBLE AWARD)

The question

Can you connect a wave explanation to a correctly labelled ray diagram?

Revisit wave quantities, reflection and refraction through original diagnostic tasks.

Equipment

- Booklet, pencil, ruler, protractor and calculator

Desk-based review only. No ray boxes, lasers, water or electrical equipment are required.

Course coverage: Shared Physics / Double Award: Review of 3.2–3.7, 3.14–3.16.

Plan, model or apparatus sketch

Draw a labelled ray diagram with direction arrows, boundaries and normals.

Method and reasoning

Read the whole sequence before starting

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1. Sketch a transverse wave and label amplitude and wavelength. Add an arrow for propagation and a separate arrow for the oscillation of one point.

2. Calculate wavelength for a practice wave with speed 12 m s^{-1} and frequency 4 Hz. Find its period, showing equations and units.

3. Draw a plane mirror, a normal and an incident ray at 40° to the normal. Construct the predicted reflected ray and label both angles.

4. Draw light entering an acrylic block obliquely from air. Correct the statement that its frequency decreases as it enters the block.

5. Draw light entering along the normal. Explain why no change of direction does not mean unchanged speed.

6. Compare your answers with the guidance. Correct one diagram and one calculation, explaining the scientific idea behind each correction.

Cleanup

- Retain corrected work and return equipment.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Practice values are invented learning examples. Ray directions represent wave propagation; they are perpendicular to wavefronts in this simple model. At a stationary boundary frequency is unchanged, while wave speed and wavelength can change.

Task	Initial answer	Correction with reason
Wave sketch		
Wave calculation		
Reflection diagram		
Refraction explanation		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. What is amplitude?

2. Find λ for 12 m s^{-1} and 4 Hz.

3. Find T at 4 Hz.

4. Predict r for i = 40°.

5. What changes when light enters acrylic from air?

6. What is special about normal incidence?