Waves and optics: written practice

Student activity • observation and reasoning

YEAR 10 / LESSON 57 / PHYSICS + SCIENCE (DOUBLE AWARD)

The question

Can you justify a wave calculation and an optical prediction independently?

Complete an original timed practice set, then explain each correction. This is not an official examination paper.

Equipment

- Booklet, ruler, protractor and calculator

Paper-based written practice. Do not set up optical apparatus for the diagram questions.

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. Work independently for fifteen minutes on the six prompts. Draw clear diagrams and show substitutions in equations.

2. For an invented wave with frequency 5 Hz and wavelength 0.80 m, calculate speed and period. Check whether you used metres and seconds.

3. Explain the difference between longitudinal and transverse oscillations using two arrows on each diagram.

4. A ray is 30° to the mirror surface. Draw the normal, find the incidence angle and construct the reflected ray. State which angle convention you used.

5. Explain why the image in a plane mirror is virtual and why a rectangular parallel-sided block can shift a ray sideways while leaving its emergent direction parallel.

6. Mark using the staff guidance, rewrite incomplete explanations and state one specific revision action. Use a new numerical example to check that the correction transfers.

Cleanup

- Keep the original attempts alongside corrections for later revision.

Record your evidence

Blank spaces are for your own work

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Reference and task data

All questions and values are original practice material. Do not infer an official grade from this activity. Angles to a surface and its normal add to 90°.

Question	Answer / diagram	Correction and reason
Wave speed and period		
Wave types		
Mirror angles		
Virtual image / block		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Find v for f = 5 Hz and λ = 0.80 m.

2. Find the period.

3. How do the two wave types differ?

4. Find i and r for 30° to the mirror surface.

5. Why is a plane-mirror image virtual?

6. Why is the emerging ray parallel for a parallel-sided block in air?