

Wave model · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2025; full Physics guide acquired (84 PDF pages). Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Waves · 1.1

Reasoning

A wave can carry energy across water while a floating marker mainly oscillates. Energy transfer and bulk transfer of matter are different. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Waves · 2.1

Reasoning

Frequency is oscillations per time; wavelength is distance between successive points in phase. Wave speed equals frequency multiplied by wavelength. Transverse oscillations are perpendicular to propagation. wavelength: Distance between successive points in phase; frequency: Number of oscillations per unit time.

Waves · 3.1

Reasoning

At a boundary, frequency stays fixed by the source. A change of speed changes wavelength. Refraction follows from speed differences; angles are measured from the normal. Measure several wavelengths and divide to reduce fractional reading uncertainty. Use a ray box with a normal drawn at the boundary. Keep the beam away from eyes and record incident and refracted angles clearly.

Waves · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: frequency 5 Hz and wavelength 0.40 m. Use $v = f\lambda$. $v = 5 \times 0.40 = 2.0$ metres per second. If speed falls to 1.5 metres per second at the same frequency, wavelength $= v/f = 1.5/5 = 0.30$ m.

Waves · 4.2

Reasoning

Frequency is 8 Hz and wavelength is 0.25 m. Find wave speed. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

Waves · 5.1

Reasoning

The wave frequency does not change simply because the medium changes. A longitudinal wave has oscillations parallel to propagation. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Waves · 5.2

Reasoning

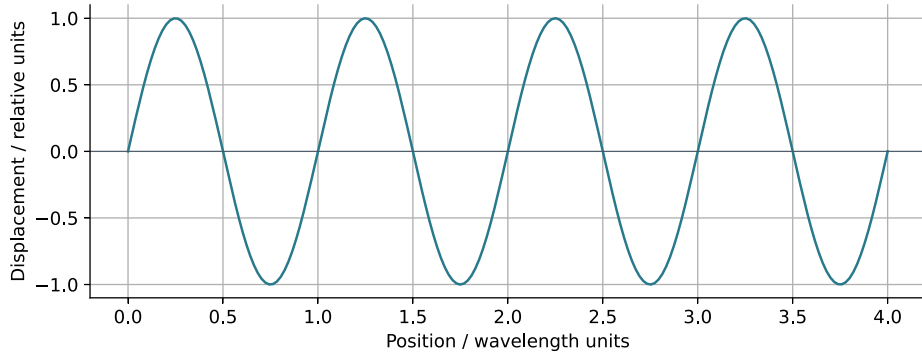
Wave frequency always changes when a wave enters a new medium. This claim is false: The wave frequency does not change simply because the medium changes. A longitudinal wave has oscillations parallel to propagation.

Waves · 5.3

Reasoning

Waves, measurement and refraction: At a boundary, frequency stays fixed by the source. A change of speed changes wavelength. Refraction follows from speed differences; angles are measured from the normal.

Waves · diagram



- Original teaching diagram: Waves, measurement and refraction
- Use the labels and the stated model together.

Waves · original transfer

Your turn

A 5 Hz wave crosses a stationary boundary where speed falls from 2 to 1 m/s. Compare wavelengths and frequency. Explain the unchanged frequency.

Waves · transfer reasoning

Method and interpretation

Wavelengths are 0.40 and 0.20 m; frequency remains 5 Hz because the boundary is driven by the same source. Moving boundaries require a different analysis.

Check yourself

- Explain frequency using the stated model.
- Explain wavelength using the stated model.
- Change one value in the original transfer; explain which assumption still matters.