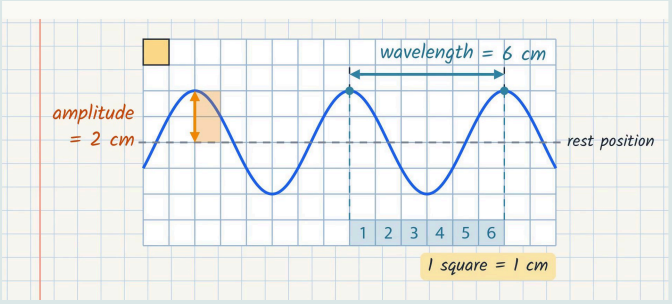
Describing waves

Four numbers for every wave

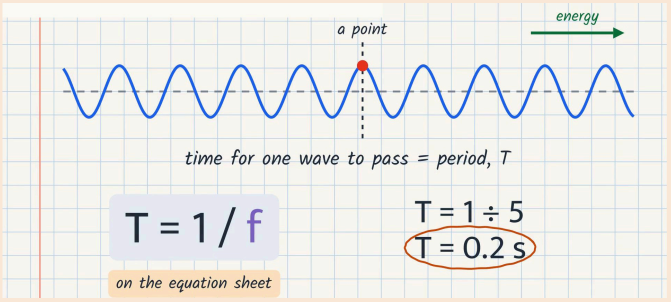
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Summary sheet

1 Amplitude and wavelength



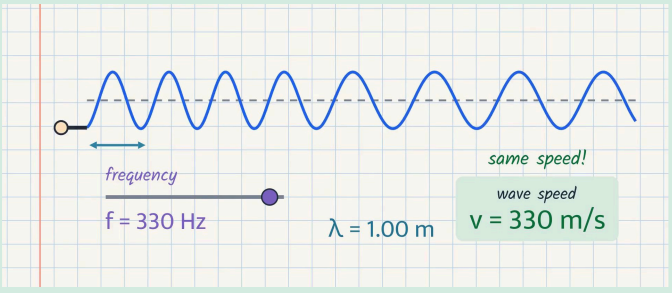
- **Amplitude**: the maximum displacement of a point from its rest position. Measure from the middle line to a peak, not bottom to top.
- **Wavelength**: from a point on one wave to the same point on the next (peak to peak, or trough to trough). Here 2 squares = 2 cm and 6 squares = 6 cm.

2 Frequency and period



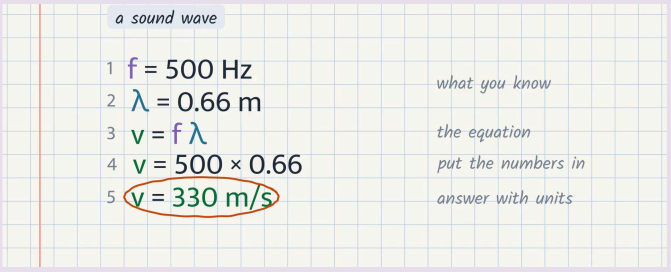
- **Frequency**: the number of waves passing a point each second, in **hertz (Hz)**. 5 waves a second = 5 Hz.
- **Period**: the time for one wave to pass. **T = 1 / f**, so at 5 Hz, T = 1 ÷ 5 = 0.2 s.

3 Wave speed



- **Wave speed**: how fast the energy moves through the medium. It is set by the medium: sound in air ≈ 330 m/s.
- In one medium, a higher frequency means a **shorter wavelength** at the **same speed**.

4 The wave equation



- **v = f λ**: speed (m/s) = frequency (Hz) × wavelength (m). 500 Hz × 0.66 m = 330 m/s.
- Rearrange for λ = v ÷ f and use the standard form key: $3 \times 10^8 \div 1 \times 10^8 = 3$ m.

v = f λ

wave speed = frequency × wavelength

Exam tip

Bigger wave? That's the amplitude, not the wavelength. Louder sound means bigger amplitude.

Check yourself

1. f = 4 Hz, λ = 2 m. What is the wave speed?
2. What is the period of a 50 Hz wave?

Answers: 1. v = 4 × 2 = 8 m/s 2. T = 1 ÷ 50 = 0.02 s