

Wave Properties

GCSE Physics · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

A wave has a frequency of 50 Hz and a wavelength of 6.0 m. Calculate its speed. (2 marks)

Step 1 · Write the equation

$$\text{wave speed} = \text{frequency} \times \text{wavelength}, v = f \lambda$$

Step 2 · Substitute and calculate

$$v = 50 \times 6.0 = 300 \text{ m/s}$$

Answer: 300 m/s

Check: $\text{Hz} \times \text{m} = \text{m/s}$, because $1 \text{ Hz} = 1 \text{ per second}$.

2. Now try one with the steps

20 complete waves pass a point in 4.0 s. The wavelength is 0.50 m. Calculate the wave speed. (3 marks)

Step 1 · Frequency = waves per second

Step 2 · Wave speed

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. State what waves transfer from one place to another. [1]

2. Describe the difference between transverse and longitudinal waves. [2]

3. Give one example of a transverse wave and one example of a longitudinal wave. [2]

4. Define the amplitude of a wave. [1]

5. Define the wavelength of a wave. [1]

6. Define the frequency of a wave and give its unit. [2]

7. A wave has a frequency of 50 Hz and a wavelength of 6.0 m. Calculate its speed in m/s. [2]

8. Sound travels at 340 m/s. Calculate the wavelength of a 170 Hz sound. [2]

9. Calculate the period of a wave with a frequency of 50 Hz. [2]

10. A wave has a period of 0.25 s. Calculate its frequency in Hz. [2]

11. 20 complete waves pass a point in 4.0 s and the wavelength is 0.50 m. Calculate the wave speed in m/s. [3]

12. Describe evidence that, for a water wave, it is the wave and not the water that travels. [2]

13. A radio wave travels at 3.0×10^8 m/s and has a frequency of 100 MHz. Calculate its wavelength. [3]

14. Describe a method to measure the speed of sound in air.

[4]

4. Before you hand it in

Measuring amplitude from the bottom of a trough to the top of a crest

Amplitude is measured from the rest position (middle line) to a crest.

"Waves carry the water along with them."

The particles oscillate about fixed positions; only the energy moves along.

Using 100 MHz as 100 in $v = f \lambda$

100 MHz = 100 000 000 Hz (1×10^8 Hz).

Forgetting that an echo travels there and back

In echo methods, the sound travels twice the distance to the wall.