LESSON MAKER PRO

Wave Speed Lab

Connect wave speed, frequency, period, and wavelength.

HIGH SCHOOL · PHY.4.3

PHY.4.3 "Use mathematical and computational analysis to explore wave characteristics (e.g., velocity, period, frequency, amplitude, phase, and wavelength)."

NAME _____ DATE _____

THE BIG IDEA

A wave travels one wavelength in each cycle, so speed = frequency * wavelength. Frequency = 1/period. Use meters, seconds, and hertz to keep units consistent.

WORKED EXAMPLE

A wave has a frequency of 11 Hz and a wavelength of 13 m. Find its speed.

1. Write the rule: speed = frequency * wavelength.
2. Substitute: speed = 11 Hz * 13 m.
3. Multiply: speed = 143 m/s.

Answer: 143 m/s

PRACTICE 6 problems

1 A wave has a frequency of 4 Hz and a wavelength of 5 m. Find its speed.

ANSWER _____

2 A wave travels at 30 m/s and has a frequency of 6 Hz. Find its wavelength.

ANSWER _____

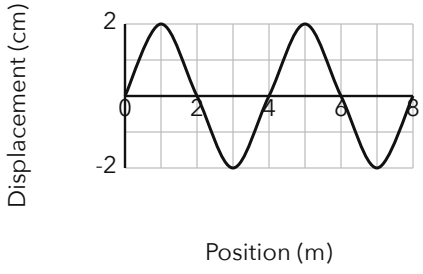
3 A wave travels at 48 m/s and has a wavelength of 8 m. Find its frequency.

ANSWER _____

4 A wave has a period of 1/4 s and a wavelength of 6 m. Find its speed.

ANSWER _____

5 The graph shows a wave at one instant. Its frequency is 3 Hz. Find its wavelength and speed.



ANSWER _____

6 A sensor records 15 full wave cycles in 3 s. Find the frequency and period.

ANSWER _____

APPLY IT Show your work

1 At a concert, a bass note has a frequency of 85 Hz. Sound travels through the air at 340 m/s. What is the note's wavelength?

WORK SPACE

ANSWER _____

2 You watch 6 full water-wave cycles pass a dock in 12 s. The waves have a wavelength of 8 m. What is their speed?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Wave A has a period of 1/3 s and a wavelength of 12 m. Wave B travels at the same speed but has a period of 1/6 s. Find B's wavelength, then explain in one sentence why it differs from A's.

WORK SPACE AND ANSWER

ANSWER KEY

Wave Speed Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A wave has a frequency of 4 Hz and a wavelength of 5 m. Find its speed.	**20 m/s**
2	A wave travels at 30 m/s and has a frequency of 6 Hz. Find its wavelength.	**5 m**
3	A wave travels at 48 m/s and has a wavelength of 8 m. Find its frequency.	**6 Hz**
4	A wave has a period of 1/4 s and a wavelength of 6 m. Find its speed.	**24 m/s**
5	The graph shows a wave at one instant. Its frequency is 3 Hz. Find its wavelength and speed.	**Wavelength: 4 m; speed: 12 m/s**
6	A sensor records 15 full wave cycles in 3 s. Find the frequency and period.	**Frequency: 5 Hz; period: 1/5 s**

PART 2 · APPLY IT

1. **4 m** Wavelength = speed / frequency = 340 / 85 = 4 m.
2. **4 m/s** Frequency = 6 / 12 = 1/2 Hz. Speed = 1/2 * 8 = 4 m/s.

CHALLENGE

6 m. B's period is half A's, so its frequency doubles and its wavelength halves at the same speed.

Accept equivalent fractions and correctly labeled units. In the graph problem, the wavelength is the horizontal distance between neighboring peaks.