

Verifying $v = f\lambda$

Concept-Development

I. Purpose:

The purpose of this activity is to confirm the mathematical relationship between the speed of a wave, its frequency, and its wavelength.

II. Materials:

Coiled spring, stopwatch

III. Procedure:

1. Stretch a spring out to a length of 13 floor tiles (approximately 4 meters).
2. As assigned by your teacher, establish a wave with 1, 2, or 3 loops.
3. Measure the frequency by timing 10 vibrations.
4. Do this 3 times and calculate the average time and then the average frequency.
5. Determine the wavelength from the number of loops and the spring length.
6. Calculate the wave speed from the frequency and wavelength.
7. Check the table speed values by timing a single pulse as it goes one round trip (forward and back). Use the equation $v = d/t$.

IV. Group Data and Calculations

V. Class Data:

Number of loops	Average Time (s)	Average Frequency (Hz)	Wavelength (m)	Speed (m/s)
1				
1				
2				
2				
3				
3				

For group data?

# of loops	Time (s)	Average Time (s)	Average Frequency (Hz)	Wavelength (m)	Speed (m/s)

Sample calculations: