

Chapter 17 Mechanical Waves and Sound

Section 17.2 Properties of Mechanical Waves

(pages 504–507)

This section introduces measurable properties used to describe mechanical waves, including frequency, period, wavelength, speed, and amplitude.

Reading Strategy (page 504)

Build Vocabulary As you read, write a definition in your own words for each term in the table below. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Properties of Waves	
Vocabulary Term	Definition
Period	The time required for one cycle
Frequency	The number of complete cycles in a given time
Wavelength	The distance between a point on a wave and the same point on the next cycle of the wave
Amplitude	The maximum displacement of a medium from its rest position

Frequency and Period (page 504)

- Is the following sentence true or false? A periodic motion repeats at regular time intervals. true
- The time required for one cycle, a complete motion that returns to its starting point, is called the period.
- The number of complete cycles in a given period of time is the frequency of a periodic motion.
- Circle the letter of each sentence that is true about frequency.
 - Frequency is measured in cycles per second, or hertz.
 - A wave's frequency equals the frequency of the vibrating source producing it.
 - Five cycles per minute is a frequency of five hertz.
 - Any periodic motion has a frequency.

Wavelength (page 505)

- The distance between a point on one wave and the same point on the next cycle of the wave is called wavelength.
- How is wavelength determined for a longitudinal wave?
For a longitudinal wave, wavelength is the distance between adjacent compressions or rarefactions.

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Wave Speed (pages 505–506)

7. Write a formula you can use to determine the speed of a wave.
 $\text{Speed} = \text{Wavelength} \times \text{Frequency}$

8. Is the following sentence true or false? The speed of a wave equals its wavelength divided by its period. true
9. What variables can cause the speed of a wave to change? The speed of a wave can change if it enters a new medium or if variables such as temperature and pressure change.

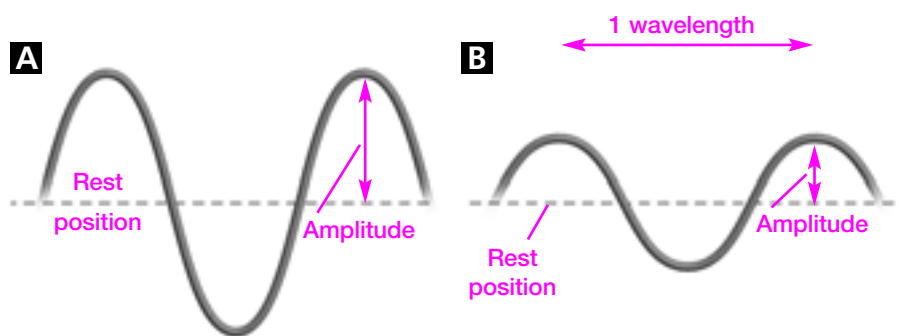
10. Circle the letter of the sentence that tells how wavelength is related to frequency for a wave traveling at a constant speed.
 - a. Wavelength is equal to frequency.
 - b. Wavelength is directly proportional to frequency.
 - c. Wavelength is inversely proportional to frequency.
 - d. A wave with a higher frequency will have a longer wavelength.

Amplitude (page 507)

11. What is the amplitude of a wave? Amplitude is the maximum displacement of a medium from its rest position.

12. It takes more energy to produce a wave with higher crests and deeper troughs, so the more energy a wave has, the greater its amplitude.

Questions 13 through 17 refer to the figure below.



13. The type of waves shown are transverse waves.
14. Label the rest position for waves A and B.
15. Add arrows to the figure to indicate the amplitude of each wave. Which wave has the greater amplitude? wave A
16. Which wave shown has more energy? wave A
17. Add an arrow to indicate one wavelength on wave B.