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Chapter 25 Vibrations and Waves

25.3 Wave Motion

The energy transferred by a wave from a vibrating source to a receiver is carried by a disturbance in a medium.

- When energy is transferred by a wave from a vibrating source to a distant receiver, there is no transfer of matter between the two points.
- When someone talks to you from across the room, the sound wave is a disturbance in the air that travels across the room.

25.4 Wave Speed

You can calculate the speed of a wave by multiplying the wavelength by the frequency.

- The speed of a wave depends on the medium through which the wave moves.
- Sound waves move at speeds of about 330 m/s to 350 m/s in air.
- Whatever the medium, the speed, wavelength, and frequency of the wave are related.
- In equation form, the relationship for wave speed is as follows:

$$v = \lambda f$$

where v is wave speed, λ (Greek letter lambda) is the wavelength, and f is wave frequency.

- Wavelength and frequency vary inversely to produce the same wave speed for all sounds.

25.5 Transverse Waves

Waves in the stretched strings of musical instruments and the electromagnetic waves that make up radio waves and light are transverse.

- Whenever the motion of the medium is at right angles to the direction in which a wave travels, the wave is a **transverse wave.**

25.6 Longitudinal Waves

Sound waves are longitudinal waves.

- When the particles in the medium oscillate parallel to or *along* the direction of the wave rather than at right angles to it, the wave is a **longitudinal wave.**

25.3 Wave Motion (pages 493–494)

14. Describe the wave that forms and what is transmitted when a stone is dropped in a pond.

_____

_____

15. Sounds waves are a(n) _____ that travels through the air.

16. Circle the letter of each statement about sound waves in air that is true.
    a. They carry energy.
    b. Air is the medium they travel through.
    c. They are a disturbance that moves through the air.
    d. Air molecules are carried along with the wave.

25.4 Wave Speed (pages 495–496)

17. Is the following sentence true or false? The speed of a wave depends on the medium through which it travels. _____
18. The speed of sound in air is about _____ m/s to _____ m/s.
19. Is the following sentence true or false? Sound travels faster in air than in water. _____
20. Circle the letter of each wave property that is related.
    a. speed b. frequency
    c. direction d. wavelength
21. Describe how to calculate the speed of a wave.

    _____

    _____
22. Circle the letter of the equation used to calculate a wave's speed.
    a. $v = \lambda p$ b. $v = \lambda t$
    c. $v = \lambda f$ d. $v = \lambda a$
23. The Greek letter _____ is often used to represent wavelength.
24. Is the following sentence true or false? The equation for calculating the speed of a wave does not apply to light waves. _____
25. Describe how wavelength and frequency are related for sound waves.

    _____

25.5 Transverse Waves (pages 497)

26. Circle the letter that best describes a transverse wave.
    a. The medium does not vibrate.
    b. The medium vibrates at right angles to the direction the wave travels.
    c. The medium vibrates in the same direction the wave travels.
    d. A sound wave.
27. Circle the letter of each example of a transverse wave.
    a. waves in the strings of instruments
    b. radio waves
    c. light waves
    d. sound waves

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Chapter 25 **Vibrations and Waves**

25.6 Longitudinal Waves (page 497)

28. Describe the motion of the particles in a medium when a longitudinal wave passes through it.

_____

_____

29. What is an example of a longitudinal wave? _____

30. Identify the types of waves formed in part (a) and part (b) of the illustration below.

a. _____ b. _____