

Chapter 17 Mechanical Waves and Sound

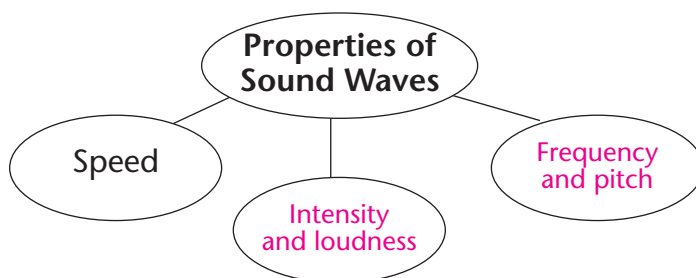
Section 17.4 Sound and Hearing

(pages 514–521)

This section discusses properties of sound waves, how they are produced, and how the ear perceives sound. It also describes how music is produced and recorded.

Reading Strategy (page 514)

Using Prior Knowledge Before you read, add properties you already know about sound waves to the diagram below. Then add details about each property as you read the section. 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 Sound Waves (pages 514–515)

- Circle the letter of each sentence that is true about sound.
 - Many behaviors of sound can be explained using a few properties.
 - Sound waves are compressions and rarefactions that travel through a medium.
 - Sound waves usually travel more slowly in solids than in gases.

Match each description with one or more sound properties.

Description	Property
<u> c </u> 2. This property is measured in units called decibels.	a. loudness b. pitch
<u> b, d </u> 3. These properties are affected by the length of tubing in a musical instrument.	c. intensity d. frequency
<u> b </u> 4. This property is the frequency of a sound as your ears perceive it.	
<u> a </u> 5. This property is a physical response to the intensity of sound.	

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Ultrasound (page 516)

6. Is the following sentence true or false? Ultrasound has frequencies that are lower than most people are capable of hearing. false
7. Describe one application of ultrasound. Ultrasound imaging is an important medical technique; sonar is used to determine the distance to an object under water.

The Doppler Effect (page 516)

8. Is the following sentence true or false? The Doppler effect is a change in sound frequency caused by motion of the sound source, motion of the listener, or both. true

Hearing and the Ear (page 517)

Match each description with the appropriate region(s) of the ear.

Description	Region
<u>a</u> 9. Sound is gathered and focused here.	a. outer ear
<u>c</u> 10. Nerve endings send signals to the brain.	b. middle ear
<u>b</u> 11. Hammer, anvil, and stirrup are located here.	c. inner ear
<u>b</u> 12. Sound vibrations are amplified.	

How Sound Is Reproduced (pages 518–519)

13. In recording sound, _____ are converted to electronic signals that are processed and stored. Circle the correct answer.
 electronic waves sound waves ultrasound waves
14. Sound is reproduced by converting electronic signals back into sound waves.

Music (page 521)

15. Is the following sentence true or false? Many musical instruments vary pitch by changing the frequency of standing waves. true
16. The response of a standing wave to another wave of the same frequency is called _____. Circle the correct answer.
 amplification interference resonance