



Chapter Review

USING KEY TERMS

Complete each of the following sentences by choosing the correct term from the word bank.

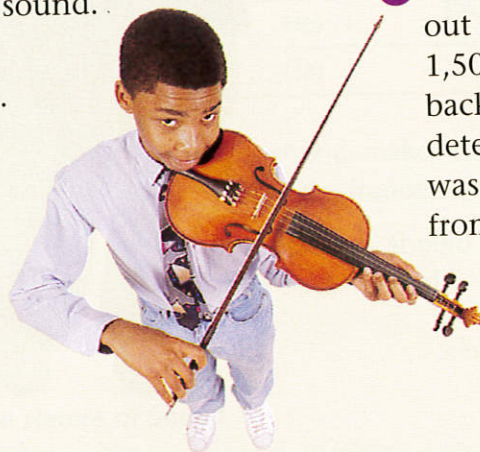
loudness echoes
pitch noise
sound quality

- 1 The _____ of a sound wave depends on its amplitude.
- 2 Reflected sound waves are called _____.
- 3 Two different instruments playing the same note sound different because of _____.

UNDERSTANDING KEY IDEAS

Multiple Choice

- 4 If a fire engine is traveling toward you, the Doppler effect will cause the siren to sound
 - a. higher.
 - b. lower.
 - c. louder.
 - d. softer.
- 5 Sound travels fastest through
 - a. a vacuum.
 - b. sea water.
 - c. air.
 - d. glass.
- 6 If two sound waves interfere constructively, you will hear
 - a. a high-pitched sound.
 - b. a softer sound.
 - c. a louder sound.
 - d. no change in sound.



- 7 You will hear a sonic boom when
 - a. an object breaks the sound barrier.
 - b. an object travels at supersonic speeds.
 - c. a shock wave reaches your ears.
 - d. the speed of sound is 290 m/s.
- 8 Resonance can happen when an object vibrates at another object's
 - a. resonant frequency.
 - b. fundamental frequency.
 - c. second overtone frequency.
 - d. All of the above
- 9 A technological device that can be used to see sound waves is a(n)
 - a. sonar.
 - b. oscilloscope.
 - c. ultrasound.
 - d. amplifier.

Short Answer

- 10 Describe how the Doppler effect helps a beluga whale determine whether a fish is moving away from it or toward it.
- 11 How do vibrations cause sound waves?
- 12 Briefly describe what happens in the different parts of the ear.

Math Skills

- 13 A submarine that is not moving sends out a sonar sound wave traveling 1,500 m/s, which reflects off a boat back to the submarine. The sonar crew detects the reflected wave 6 s after it was sent out. How far away is the boat from the submarine?



CRITICAL THINKING

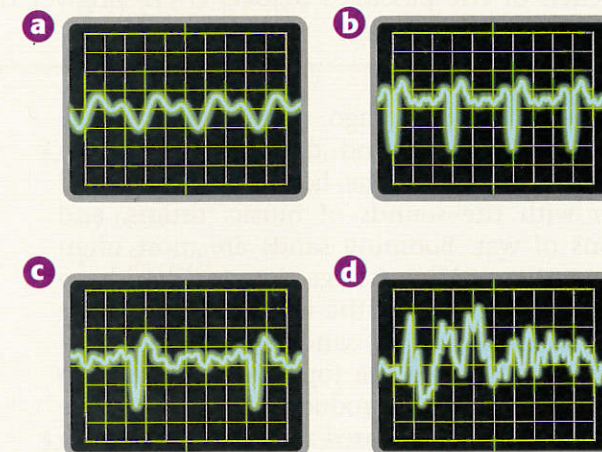
- 14 **Concept Mapping** Use the following terms to create a concept map: *sound waves, pitch, loudness, decibels, frequency, amplitude, oscilloscope, hertz, and interference.*
- 15 **Analyzing Processes** An *anechoic chamber* is a room where there is almost no reflection of sound waves. Anechoic chambers are often used to test sound equipment, such as stereos. The walls of such chambers are usually covered with foam triangles. Explain why this design eliminates echoes in the room.



- 16 **Applying Concepts** Would the pilot of an airplane breaking the sound barrier hear a sonic boom? Explain why or why not.
- 17 **Forming Hypotheses** After working in a factory for a month, a man you know complains about a ringing in his ears. What might be wrong with him? What do you think may have caused his problem? What can you suggest to him to prevent further hearing loss?

INTERPRETING GRAPHICS

Use the oscilloscope screens below to answer the questions that follow:



- 18 Which sound is noise?
- 19 Which represents the softest sound?
- 20 Which represents the sound with the lowest pitch?
- 21 Which two sounds were produced by the same instrument?

