Name _____ Class _____ Date _____

Chapter 21 – The Nature of Sound
Directed Reading A

Section: What Is Sound?

SOUND AND VIBRATIONS

1. The complete back-and-forth motion of an object is called a(n) _____.

2. In a(n) _____ the particles in the air are closer together than in the surrounding air.

3. In a(n) _____, the particles in the air are less crowded than in the surrounding air.

4. Longitudinal waves that are caused by vibrations and that travel through a medium are called _____.

5. As sound waves leave their source, in what direction do they travel?

_____

6. Air does not travel with sound waves. But what would happen at the school dance if air did travel with sound?

_____

_____

7. A substance through which a wave can travel is a(n) _____.

8. Why is there no sound in a vacuum?

_____

9. Why does the sound of the ringing alarm clock get quieter as the air is removed?

_____

_____

HOW YOU DETECT SOUND

_____10. After your ears convert sound waves into electrical signals, where are the signals sent for interpretation?

a. pinna
b. spinal cord
c. brain
d. oval window

Match the labels to the parts of the drawing. Write the letters in the spaces provided.

_____**11.** ear canal

_____**12.** pinna

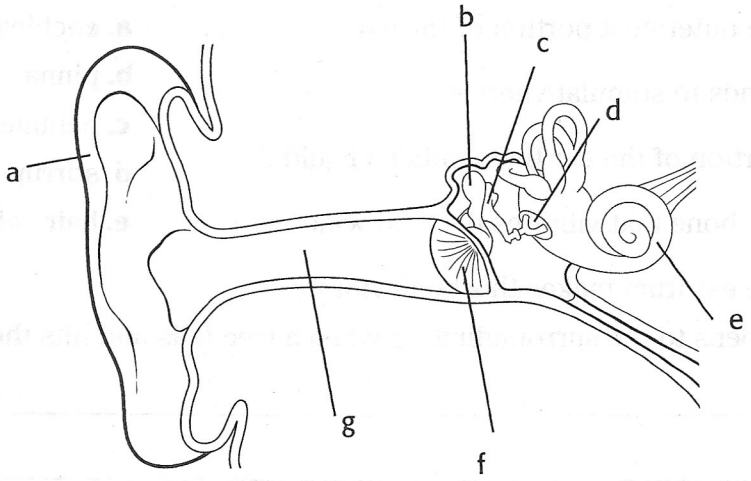
_____**13.** cochlea

_____**14.** eardrum

_____**15.** hammer

_____**16.** anvil

_____**17.** stirrup

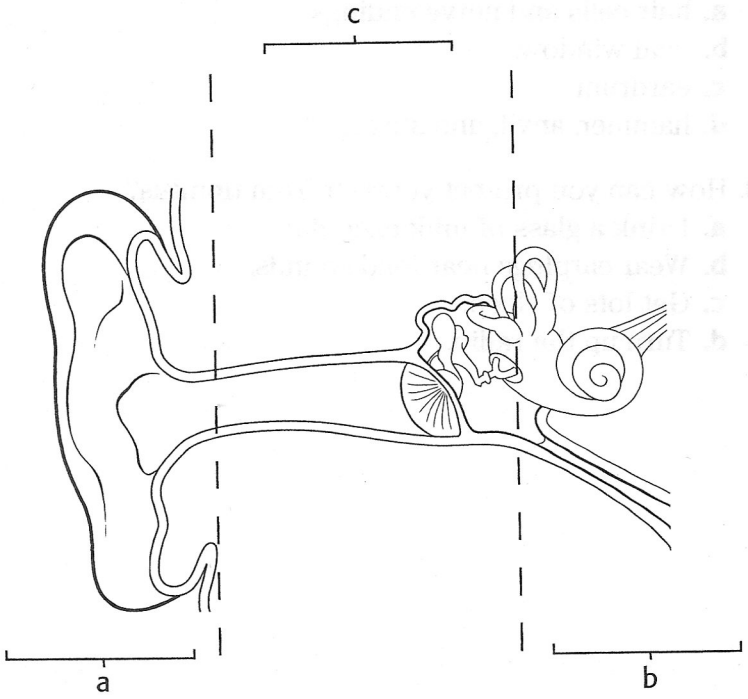


Match the labels to the parts of the drawing. Write the letters in the spaces provided.

_____**18.** middle ear

_____**19.** outer ear

_____**20.** inner ear



Match the correct definition with the correct term. Write the letter in the space provided.

_____**21.** the outermost portion of the ear

_____**22.** bends to stimulate nerves

_____**23.** portion of the ear that contains liquid

_____**24.** the bone that vibrates the oval window

_____**25.** the eardrum makes this bone vibrate

a. cochlea
b. pinna
c. hammer
d. stirrup
e. hair cell

26. What happens to the surrounding air when a tree falls and hits the ground?

_____

_____

HEARING LOSS AND DEAFNESS

_____**27.** Loud sounds can cause damage to the
- **a.** hair cells and nerve endings.
- **b.** oval window.
- **c.** eardrum.
- **d.** hammer, anvil, and stirrup.

_____**28.** How can you protect yourself from tinnitus?
- **a.** Drink a glass of milk each day.
- **b.** Wear earplugs near loud sounds.
- **c.** Get lots of sleep.
- **d.** Turn up the radio.

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: Properties of Sound

1. The differences between sounds depend on the properties of the

_____.

THE SPEED OF SOUND

_____ **2.** How quickly a sound reaches your ears depends on
- **a.** how loud or soft the sound is.
- **b.** the medium through which the sound is traveling.
- **c.** what causes the sound.
- **d.** the properties of the sound.

3. In general, what happens to the speed of sound as a medium cools?

_____

_____

4. What happens to particles as they slow down?

_____

_____

5. What did Chuck Yeager accomplish in 1947?

_____

_____

PITCH AND FREQUENCY

_____ **6.** A measure of how high or how low a sound is perceived to be is
- **a.** its pitch.
- **b.** its frequency.
- **c.** its speed.
- **d.** its medium.

_____ **7.** Pitch is NOT related to
- **a.** the frequency of the sound wave.
- **b.** the number of Hertz of the sound.
- **c.** the number of sound waves produced in a given time.
- **d.** how far away the source of the sound is from your ear.

_____ **8.** The sound produced by a dog whistle
- **a.** has a frequency too low for people to hear.
- **b.** has a pitch too low for people to hear.
- **c.** cannot be heard by a dog.
- **d.** is called an ultrasonic sound.

9. The apparent change in the frequency of a sound caused by the motion of either the listener or the source of the sound is the _____.

10. What happens to the sound waves from a moving source, such as a car with its horn honking, when the sound waves are moving in the same direction as the car?

_____

_____

11. How do the frequency and pitch of the sound seem to a person in front of a moving car with its horn honking?

_____

_____

12. How do the frequency and pitch of the sound seem to a person behind a moving car with its horn honking?

_____

_____

13. What happens to the pitch of the sound that the driver hears?

_____

_____

LOUDNESS AND AMPLITUDE

Match the correct description with the correct term. Write the letter in the space provided.

_____**14.** the unit used to express how loud or soft a sound is perceived

_____**15.** how loud or soft a sound is perceived

_____**16.** the maximum distance the particles in a wave vibrate from their rest positions

a. decibel
b. loudness
c. amplitude

"SEEING" AMPLITUDE AND FREQUENCY

17. What does an oscilloscope do?

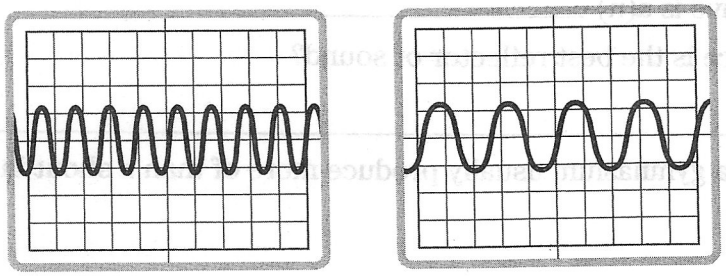
_____

_____

_____

_____

Look at the two sounds represented on the oscilloscope screens below. Then, answer the following questions.



18. How is the frequency of the sounds different?

_____

_____

19. How is the pitch of the sounds different?

_____

_____

20. What does the line on a graph from an oscilloscope represent?

_____

_____

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: Interactions of Sound Waves

REFLECTION OF SOUND WAVES

1. List two reasons why sounds are important to beluga whales.

_____

_____

2. The bouncing back of a wave after it strikes a barrier is called a(n) _____.

3. A reflected sound wave is a(n) _____.

4. What kind of a surface is the best reflector of sound?

_____

5. What will a shout in a gymnasium usually produce more of than a shout in an auditorium?

_____

6. The use of reflected sounds by animals such as bats to find objects is called _____.

7. How does the Doppler effect help bats find food?

_____

8. The process of using reflected sound waves to find objects is called _____.

9. What are three ways that sonar is used?

_____

_____

_____

10. The term for a medical procedure that uses echoes to "see" inside a patient's body is called _____.

11. What are three ways that ultrasonic waves can be used in medicine?

_____

_____

_____

INTERFERENCE OF SOUND WAVES

12. When two or more waves combine to form a single wave,

_____ occurs.

13. In _____ interference, two sound waves combine so that the compressions of one wave overlap the rarefactions of another wave to produce a softer sound.

14. In _____ interference, two sound waves combine so that the compressions of one wave overlap the compressions of another wave to produce a louder sound.

15. When an airplane travels faster than the speed of sound, a(n)

_____ is created.

16. Explain what happens when a jet flies at supersonic speeds.

_____

_____

_____

17. In a(n) _____, a pattern of vibration looks like a wave that is standing still.

RESONANCE

18. What is resonance?

_____

_____

19. Under what circumstances can a tuning fork cause a guitar string to vibrate without touching it?

_____

_____

20. How does a guitar use resonance to make sound?

_____

_____

_____

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: Sound Quality

_____ **1.** What is the difference between music and sound?

a. loudness
b. pitch
c. amplitude
d. sound quality

WHAT IS SOUND QUALITY?

2. Why do the same notes sound different on different instruments?

_____

_____

3. The result of several pitches mixing together through interference is

_____.

SOUND QUALITY OF INSTRUMENTS

_____ **4.** What causes differences in sound quality among different musical instruments?

a. interference
b. frequency
c. structural differences
d. standing waves

Match the correct instrument with the correct family. Write the letter in the space provided. Each family will be used more than once.

a. string instrument
b. wind instrument
c. percussion instrument

_____ **5.** drum

_____ **6.** guitar

_____ **7.** trumpet

_____ **8.** cello

_____ **9.** bells

_____ **10.** tuba

_____ **11.** clarinet

_____ **12.** banjo

_____ **13.** cymbals

_____ **14.** saxophone

_____ **15.** violin