Chapter 2

Book O

The Nature of Sound

Name _____Teachers_____
Class _____
Test Date ____3/6/2014_____

Chapter 2 –The Nature of Sound Outline
Section 1-What is Sound? p. 30 - 35

I. Sound and Vibrations

Note-Sound is caused by __vibrations_____. Vibrations are complete back and forth motion by an object.

A. Sound Waves

*Note-A __sound wave_____ is a longitudinal wave caused by vibrations and carried through a medium.

B. Sound and Media

*Note-Facts about sound:

1. Sound waves cannot travel through a __vacuum_____. (space)
2. Sound waves exist even if no one hears them.
3. Air particles vibrate along the path of a sound wave.

II. How You Detect Sound

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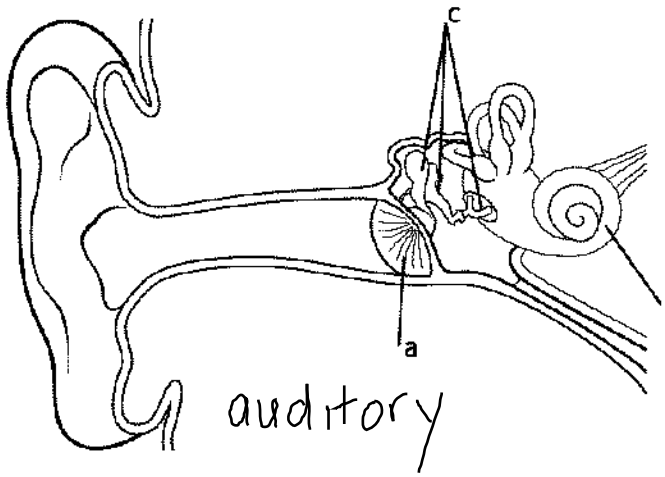


*d. __b

*a. __eardrum_____ -Sound waves cause the eardrum to vibrate.

*b. __cochlea_____-Movement of liquid inside the cochlea causes hair cells to bend.

*c. __hammer_____, __anvil_____, & _stirrup_____. Bones in the middle ear that increase the size of the vibrations. The stirrup vibrates the oval window.

Electrical signals are sent to the rain_____ through nerves.

A. Making Sound Versus Hearing Sound

III. Hearing Loss and Deafness

*Note- __Tinnitus_____-One of the most common types of hearing loss. Tinnitus results from long term exposure to loud sounds.

a. Protecting Your Hearing

Chapter 2 –The Nature of Sound Outline
Section 2-Properties of Sound p. 36 - 41

I. The Speed of Sound

*Note-The medium through which sound travels will affect its __speed_____.

A. How the Speed of Sound Can Change
Sound travels slowest through __gases__(air)_____.
Sound travels faster though ____liquid_____.
Sound travels the fastest through __solids_____.

II. Pitch and Frequency

*Note- __Pitch_____ is how high or low the sounds seems to the listener. Pitch is affected by the __frequency_____ of the sound waves.

A. Frequency and Hearing

*Note-Humans can hear sounds that have frequencies between 20 and 20,000 Hz. Sounds that are too high for humans to hear are called __ultrasonic sound___.

B. The Doppler Effect

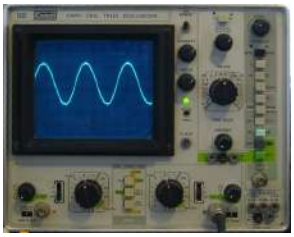
*Note-The __Doppler_Effect_____ is caused by the motion of the listener or the source of the sound.

III. Loudness and Amplitude

A. Energy and Vibration
B. Increasing Amplitude
*Note-The amplitude of a sound wave determines its ___loudness_____.
C. Measuring Loudness
*Note-The most common unit used to measure the loudness of sound is the ___decibels_____ (dB).

IV. Seeing Amplitude and Frequency

A. From Sound to Electrical Signal



Oscilloscope: changes a sound wave (longitudinal) to a transverse wave

Chapter 2 –The Nature of Sound Outline
Section 3 Interactions of Sound Waves

I. Reflection of Sound Waves

*Note-An __echo_____ is a reflected sound wave. Sounds waves reflect best off of smooth, hard surfaces.

A. Echolocation

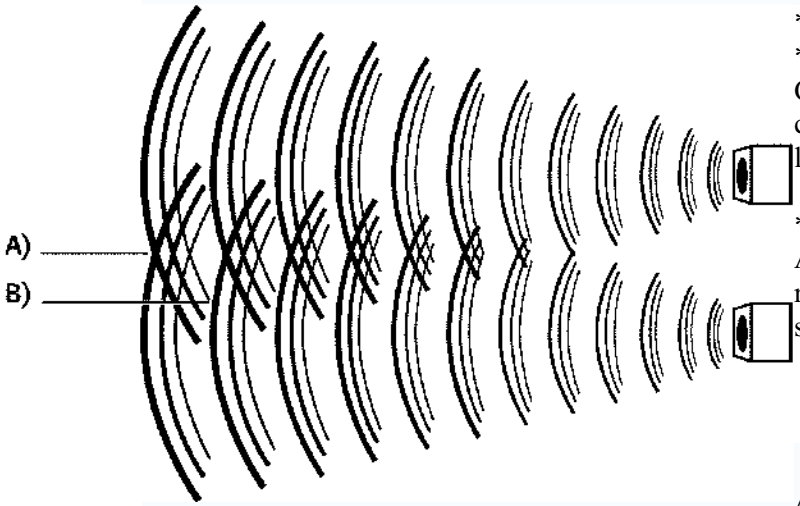
*Note-Some animals use ___echolocation_____ to find food or other objects.

B. Echolocation Technology

C. Ultrasonography

II. Interference Of Sound Waves

*Note-___Interference_____ is the combination of two or more waves that result in a single wave. Interference can occur when two instruments play the same note.



*Notes

*A-**Constructive Interference**-Compressions of one wave overlap compressions of another wave to create a louder sound.

*B-**Destructive Interference-**
As the compressions of one wave overlap the rarefactions of another wave, the sound will be softer because the amplitude is decreased.

A. Interference and the Sound Barrier

*Note-A person experiences a __sonic_boom_____ when the shock waves reach their ears.

B. Interference and Standing Waves

*Note- A __standing_wave___ is a pattern of vibrations that looks like a wave at rest.

*Note-See figure 8 on page 46-Frequencies two or more times the fundamental frequency are called __overtones_____.

III. Resonance

A. Resonance in Musical Instruments

*Note-___Resonance_____ is when the sound of one object causes another object to vibrate.

Chapter 2 –The Nature of Sound Outline
Section 4-Sound Quality

I. What is Sound Quality?
*Note-The blending of pitches through interference produces an instrument's ___sound quality_____.

II. Sound Quality Instruments

A. String Instruments

B. Wind Instruments
*Note-In a Wind Instrument ___vibrations____ cause standing waves inside its air column.

C. Percussion Instruments
*Note-__Percussion_____ instruments vibrate when they are struck.