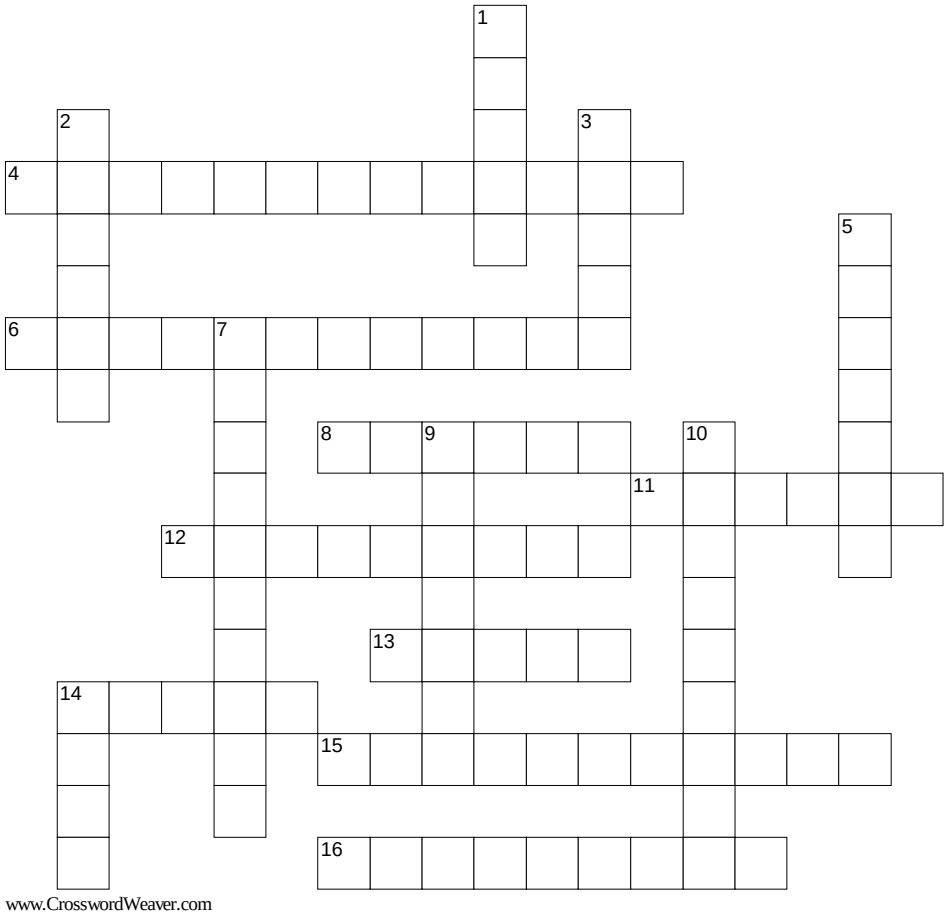
Review - Unit 12



Across

4 multiple echoes
6 "dead spots" in an auditorium are the results of destructive -
8 twice the frequency of a musical note
11 The pitch of a wind instrument depends on the ____ of the air column
12 the fundamental mode plus overtones
13 The frequency of the ____ overtone of a 100 Hz note is 600 Hz.
14 mixture of sound frequencies with a pattern
15 The _____ mode determines the pitch of a musical sound
16 whole number multiples of the fundamental mode

Down

1 pulsing sound as the result of interference of sound waves of slightly different frequencies
2 The first overtone of a note is the _____ harmonic
3 random mixture of many sound frequencies
5 Sound _____ depends on the number and relative intensity of harmonics
7 the bending downward of sound waves as they more into a layer of cool air is an example of -
9 Decreasing the ____ of a vibrating string lowers the pitch.
10 When a tuning fork matches the frequency of piano string, ____ occurs.
14 The pitch of a percussion instrument depends on -

PROBLEMS: Give the formula used!

1. What is the speed of sound in air when the temperature is -32°C?

2. How many seconds will it take a girl to hear her echo when she yells toward a mountain 220 m away (T = 10.0 ^0C)?

3. What is the wavelength of the sound of a wave produced in water by a 256 Hz tuning fork? The velocity of sound in water is 1497 m/s.

4. What is the intensity of a 450 w sound heard 26 m from the source?

5. Is an 80 dB sound twice as loud as a 40 dB sound? Explain.

FILL IN THE BLANKS:

1. Sound waves are _____, _____ waves, consisting of _____, and _____ rather than crests and troughs.

2. The frequency of a sound wave determines the _____ of the sound, and the amplitude determines the _____.

3. The velocity of sound waves depends on the _____.

4. _____ is characterized by a random mixture of frequencies with no readily identified pitch.

5. The upper limit of sound intensity is called the threshold of _____, and the lower limit is called the threshold of _____, which is 1.0×10^{-12} _____/_____ at 1000 Hz.

6. Compared to the speed of light, sound is much _____, and compared to the energy of light, sound is much _____.

7. Sound waves cannot travel in a _____.

8. Of the 3 phases of matter, sound travels the fastest in _____ and slowest in _____. Sound travels _____ in hot air than in cold air.

9. The _____ range of frequencies for the average human is 20- _____ Hz. Sounds of higher frequencies are called _____ and of lower frequencies are _____.

10. The _____ is the "dimensionless" unit for β which is relative _____.

11. Sound intensity is _____ divided by _____. It is the best measure of _____ of sound which cannot be measured exactly because of differences among people's ears.

12. Sound intensity _____ as the distance from the source increases.

13. Two equations involving the speed of sound are: v = _____ and v = _____.

14. The change in pitch of a sound as the source and observer move towards or away from each other is the _____ _____. Two practical applications are: _____ ; _____

15. _____ occurs when an outside force matches the _____ frequency of an object. The result is a dramatic increase in the _____ of the waves.

16. _____ can be heard when two tuning forks of different frequencies are sounded together. This results from constructive and destructive _____ of the two sound waves produced.

17. Echoes are _____ sound waves, and _____ are multiple echoes.

18. _____- One is the speed of sound. A _____ plane travels faster than sound. Trailing behind it is a _____ shaped region of compressed air producing a _____ _____.