

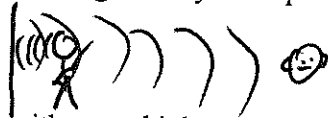
Name Key Date _____ Period _____

Physical Science B - Review for Sound Test

1. If the teacher is standing at the front of the room and turns to face the board you can still hear the voice.

A. Write about how the sound starts and what does it have to do to get to your ear
vibrations in throat, vibrates air molecules, which vibrate other molecules until it gets to your ear

B. Draw a small picture to go with your explanation.



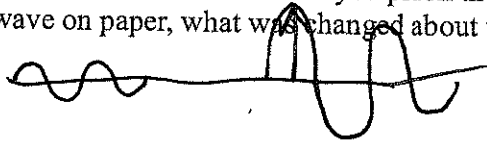
2. The teacher sings a song with some high notes and some low notes. What makes some notes high and some notes low? Give details.
vocal chords vibrate fast for higher notes

3. What is the equation relating the speed of sound, with wavelength, with... etc?

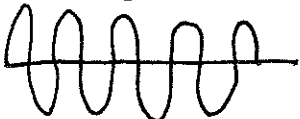
$$v = \lambda f$$

4. If you pluck the string lightly on a guitar it makes a sound. When you pluck the string harder the sound is louder. If we were drawing the wave on paper, what was changed about the drawing of the sound wave?

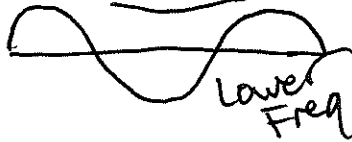
Amplitude



5. If you have two different sound waves, the wave that had a higher sound would have a different wavelength. How would the higher sound's wavelength be different from a sound that was lower?



High Freq

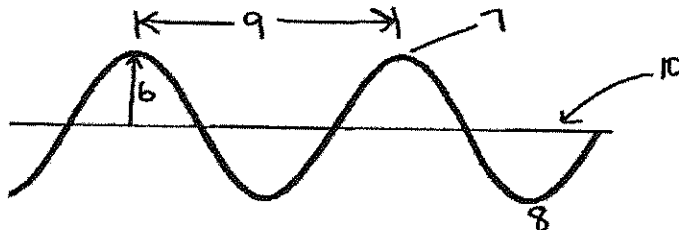


Lower Freq.

higher sound has shorter wavelength

Label the wave

6. amplitude
7. crest
8. Trough
9. wavelength
10. rest position



11. From slowest to fastest, how does sound travel in gas, solids, and liquid?

gas liquid solid
 Slowest *343m/s air* *1500m/s water* *5000m/s steel* Fastest

12. If swimmer A has one ear in the water and one ear out of the water, and swimmer B does a belly flop way at the other end of a very large pool, with which ear would swimmer A hear the splash first?

water ear. sound travels faster in water than air
 EXPLAIN why!

13. Sounds that are higher than human hearing are called ultra sonic

14. Sounds that are lower than human hearing are called Infra sonic

15. When ships use sound to show what is underwater, this is called Sonar
Sound Navigation and Ranging

16. What is an echo? and when can we hear one?
sound reflection but with a noticeable delay
when a sound reflects from a large surface over 100ft

17. What would be considered the low end for human hearing? 20 Hz

18. When the sound that a car makes is higher because it is coming towards you and lower when it goes away from you, this is called Doppler effect.

19. About how fast is the speed of sound in air? 343 m/s

20. How can you estimate how far lightning is away from you?
sound travels about 5 seconds per mile.
see lightning count seconds until thunder

21. If I increase the frequency of a sound, what effect do you notice about that sound?

Pitch is higher

22. In which kind of a wave does the matter or particles vibrate in a direction that is different than the energy travel?

vibration ↑ Transverse Compressional Longitudinal

energy →

23. What are the units for the loudness, or intensity, of sound? decibels dB

24. As you are standing on the side of the road, a fire truck goes by with its sirens blaring and you notice that a difference in the sound as it is driving away from you than it sounded when it was approaching you. Describe how they are different.

higher as it approaches then lower as it

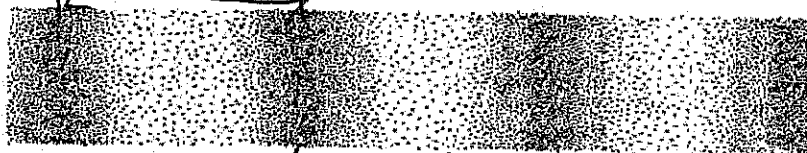
25. An echo can be used to calculate the distance of any object off in the distance. Fishermen use this technique all of the time to make their lives a little easier. They send down a sound wave through the water that reflects off the school of fish below their boat, and then the computer calculates how deep the fish are swimming. If the sound is sent out and it takes two seconds for the sound to travel there and back how deep are the fish? (Speed of sound in water is 1500 m/s)

$$v = \frac{d}{t}$$

$$d = vt = \left(\frac{1500\text{m}}{\text{s}}\right)(2\text{sec}) = 3000\text{m}$$

1500 m deep

26. Label a rarefaction, compression, and the wavelength of the wave below.



wavelength (arrow above wave)
compression (arrow pointing to dense area)
rarefaction (arrow pointing to sparse area)
how far it travelled (arrow pointing to the right)

27. Explain why sound cannot be heard in a vacuum? (NOT a vacuum cleaner, of course!)

no molecules to transfer the energy

28. What is the wavelength of a 512 Hz sound in air?

$\lambda = ?$ $f = 512 \text{ Hz}$ $v = 343 \text{ m/s}$ $v = \lambda f$ $\frac{v}{f} = \lambda = \left(\frac{343 \text{ m}}{\text{s}}\right) \left(\frac{1}{512}\right) = 1.67 \text{ m}$

29. If a 320 Hz wave was 1.34 m long, what would be the speed of the wave?

$v = \lambda f = 1.34 \text{ m} \left(\frac{320}{\text{s}}\right) = 428.8 \text{ m/s}$

30. How many waves of frequency 15,000 Hz would fit into a 2 meter long tube in our classroom?

$v = \lambda f$ $\frac{v}{f} = \lambda = \left(\frac{343}{15,000}\right) = .0228 \text{ m}$

$\frac{2 \text{ m}}{.0228 \text{ m}} = 67.46 \text{ waves}$

31. Instead of crests and troughs, as in an ocean wave, a longitudinal wave has compressions and rarefactions.

32. Waves in a rope are transverse waves because the medium's vibration is

90°, perpendicular sideways

33. In a transverse wave, wavelength is measured from crest to crest or from trough to trough.

34. To determine the speed of a wave, you must know the wave's wavelength and frequency.

35. To compare the energy of different waves, measure the amplitude of the waves.

36. If two waves collide and form a temporary larger wave, the interference is constructive.

37. You note a 6.0-second delay for an echo in a canyon. What is the distance to the wall of the canyon?

$v = \frac{d}{t}$ $vt = d = 343 \text{ m/s} (6 \text{ sec}) = 2058 \text{ m}$

$\frac{2058 \text{ m}}{2} = 1029 \text{ m}$

38. Sounds that are higher than the range of human hearing are called ultrasonic

39. Sounds that are lower than the range of human hearing are called infrasonic

40. If a plane flies at 700 m/s, what is its Mach speed? Mach 2.04 $\frac{700 \text{ m/s}}{343 \text{ m/s}} =$

41. What happens to pitch in a string if you:

Increase	Then pitch will:
String Length	Lower
String tension (tightness)	Higher
String Density (usually thickness)	Lower