

## Bonus Sound Energy Notes

1. Sound is: A disturbance that travels through some material (a medium) as a wave.

2. Sound waves are made by:

- 1.) A sound wave begins with a vibration
- 2.) The vibrations disturb nearby air particles
- 3.) As the sound keeps vibrating it pushes air particles together
- 4.) Air particles bounce back in opposite direction. They spread out.
- 5.) The particles travel through the air by pushing together and bouncing through the air as waves

3. Sound waves travel through many different materials (mediums):

Solids (doors), Liquids (water), Gases (air)

4. The speed of sound depends on the temperature and density of the materials (mediums) it's traveling through.

5. Sound cannot travel in a vacuum...or a place without oxygen (like space)

6. How does the state of matter influence the speed of sound?

It travels the slowest in gases and fastest in solids.

Why?

This is because the particles of solids are closer together than the particles of other states of matter so the sound vibrations bounce off those particles faster.

7. Why does a higher temperature lead to sound traveling faster?

-higher temperature, particles are moving faster

8. How does the density of a medium influence the speed of sound?

Density = how much matter or mass there is in a given amount of space or volume. The denser the medium, the more mass it has in a given volume.

Sound travels more slowly in denser materials. The particles of a dense material do not move as quickly as those a less dense material.

9. Behaviors of sound waves:

- 1.) They can reflect → echo
- 2.) Bend around corners → This is why you can hear someone who is talking in the hallway before you come around the corner. The person's sound waves bend and spread out around the corner.

10. How is sound measured?

The loudness of different sounds is compared using a unit called the decibel (dB).

0 dB is the loudness of a sound you can barely hear.

10 dB = rustling leaves

20 dB = a whisper

11. The frequency of a sound wave is how many times an object vibrates in one second. Frequency is measured in hertz.

12. Pitch = a description of how high or low the sounds seems to a person. Pitch depends on the Frequency of the sound wave

Sound waves with a higher frequency have a high pitch.

Example of an opera singer: Frequency = 1000 Hz or 1000 vibrations per second

13. The Doppler Effect: When a sound source moves closer or farther away from an observer, the frequency of the sound wave changes. The motion of the sound source adds motion to the wave so the frequency changes.