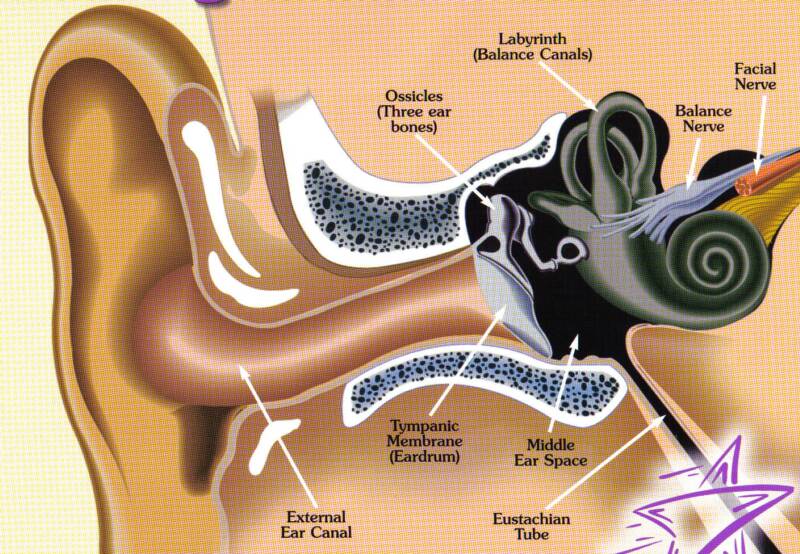
Note Guide: Sound waves

* What is sound?
* Sound waves are in all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Fluids are both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* People can hear from \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hz- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Hz
* The process of hearing is an intricate procedure.
* The Amazing Ear
* 
* There are sounds outside the limits of human hearing
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** sounds with frequencies lower than 20 Hz
  + Ex: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, wind, weather, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, cattle
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** sounds with frequencies higher than 20,000 Hz.
* **Dogs <45,000 Hz**
* **Cats <70,000 Hz**
* **Bats <100,000 Hz**
* Speed of Sound in Different Materials

|  |  |
| --- | --- |
| **Material** | **m/s** |
| Air (0°ͦ) | 331 |
| Air (20°) | 343 |
| Helium (0°) | 972 |
| Water (25°) | 1493 |
| Seawater (25°) | 1533 |
| Copper (25°) | 3560 |
| Iron (25°) | 5130 |

* Find the wavelength in air at 20° C of an 18 Hz sound wave, which is one of the lowest frequencies that is detectable by the human ear.
* What is the wavelength of an 18 Hz sound wave in seawater at 25°C?
* Find the frequency of a sound wave moving through iron at 25°C with a wavelength of 1.25m.
* A 2280 Hz sound wave has a wavelength of 0.655m in an unknown medium. Identify the medium
* Speed of Sound
* The speed of sound can change based on the medium and the temperature it is propagating through.

v = (331 + 0.6Tc)

* V = velocity (m/s)
* T = the air temperature in degrees Celsius
* Ex: On a cool October afternoon (air temp = 15 degrees) your seat on the centerfield stands 113m from first base, you watch a play at the World Series. You see the runner’s foot tag the base, half a second later you hear a baseman’s glove hit the base. Is he safe or out?