**SOUND**

**A. Sound**

1. Is a form of energy produced and transmitted by vibrating matter.

2. Travels in longitudinal waves.

3. Travels more quickly through solids than liquids or gases – A medium (media pl.) is the matter though which waves travel.

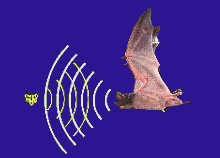
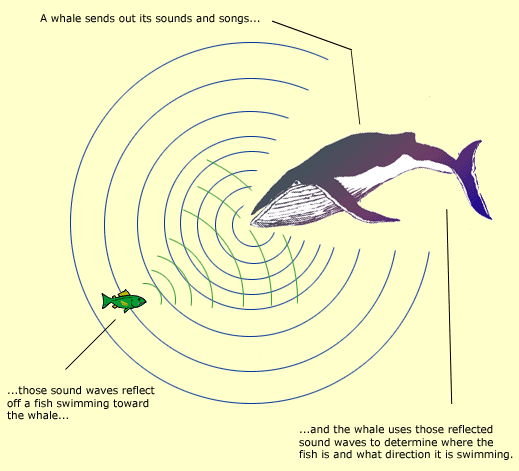
**B. Sound Waves**

1. **ALL** sound is carried through matter as sound waves.
2. Sound waves are alternating areas of high and low pressure in the air.
3. Sound waves move out in **ALL** directions from a vibrating object.

**C. Sonar**

1. An instrument that uses reflected sound waves to find underwater objects.

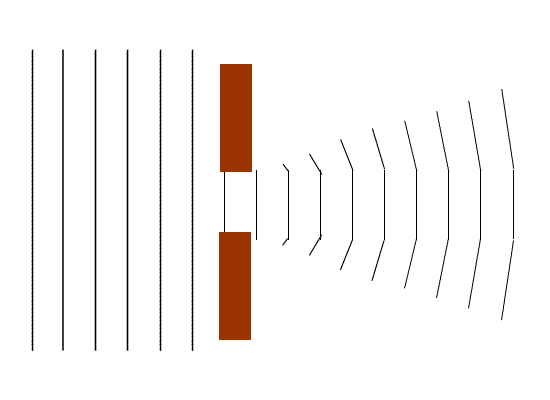
2. For example,

Animals use sonar or echolocation to find their prey; these sounds have such a high pitch or frequency that the human ear cannot hear them.

**D. Interactions of Sound Waves**

* **Reflection**
  + A reflected sound wave is called an echo.
  + The harder and smoother the surface, the stronger the reflection.
* **Diffraction**
* Sound waves can diffract, or bend, around corners and then spread out.

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**Interference**

* When sound waves meet and interact with each other.
* It can be constructive or destructive.

**Give ONE example of each type of interference**

Constructive: louder sound

Destructive: silence

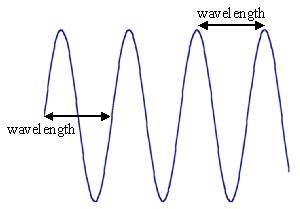
**E. Measuring Waves**

* Amplitude- volume of a wave (or height of a wave)
  + As wave height increases, volume increases
  + Measured in ***Decibels.***
* Frequency- *Pitch*, high or low (length of a wave)
  + As wavelength increases, pitch decreases.
* Measured in ***Hertz.***

**F. Wavelength & Frequency**

1. Wavelength is the distance between one part of a wave and the same part of the next wave.

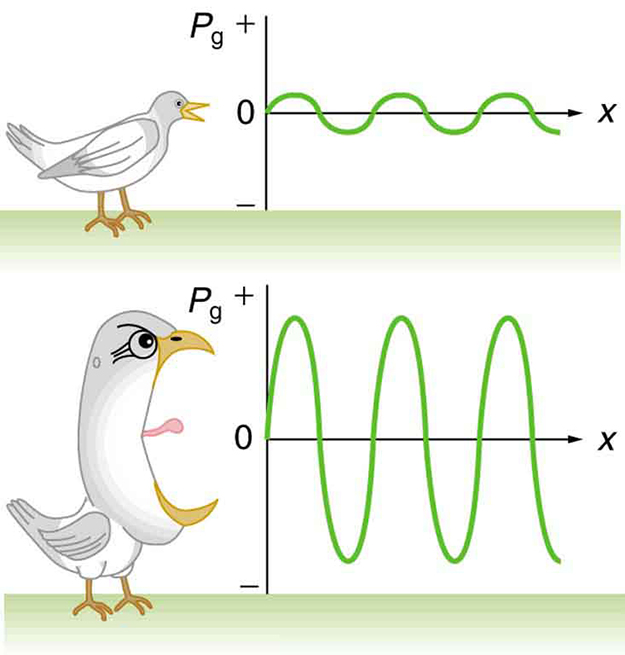
2. Frequency is the number of waves moving past a point in one period.

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**G. Volume**

1. Is a measure of how loud or soft a sound is.

2. Volume depends on the amplitude of the sound wave.

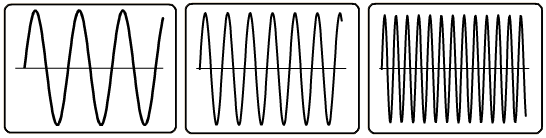
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**H. Pitch‎**

1. Is a measure of how high or low a sound is.

2. Pitch depends on the frequency of a sound wave.

3. For example,



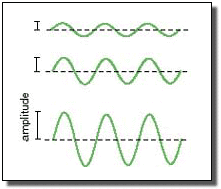
Low frequency High frequency

Low pitch High pitch

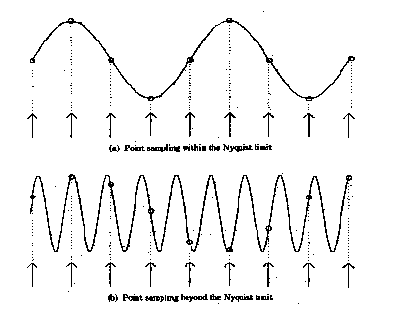
Longer wavelength Shorter wavelength

**Amplitude versus Frequency**

* Which one will have the higher *volume*?

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* Which one will have the higher *pitch*?

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**What can you hear?**

**Decibels (dB): Volume Hertz (Hz): Pitch or frequency**

* Normal Speech: 60dB - young people can hear frequencies between 20 – 20,000 Hz
* Library: 40dB
* Close Whisper: 20dB - dogs can hear frequencies that range from 67 – 45,000 Hz
* Jet Engine: 140dB
* Loud Rock Music: 110dB -as you age your ability to hear high frequency sounds decreases
* Subway Train: 100dB
* Busy Street Traffic: 70dB
* 120dB or above usually

causes pain to the ear

**Sound and Instruments**

* Instruments can be played at different pitches by changing the lengths of different parts of the instrument.
* Another way to make different pitches is to change the thickness of the of the material that vibrates.
* Remember…sound is a vibration.
* It is the back and forth movement of molecules of matter.
* Sound waves move through 3 parts of the ear; outer ear, middle ear, and inner ear.

**Show Sound and Hearing Power Point**

**Have students color and label the parts of the ear diagram. (Handout)**

**Teen hearing loss writing assignment**

**Infra sound article writing assignment**