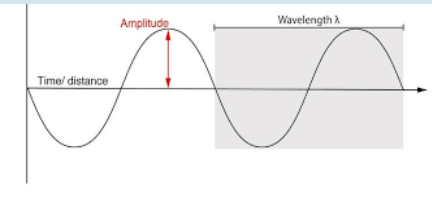
Sound Cheat Sheet

by Lucifer05 via cheatography.com/103888/cs/21396/

Important Terms



Amplitude - The maximum displacement of a particle of the medium on either side of its mean position.
Time period - The time taken by a particle to complete one vibration.
Frequency - The no. of vibrations made by a particle in one second.
Wavelength - The distance traveled by the wave in one time period of vibration of the medium.
Velocity - The distance traveled by the wave in one second.
Equations - $V = f \lambda$
$f = 1/T$

Factors Affecting Speed of Sound

Pressure and Density	$V = \sqrt{(\gamma P/d)}$
Tension and Mass (in a string)	$V = \sqrt{(T/m)}$

Differences between Light & Sound waves

Light	Sound
Electromagnetic waves	Mechanical waves
Can travel in vacuum	Cannot travel in vacuum
Speed = $3*10^8$ m/s (in air)	Speed = 330 m/s (in air)
λ is smaller	λ is bigger
Transverse waves	Longitudinal waves

Echo

The sound heard after reflection of the original sound from a distant object, after the original sound has ceased is called an echo. to create the perception of an echo the person must hear the sound at least 0.1 seconds after after the original sound is heard. the reason is that the stimulus persist for 0.1 s before stopping. Equation of Echo - d=Vt/2

Applications of Echos

Use by bats and dolphins - Bats produce sounds that get reflected back to them from the obstacles near them. After hearing the echo they get to know the the location of the obstacles and so fly safely even in the dark. The same principle is used by dolphins to hunt their preys.This is called sound ranging.

SONAR - it sands for **So**und **Na**vigation and **R**anging. It works on the principle of echo. Ultrasonic waves are sent in all directions and received after reflection. By the formula of echo the distance from the obstacle is calculated . The depth of the sea can also be found by this method this is called echo depth sounding.

Use in medical field - echo is also used for the imaging of internal organs. This is known as ultrasonography.

Reverberation

It is a phenomenon by which sound is prolonged because of multiple reflections of the sound.

Natural, Damped & Forced Vibrations

Natural vibrations - The periodic vibrations in a body in the absence of any external force is called natural or free vibrations. In this sort of vibration the body vibrates with the same frequency and amplitude forever. This is the vibration of a body in an ideal condition.

Damped vibrations - The periodic vibrations in a body of decreasing amplitude in presence of a resistive force. The vibrating body loses energy in the form of heat energy.

Forced vibrations - The vibrations in a body which take place under the influence of an external periodic force acting on it.

Resonance - It is a special case of Forced vibrations. When the frequency of the externally applied periodic force on a body is equal to its natural frequency, the body begins to readily vibrate with an increased amplitude.

Loudness

It is the characteristics by which a loud sound can be distinguished from a feeble one, when both have the same pitch and quality. It is also known as Intensity . it is associated with the amplitude of the sound . $L \propto A^2$

Pitch

It is the characteristic of sound by which a shrill note can be distinguished from a flat note of the same loudness. It is also called shrillness. It is associated with the frequency of the sound.

By **Lucifer05**
cheatography.com/lucifer05/

Published 13th December, 2019.
Last updated 13th December, 2019.

Quality

It is the characteristic which distinguishes the two sounds of the same loudness and pitch because of different wave forms. It is associated with the wave form of a sound wave.

By **Lucifer05**
cheatography.com/lucifer05/

Published 13th December, 2019.
Last updated 13th December, 2019.