

Physics of Speakers

"Who knew they were that simple!"

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Physics of Sound

What is sound?

Sound is a mechanical wave of **pressure** travelling through a medium.

Vibrating objects displace air to generate sound.

Physics of Sound

How are sounds different?

Amplitude is the height of the wave (volume)

Frequency is how fast the
wave oscillates (pitch)

Physics of Sound

Frequency is measured in **Hertz (Hz)**

1Hz is 1 vibration every second

The range of human hearing is
20Hz to 20kHz

Electromagnetism

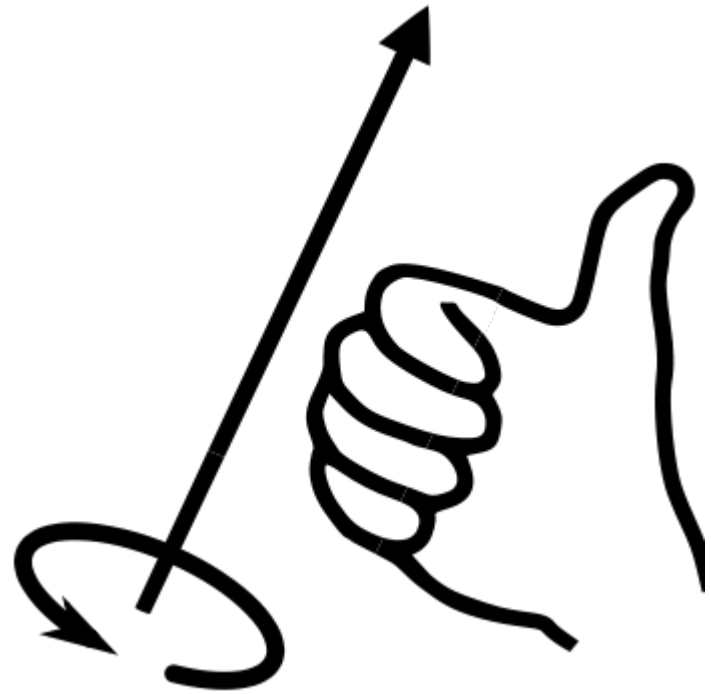
A **magnetic field** can be generated by current flowing through a wire

These magnetic fields behave the same as permanent magnets

The strength of the magnetic field is:

$$B = \frac{\mu_0 I}{2\pi r}$$

Electromagnetism



The direction of the magnetic field follows the **right hand rule**

Reversing the current reverses the magnetic field

Electromagnetism

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<http://hyperphysics.phy-astr.gsu.edu/hbase/magnetic/solenoid.html>

A **solenoid** is a tight coil of wire

The magnetic field of a solenoid is very strong in the center, where the fields are aligned

The strength of the central field is:

$$B = \mu_0 \frac{N}{L} I$$

Remember...

Sound is caused by vibrating objects

Magnetic fields can be generated using
electricity