

## SOUND AND LIGHT ENERGY

### What Is Sound?

**Sound** is a type of energy that travels in waves which are caused by vibrations.

### How Does Sound Travel?

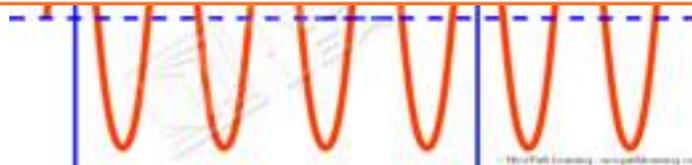
Sound needs something in which to travel. Sound can travel through solids, liquids, and gases. Sound travels through solids the fastest.

### Characteristics of Sound



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- **Pitch and Loudness:** the highness or lowness of a sound.
- **Frequency:** The number of vibrations in a period of time is called the **frequency** of a vibration. The faster the vibration, the higher the frequency. Frequency is measured in Hertz (Hz).
- **Volume:** The loudness or quietness of a sound is its **volume**. The loudness of a sound can be measured in units called **decibels**.

## Measurement Examples of Various Sounds

- a whisper = 10 decibels
  - normal conversation = 60 decibels
  - a train = 100 decibels
  - rock concert = 110-140 decibels
- **Reflection and Absorption:** Reflection is when sound bounces off an object. An echo is a reflected sound. **Absorption** is when sound is taken in by an object.

## What is Light?

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the visible spectrum which include red, orange, yellow, green, blue, and violet. On the visible spectrum, as you move from the colors on the right to the colors on the left, wavelength decreases and frequency increases.



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Visible Spectrum



## Invisible Waves

Most waves in the **electromagnetic spectrum** are invisible to our eyes. X-rays and waves in your microwave that cook your food are examples of electromagnetic waves.

## What is a concave lens?

A **concave lens** is **thinner in the middle** than on its edges. We use a concave lens to make things look **smaller**.



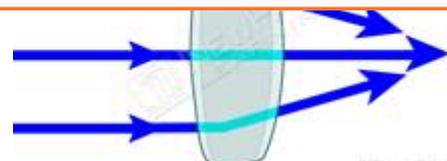
The diagram shows a concave lens with parallel light rays entering from the left. The rays are shown diverging as they pass through the lens, which is thinner in the center and thicker at the edges.

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The diagram shows a convex lens with parallel light rays entering from the left. The rays are shown converging as they pass through the lens, which is thicker in the center and thinner at the edges.

## Transparent, Translucent and Opaque Materials

A **transparent** material allows light to pass through clearly without any effects, such as a window.

A **translucent** material allows light to pass through it, but it is not clear. Wax paper is translucent.

An **opaque** material does not allow any light to pass through at all, such as a brick wall.