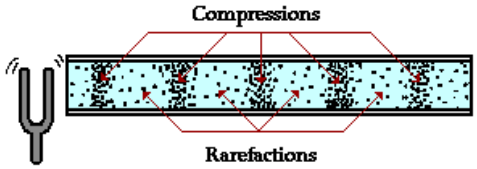
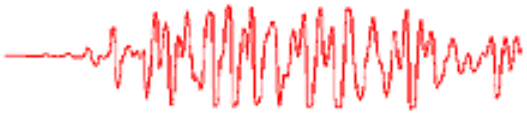


“WAVE” STUDY GUIDE

FOR: MRS. GROM’S SCIENCE CLASS



BY: MRS. CAMUTO

THE TWO TYPES OF WAVES!

- **LONGITUDINAL** | **TRANSVERSE**

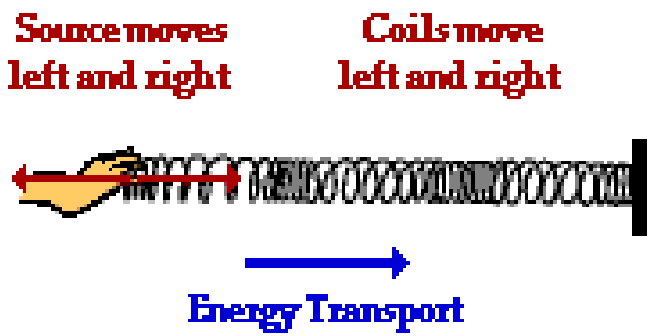
1.) **COMPRESSIONS –** (close together)
Represented by the coils of the spring being CROWDED TOGETHER.

2.) **RAREFRACTION –** (far apart)
Represented by the coils of the spring that are SPACED APART.

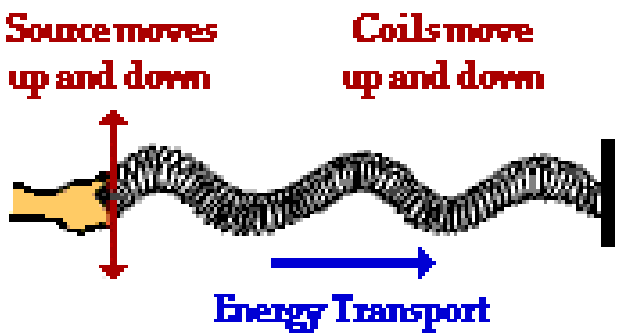
1.) **CREST -** (highest point)
Represented by the coils of the spring where there is a MAXIMUM DISPLACEMENT UPWARD of the particles.

2.) **TROUGH –** (lowest point)
Represented by the coils of the spring where there is a MAXIMUM DISPLACEMENT DOWNWARD of the particles.

Longitudinal wave



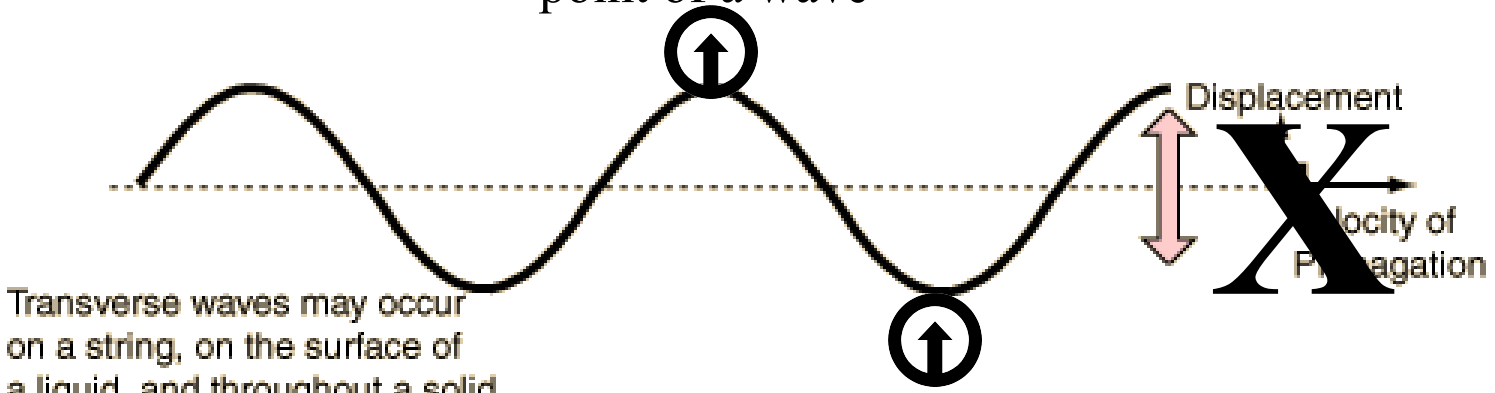
Transverse Wave



The subsequent direction of motion of individual particles of a medium is the same as the direction of vibration of the source of the disturbance.

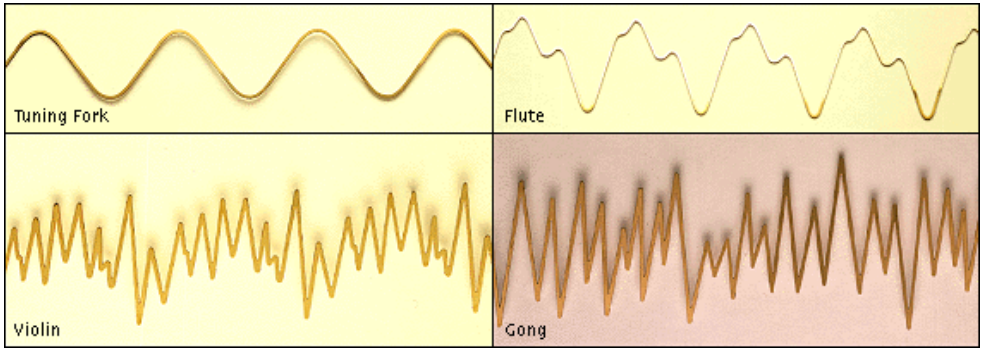
TRANSVERSE WAVES

CREST - highest point of a wave

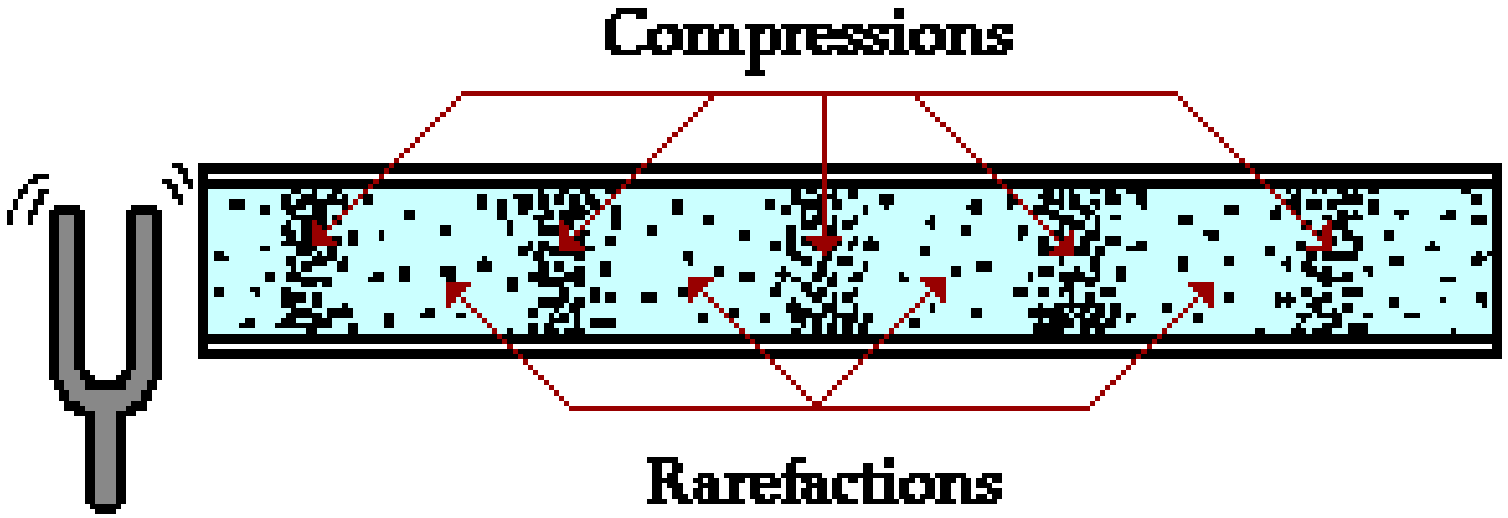


TROUGH - lowest point of a wave

In this type of wave, the **MOTION of the WAVE and the DIRECTION of the wave are at RIGHT ANGLES.**

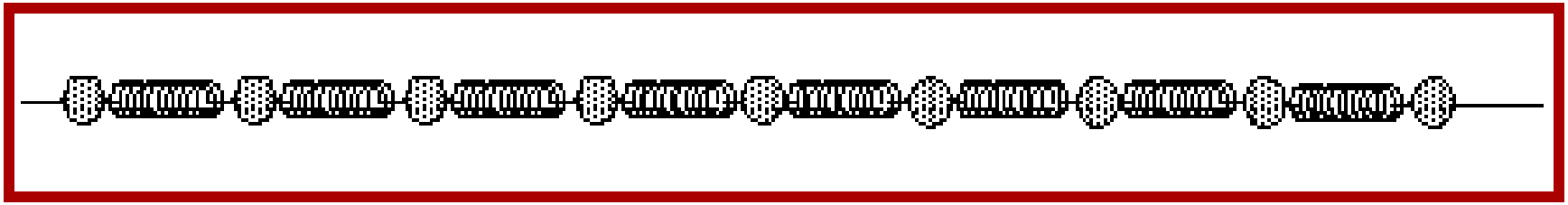


PARTS OF THE LONGITUDINAL WAVE



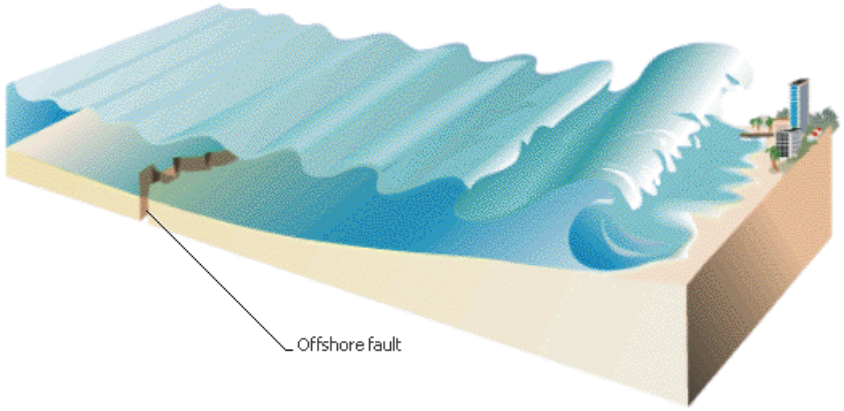
COMPRESSIONS – part of the wave where the particles are CLOSE (crowded) together.

RAREFRACTIONS – part of the wave where the particles are SPACED APART.



WHAT IS A WAVE?

Waves **CAN BE** transmitted through **ALL PHASES OF MATTER** (solid, liquid and gas)



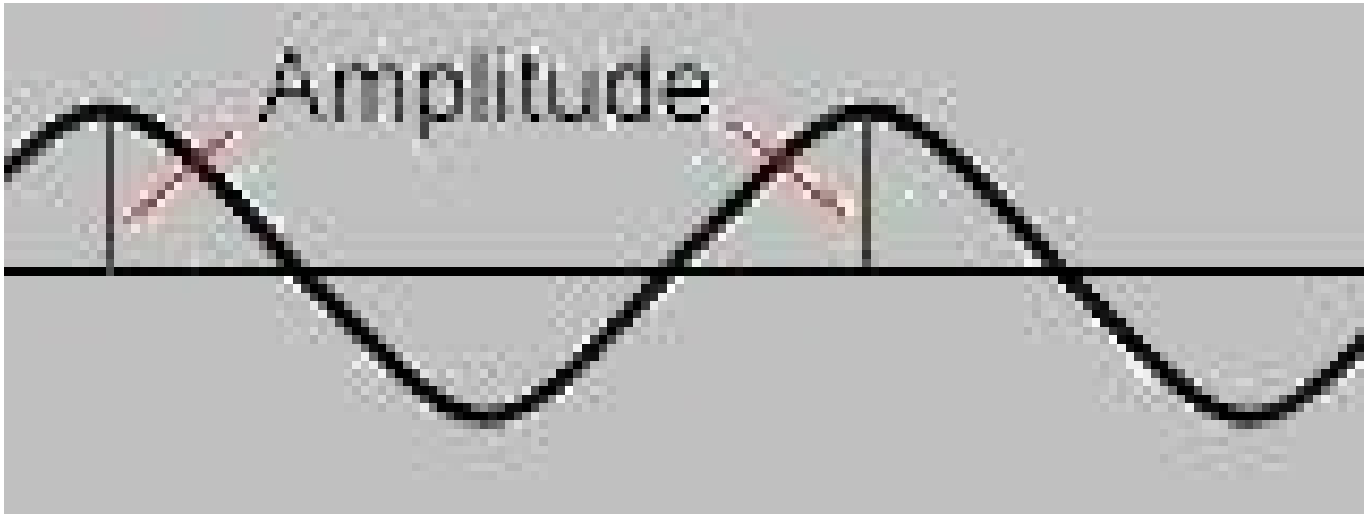
- **A wave is** - ANY DISTURBANCE that **causes energy to travel from place to place. In other words, ALL WAVES TRANSFER ENERGY THROUGH A MEDIUM.**
- **WAVES** are created when a **SOURCE OF ENERGY** causes a **MEDIUM to VIBRATE**.
- All waves, however, **share certain basic characteristics:**
  - **ALL WAVES HAVE:**

1.) amplitude
2.) wavelength
3.) frequency..

AMPLITUDE

Amplitude

- The maximum distance the medium (the material through which a wave travels) moves away from its rest position. The higher the wave moves up-and-down as it vibrates, the larger the amplitude of the resulting waves.
- In simple terms,
  - **AMPLITUDE IS THE HEIGHT OF THE WAVE!**
- **Waves with high energy have a LARGE amplitude.**
- **Waves with low energy have a SMALL amplitude.**



WAVELENGTH!

WAVELENGTH –

The distance between two consecutive (one after another) SIMILAR points on a wave; in other words,

***a measurement from one **crest** or **trough** to the next on a wave is called the wavelength.

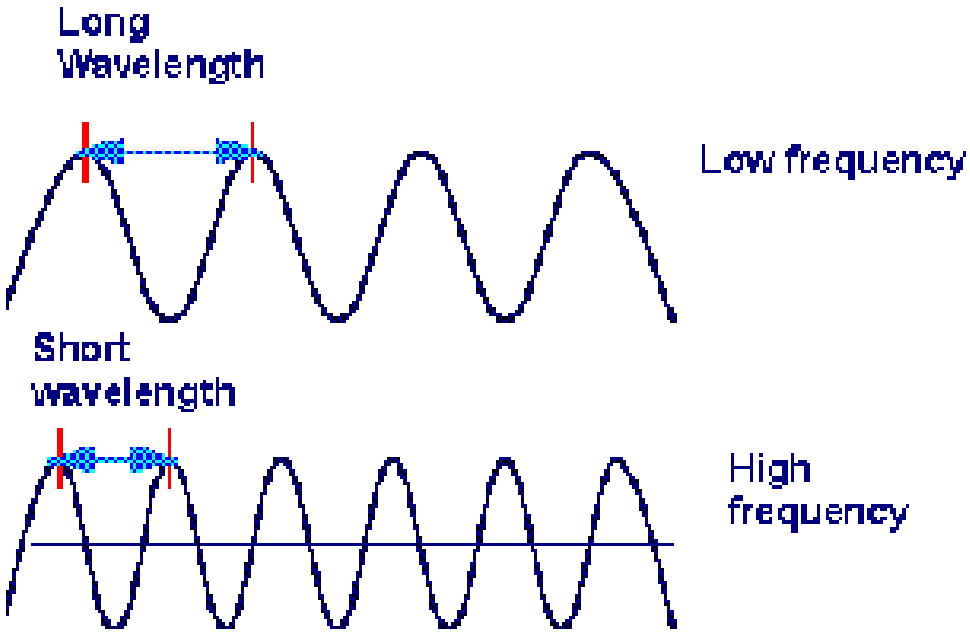
The wavelength can be measured from any point on a wave as long as it is measured to the same point on the next wave.

This is ONE wavelength.

This is ONE wavelength

These are measured in METERS.

FREQUENCY



FREQUENCY -

the number of complete waves, or complete cycles, per unit of time

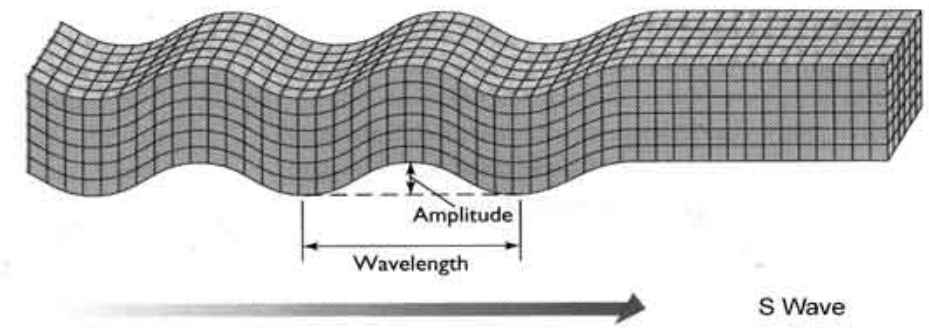
Because every complete wave has one crest and one trough, you can think of the frequency as the number of crests or troughs produced per unit time.

The unit used to measure wave frequency is called the hertz (Hz).

HERTZ is the SAME as ONE WAVE PER SECOND!

WAVES NEED A MEDIUM!

Remember: this medium **will NOT move as a whole** as the ENERGY is transmitted through it.



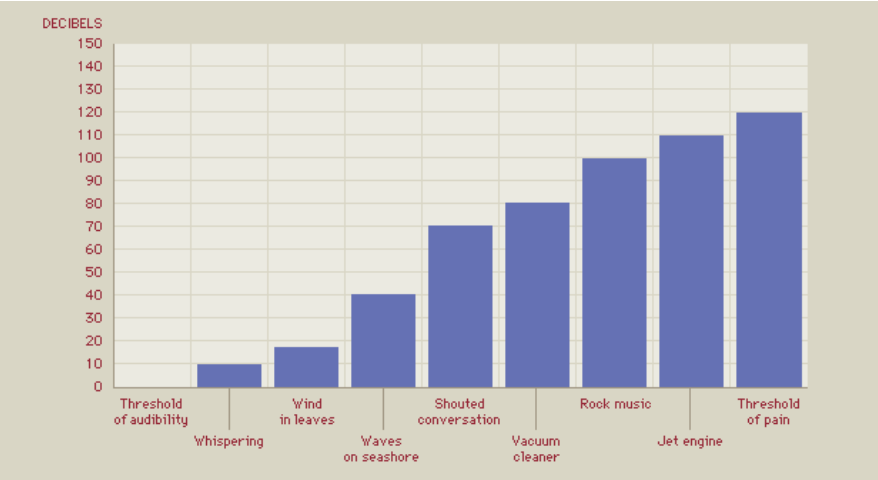
- **MEDIUM –**
- the material through which a wave travels through –
- This includes **ALL phases of MATTER**.
- **TYPES OF MEDIUMS** –
  -LAND
  -WATER
  -AIR

SOUND WAVES

- A sound wave is different than a light wave in that a **sound wave is not capable of traveling through a vacuum.**

(in other words, SOUND cannot travel through outer space.)

******SOUND WAVES become PAINFUL at 120 decibels.**

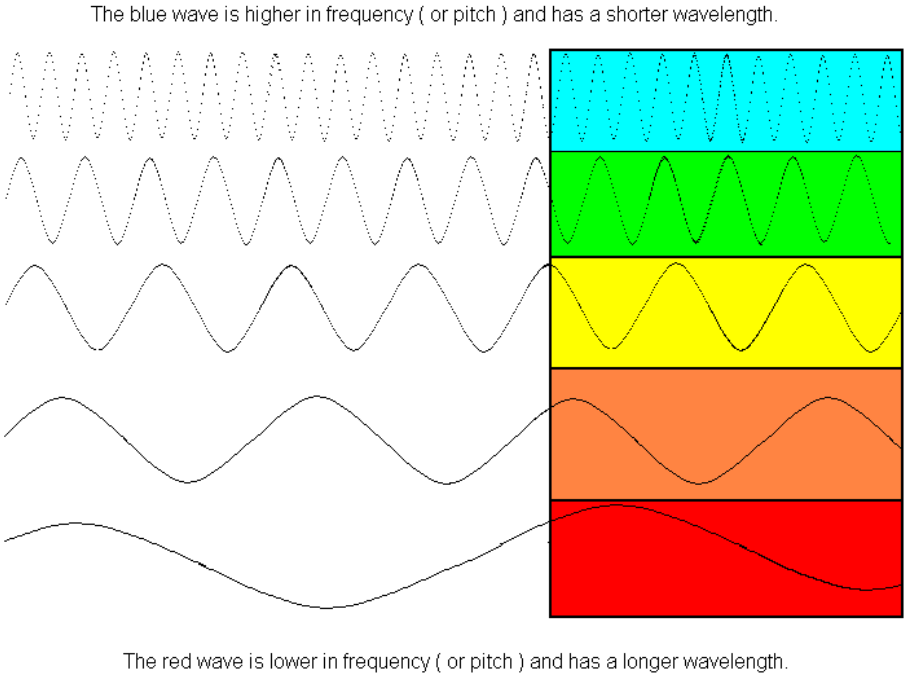


Sound is a Mechanical Wave

MECHANICAL WAVES

MUST have a MEDIUM to travel / pass through.

ELECTROMAGNETIC WAVES



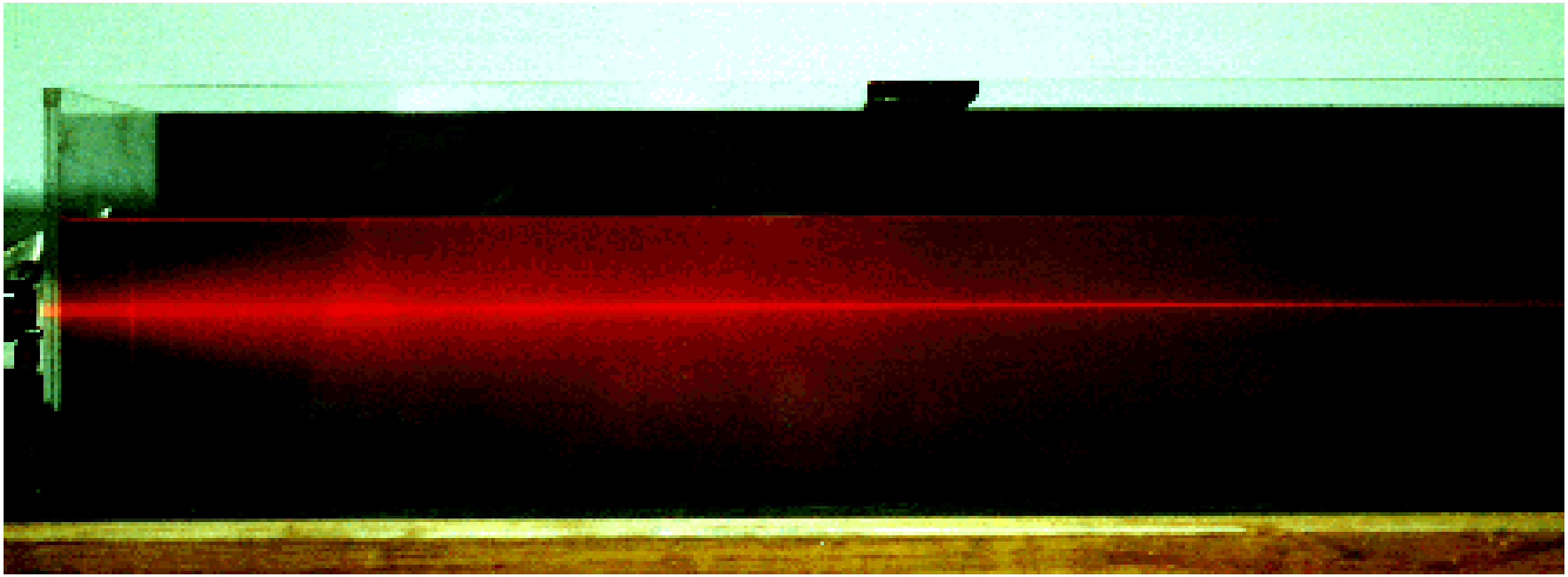
- An **electromagnetic wave** is a wave which is capable of transmitting its energy through a vacuum (i.e., empty space).
- **All light waves** are examples of electromagnetic waves.
- LIGHT can travel through outer space!

LIGHT WAVES

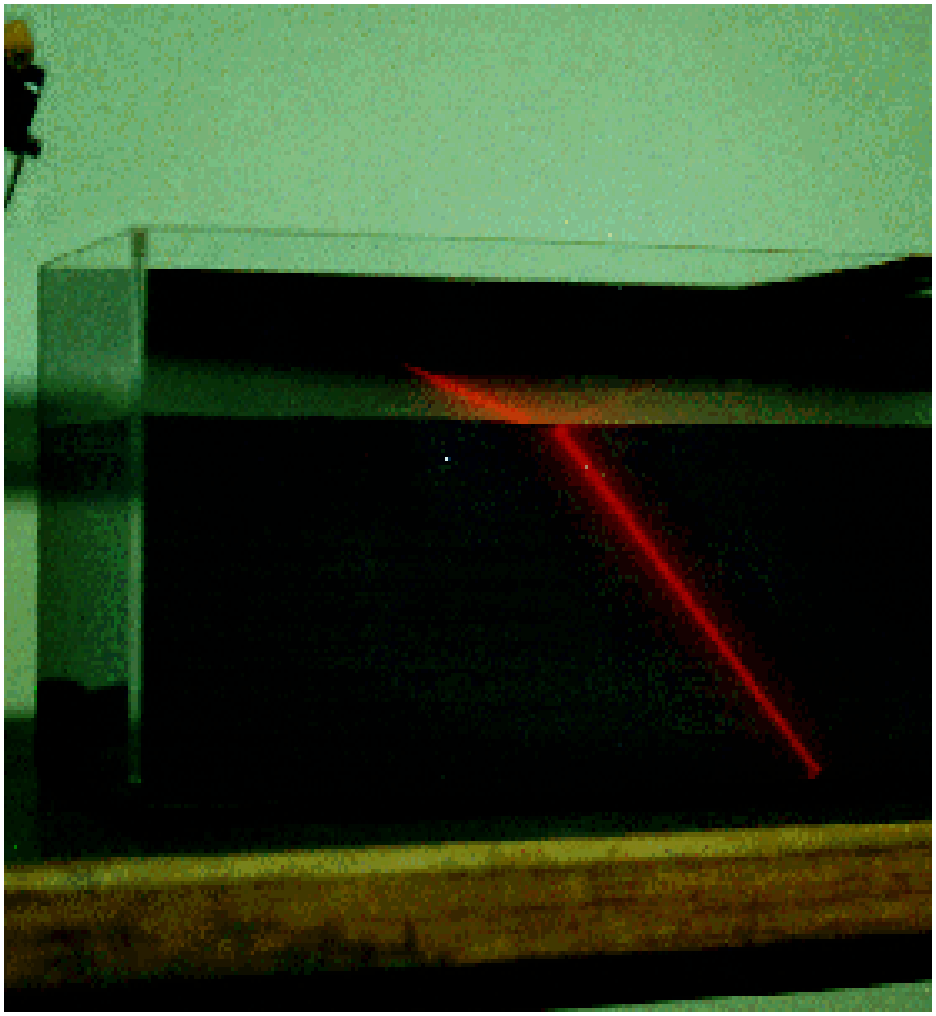
Light waves can pass through many media: air, water, glass, to name a few.

Light waves **do not need any medium to travel.**

Sunlight, moonlight, and starlight pass through the vacuum of outer space to reach us.



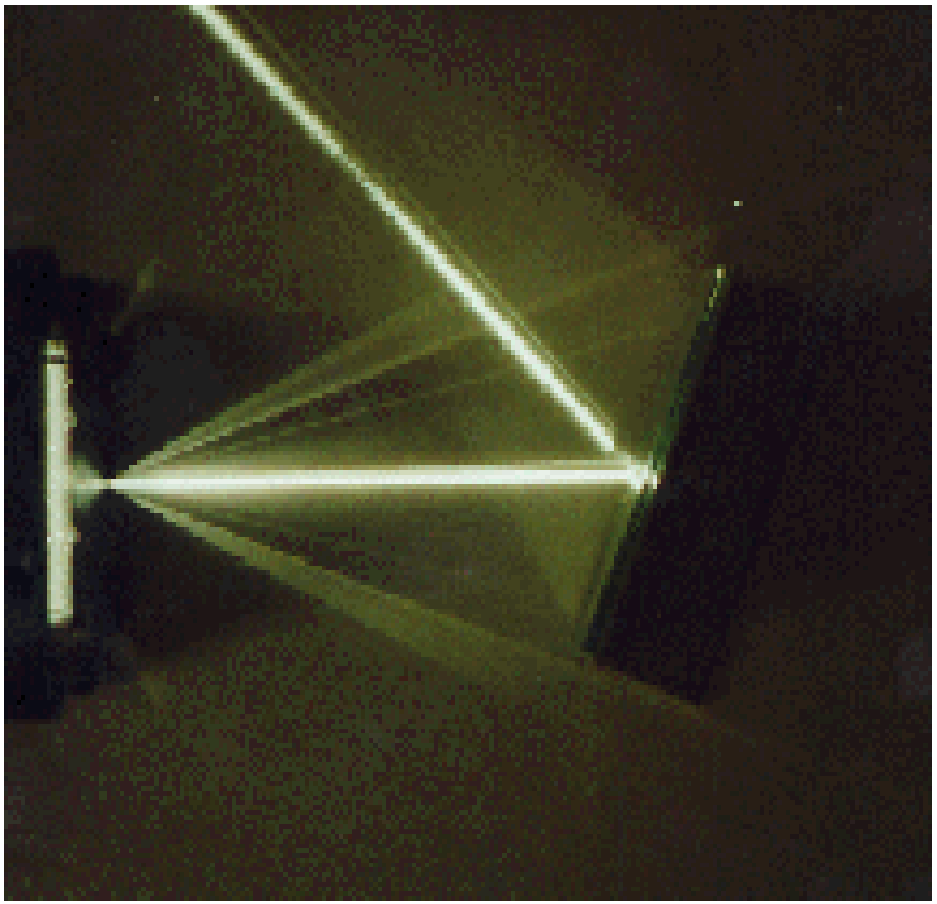
REFRACTION



- Re**frac**tion occurs when light passes into a transparent material.

- An example of this is when a **PENCIL SEEMS TO BEND** when you place it in a glass of water!

REFLECTION

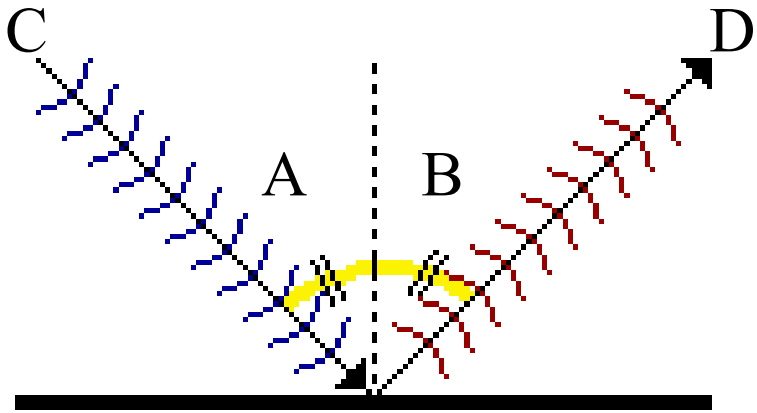


- Re**flec**tion occurs when light bounces off an opaque material.

- **IN OTHER WORDS –**

The wave STRIKES the boundary and bounces back!

LAW OF REFLECTION



Light waves follow the "law of wave reflection."

- In this law the ANGLE OF INCIDENCE is EQUAL TO the ANGLE OF REFLECTION.

C = the INCIDENT WAVE

A = the ANGLE OF INCIDENT

B = the ANGLE OF REFLECTION

D = the REFLECTED WAVE

When a WAVE strikes a barrier, it can be **ABSORBED** or **REFLECTED.**