

Name: _____ Date: _____ Period: _____

Waves:

- A transfer of energy from place to place through matter or space

Medium:

- Material through which a wave travels
- Solid, liquid, or gas
- Mechanical waves require a medium to travel through

Mechanical Waves:

- Waves that form when a source of energy causes a medium to vibrate
- Need a medium – cannot travel through empty space

Types of Mechanical Waves:

1. Longitudinal
2. Transverse

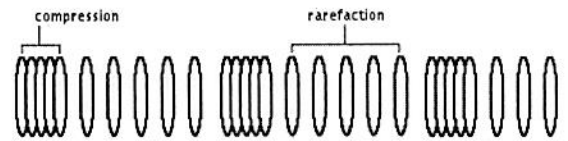


Figure 1: Longitudinal Wave

Longitudinal Wave:

- Vibrates the medium in the same direction in which the wave travels
- Example: sound waves

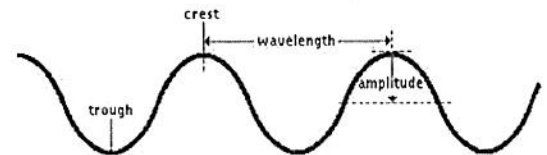
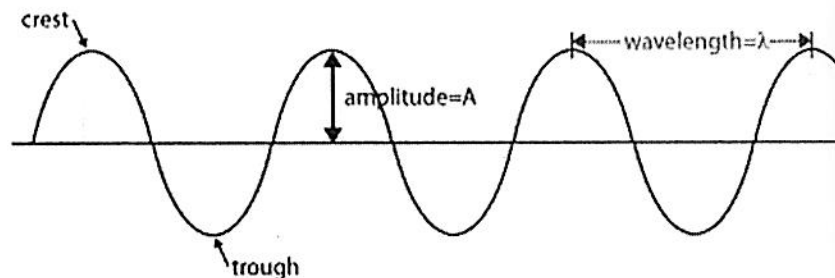


Figure 2: Transverse Wave

Transverse Wave:

- Vibrates the medium at right angle (perpendicular) to the direction in which the wave travels
- Example: seismic (earthquake) waves



Characteristics of Transverse Waves:

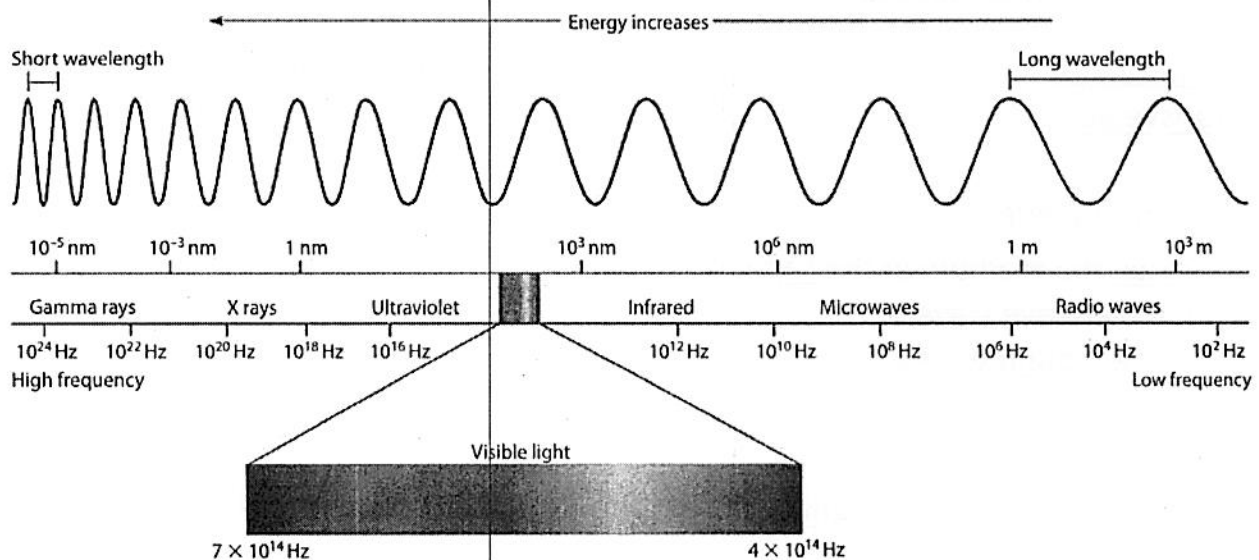
- Crest – high point on a wave
- Trough – low point on a wave
- Amplitude – height of a wave's crest
- Wavelength – distance between two crests or two troughs of a wave
- Frequency – number of waves that pass a given point every second measured in Hertz (Hz)

Electromagnetic Waves:

- Energy that is transferred through matter or space by transverse waves

The Electromagnetic Spectrum is made up of:

1. Radio waves – for broadcasting radio signals, safest with longest wavelength
2. Microwaves – for cooking, speed radar (radio detection and ranging), communications/cell phones, GPS (Global Positioning System)
3. Infrared rays – heat lamps, infrared camera
4. Visible light – light we can see
5. Ultra violet (UV) rays – high energy, cause sun burns, needed for skin to produce vitamin D needed for healthy bones and teeth
6. X-rays – used to image bones and teeth, too much exposure can cause cancer
7. Gamma rays – most dangerous with shortest wavelength, used in medicine



How waves change direction:

1. Reflection – bouncing of waves off a surface
2. Refraction – bending of waves due to a change in speed
3. Diffraction – bending and spreading of waves as they move around a barrier

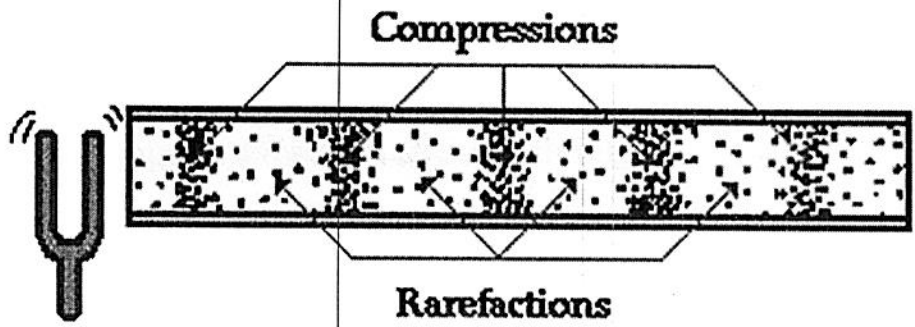
Seeing color:

- The color an object appears depends on the colors of light it reflects
- For example, a red book only reflects red light

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Sound Waves:

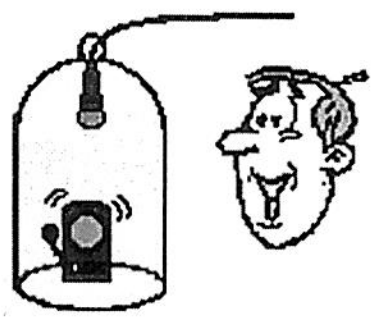
- A disturbance that travels through a medium as longitudinal waves



- Compressions – areas where particles are close together
- Rarefactions – areas where particles are spread out
- Wavelength – distance from one compression to the next compression

Can you hear the sound of a bell inside a vacuum?

The sound produced by the bell cannot be heard since sound cannot travel through a vacuum- it needs a medium



Why do we see lightning before we hear thunder?

- Speed of light = 300,000,000 m/s
- Speed of sound = 330 m/s

How can we tell how far away a storm is?

- Every 5 seconds between seeing the flash and hearing the thunder is 1 mile away