

UNIT 2: WAVES

PHYSICS 20
SEPTEMBER 20, 2010

What are Waves?

- A **wave** is a periodic energy disturbance moving from one location to another
- A **pulse** is a single energy disturbance moving from one location to another location
- Three types of waves
 1. Mechanical
 2. Electromagnetic
 3. Matter

What are Waves?

- **Mechanical** waves travel through a medium

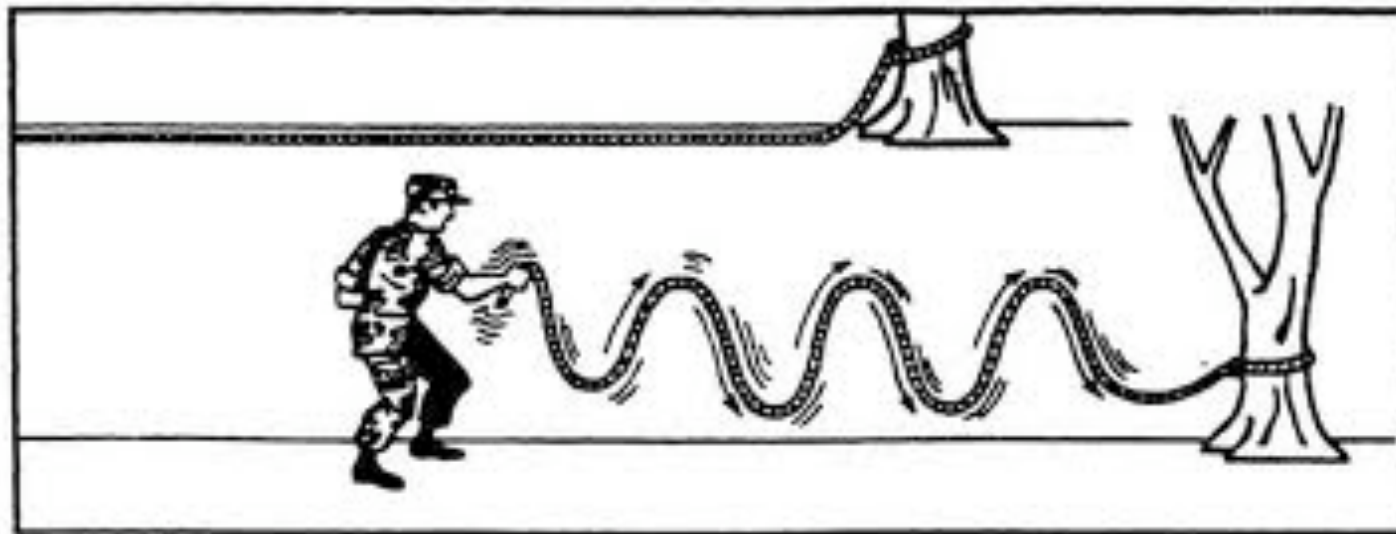
Wait.... What's a medium???

A **medium**:

- is anything that a wave travels through.
- carries a disturbance from one location to another
- i.e. : in a water wave the medium is water; in a sound wave the medium is air; in a slinky wave the medium is the slinky; what about doing "the wave" at a stadium?

What are Waves?

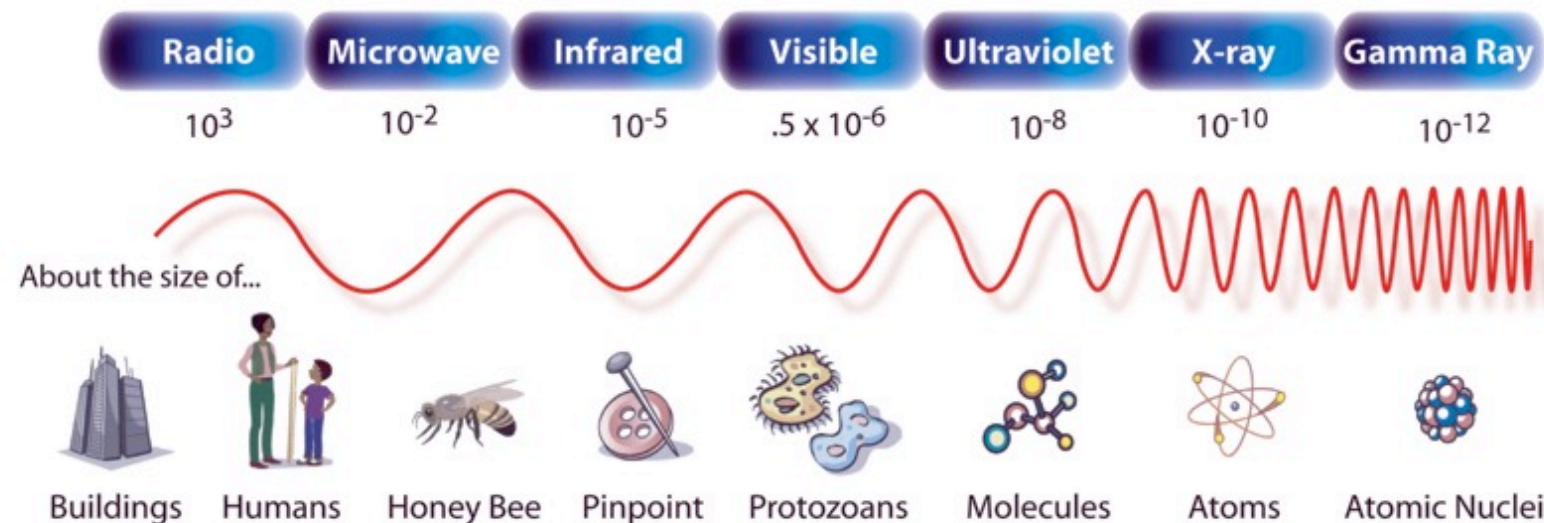
- **Mechanical** waves travel through a medium
- Remember: Waves are moving energy NOT matter!
- i.e. water waves, sound waves, waves along a rope



We will focus on these types of waves for this unit

What are Waves?

- **Electromagnetic** waves:
- do not need a medium to travel
- travel at the speed of light
- cannot be directly observed
- i.e. light waves, radio waves, x-rays



What are Waves?

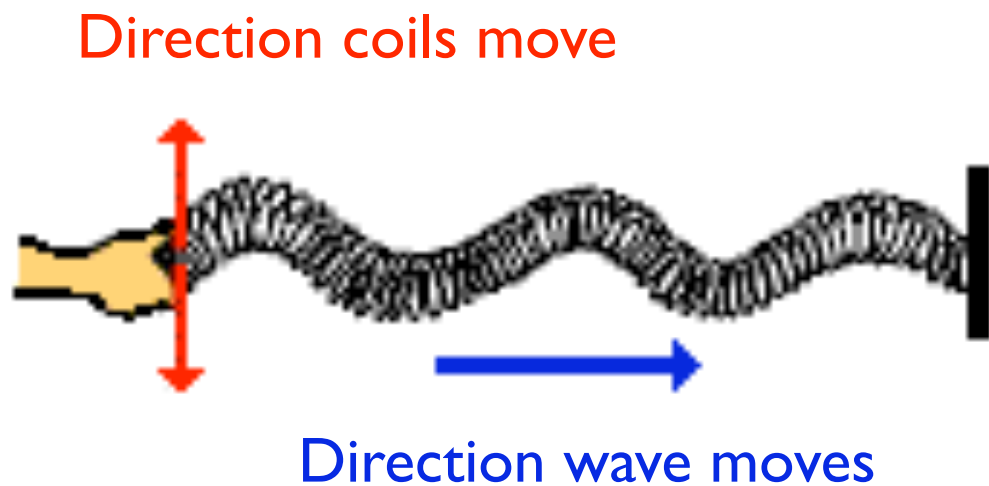
- **Matter** waves are electrons and other similar particles which exhibit wave-like properties.
- Quantum mechanics is used to describe matter waves.
- We will not be studying these types of waves in Phys 20

Mechanical Waves

- There are two types of mechanical waves based on how they travel through and disturb the medium.
 - Transverse
 - Longitudinal

Mechanical Waves

- **Transverse** waves occur when the particles in the medium vibrate at right angles to the direction the wave moves.
- i.e. think of how piano or guitar strings vibrate



Mechanical Waves

- **Longitudinal** waves occur when the particles in the medium vibrate in the same direction the wave moves
- i.e. think of a sound wave, or a traffic jam

