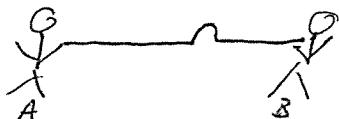


# Aim: Introduction Waves/Pulses

Day 1

Rope-Demo  
Public will jolt student B



Waves - Transmit energy without transmitting matter

## Types of Waves

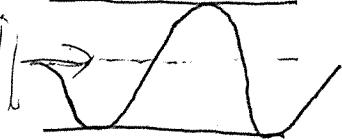
Mechanical Water Waves  
Sound Waves 330 m/s  
Waves along a rope } require a material medium to travel

Electromagnetic Light waves  
radio waves  
x-rays } Speed  $3 \times 10^8$  m/s ~~constant speed~~  
constant rate through space  
(Do not need medium to travel)

Math Wave Wave like behavior of particles. Ex. Electrons

## Mechanical Waves (A Closer Look)

1) Traverse Waves



Guitar String

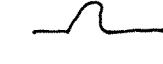
Rope we did in last experiment

Particles move  $\perp$  to the direction of the wave

2) Longitudinal Wave - Particle moves  Ex Compressed Spring (sound wave)

$\parallel$  to the direction of the wave

3) Surface Wave Particles move both  $\perp$  and  $\parallel$  (mix of 1&2)

Wave Pulse - A single traveling movement Ex Toss rope 

Wave - A regular pattern of motion along a rope 

Need - springs, jump rope. Waves - transmit energy without transmitting matter

Types of Waves

Mechanical - Water waves, Sound waves = constant  $330 \text{ m/s}$ , Waves along a Spring or rope } require a material medium.

other types

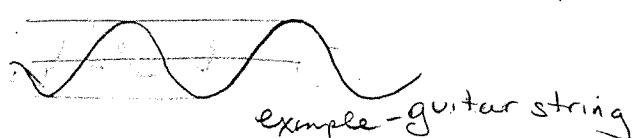
electromagnetic - light waves, radio, " X rays } Speed  $3 \times 10^8 \text{ m/s} = \text{const}$  rate through space

matter wave - wave-like behavior of particles (such as electrons)

### Mechanical waves

(1) transverse wave

particles move  $\perp$  to the direction of the wave



example - guitar string

(2) longitudinal wave

particles move  $\parallel$  to the direction of the wave.

example - compressed string.  
- sound wave

(3) surface waves

particles move  $\perp$  and  $\parallel$   
mixture of (1) and (2)

*Jens' graphique  
Rope, what happens to the  
particles? more of  
them?*

motion of particles  
a sudden jerk of the rope causes  
single traveling wave pulse

a regular pattern of motion along a  
rope causes a traveling wave.