

A wave is a Periodic Disturbance.

In a wave, information & Energy MOVE from point A to point B but NO Matter or "object" makes that trip.

THREE Main types of WAVES:

★ • Mechanical

Require a MEDIUM through which to propagate.

Ex: Sound, H₂O, Slinky

• Electromagnetic

No MEDIUM Required.

All EM waves travel w/ SPEED c in a vacuum. [$c \approx 3 \times 10^8 \text{ m/s}$]

Ex: Light, Radio waves, X-rays, Microwaves...

• MATTER

A property of atomic & subatomic particles.

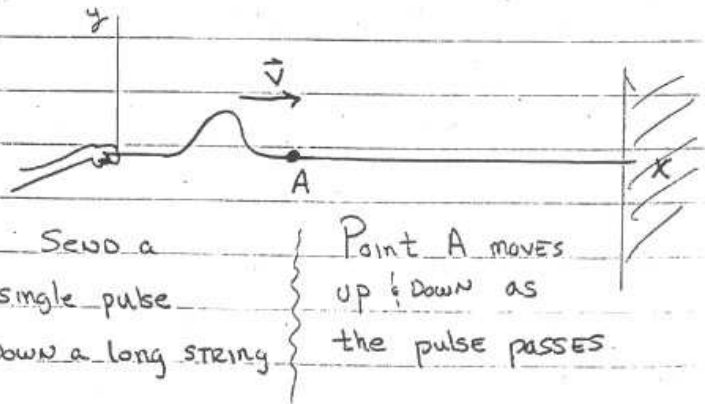
Ex e^- , p^+ .

* CLASSIFICATION OF (Mechanical) WAVES * ^{our interest}

1) Transverse

2) Longitudinal

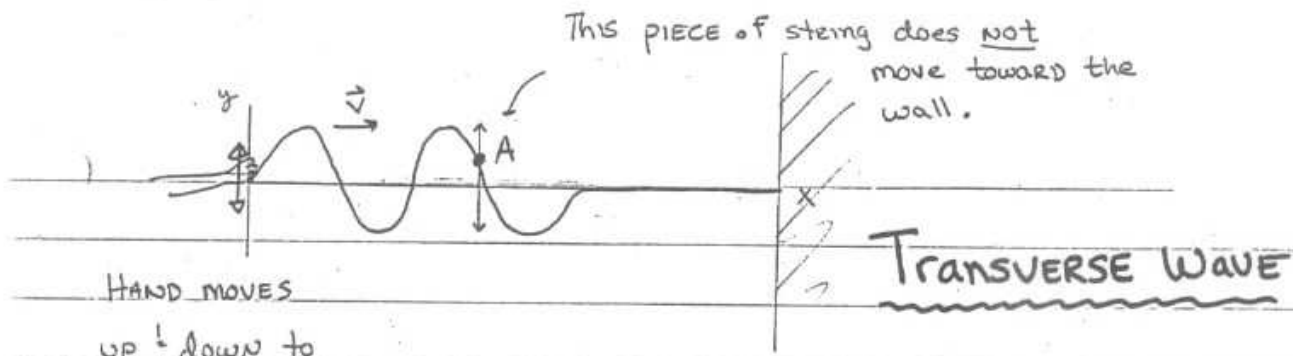
① Transverse :



We say the pulse moves w/ SPEED v .

Send a single pulse down a long string

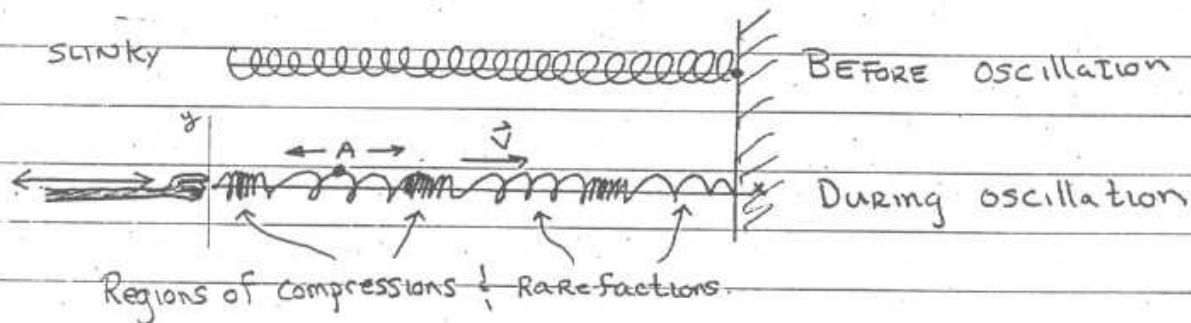
Point A moves up & down as the pulse passes.



HAND MOVES
up & down to
create continuous
sinusoidal waves.

* Although the wave travels to the right w/ speed v , each point (A) on the string oscillates in a direction that is transverse (\perp) to direction of wave travel. *

[2] Longitudinal wave: (slinky) The MEDIUM through which the wave travels oscillates in a direction that is longitudinal (parallel) to the direction of wave travel.

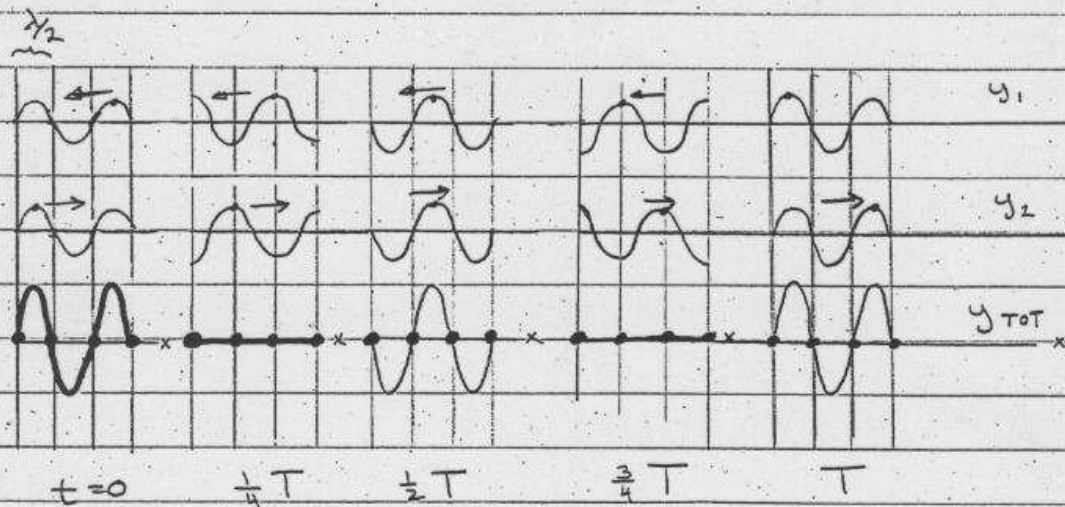


Point A oscillates back & forth, parallel to the wave velocity.

* Both Transverse & Longitudinal waves are said to be TRAVELING WAVES because the wave travels from one point to another.

STANDING WAVES

- 1) Consider two sinusoidal waves (same y_m & λ) traveling in OPPOSITE directions, along a taut string. 4-19
What is the resulting wave form?



There ARE places along the string, called NODES, where the string is always at rest.

Regions of Maximum Amplitude are called ANTINODES.

* THERE ARE NO NODES OR ANTINODES IN A TRAVELING WAVE! *

The resultant wave patterns (y_{TOT}) are called STANDING WAVES because the wave patterns do NOT move left or right. The locations of the maxima & minima do NOT change.

- ∴ If two sinusoidal waves of the same Amp & wavelength travel in opposite directions along a stretched string, they interfere to produce a STANDING WAVE.