

traveling waves

medium

Ocean

water surface

transverse

Sound

air

longitudinal

radio. ("electric field")

transverse

light

longitudinal

seismic

rock

transverse

blood pressure

artery walls

transverse

traveling wave



$L \gg \lambda$

long

tight

string

- string is waving in the y -direction
- disturbance (wave) is moving in the x -direction

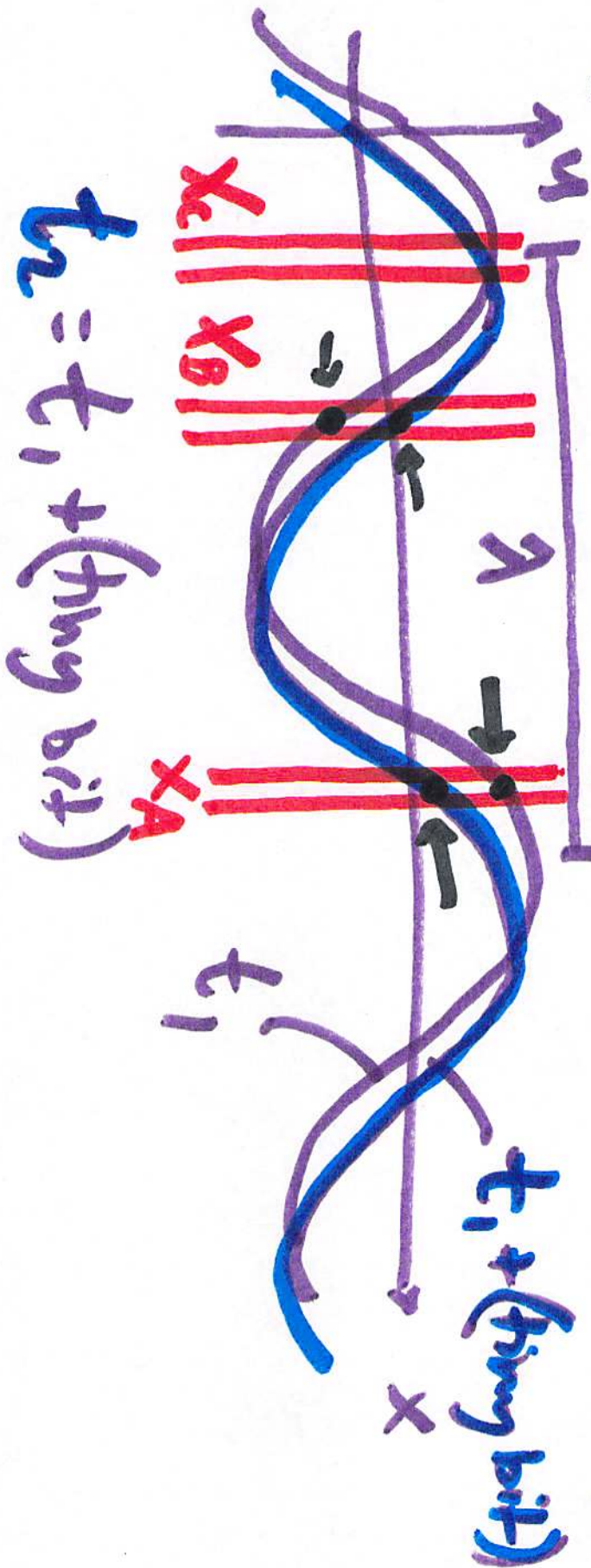
Snapshot of the wave at time t_i

$$y(x,t) = A \cos\left(\frac{2\pi x}{\lambda} - \frac{2\pi t}{T}\right)$$

$$= A \cos(kx - \omega t)$$

Snapshot @ time t_1

$$y(x) = A \cos\left(\frac{2\pi x}{\lambda} - \phi\right) \quad \phi \equiv \frac{2\pi t_1}{T}$$

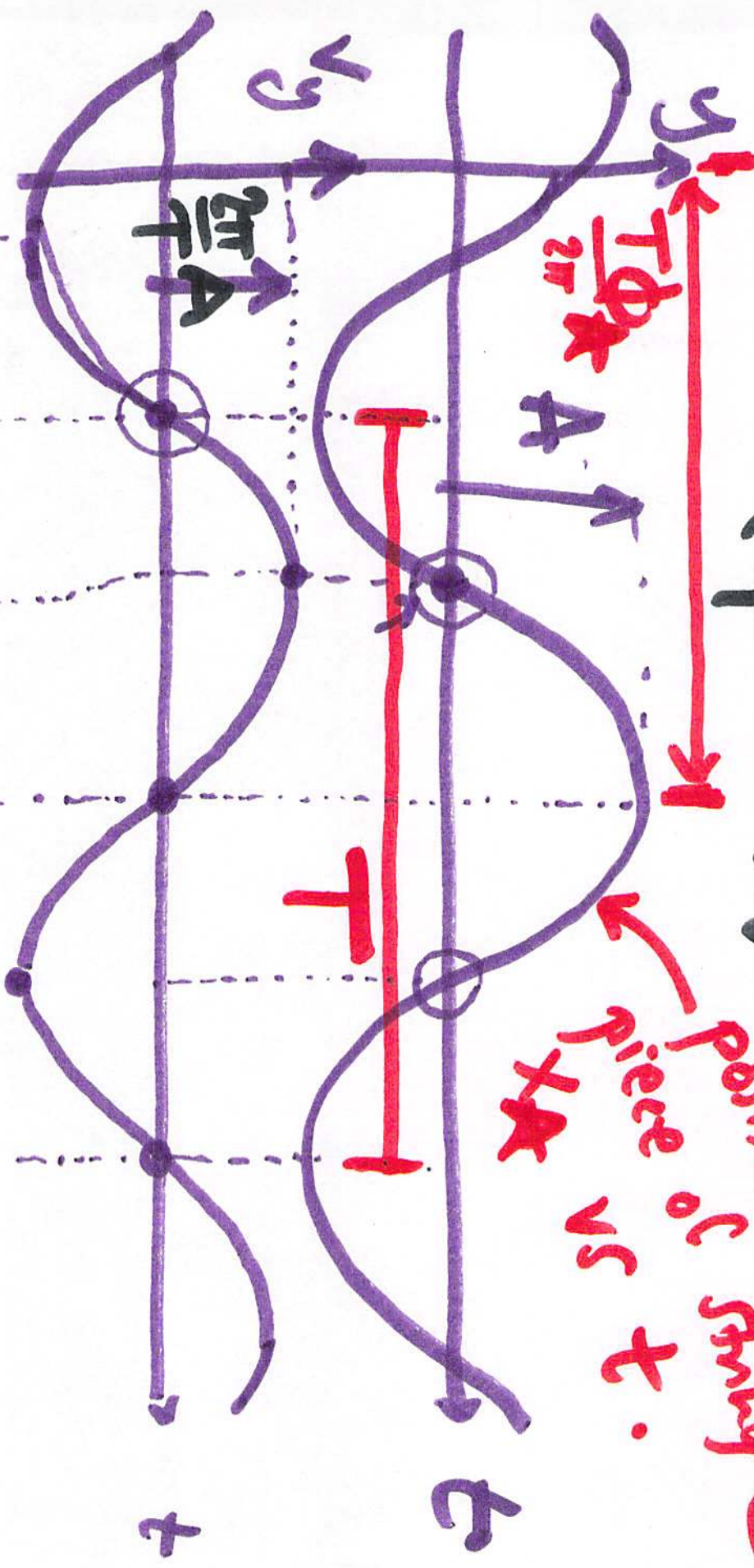


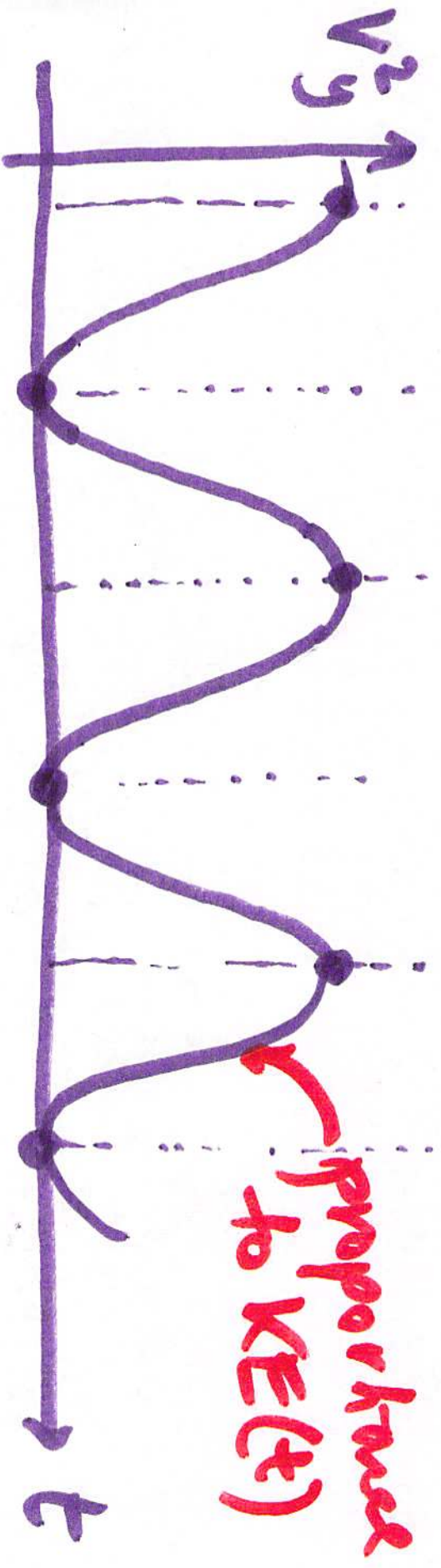
"Slice" @ position x_A

$$y = A \cos\left(\phi_A - \frac{2\pi t}{T}\right) \quad \phi_A \equiv \frac{2\pi x_A}{\lambda}$$

$$= A \cos\left(\frac{2\pi t}{T} - \phi_A\right)$$

position of the string @
 piece of string vs t .





proportional
to $KE(t)$