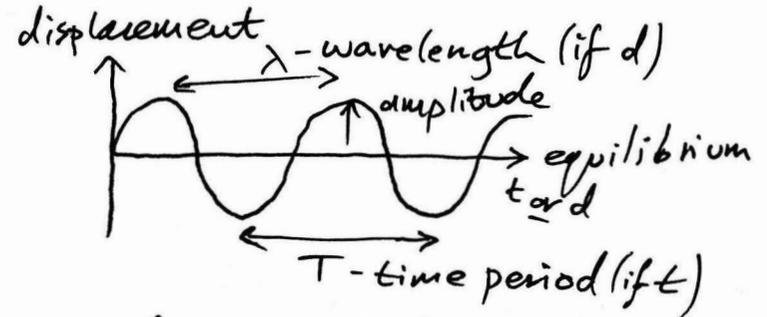- WAVES TRANSFER ENERGY BUT NOT MATTER.

- LONGITUDINAL: PARTICLES OSCILLATE PARALLEL TO DIRECTION OF ENERGY TRANSFER (COMPRESSIONS & RAREFACTIONS) e.g. SOUND

- TRANSVERSE: PARTICLES OSCILLATE PERPENDICULAR TO DIRECTION OF ENERGY TRANSFER e.g. LIGHT (EM), STRING, WATER.

WAVES

displacement — λ - wavelength (if d)

amplitude

→ equilibrium

t or d

T - time period (if t)

frequency (Hz): NUMBER OF COMPLETE WAVES PASSING A POINT EVERY SECOND.

$$f = \frac{1}{T} \qquad v = f\lambda \quad \text{or } c = f\lambda$$

- STATIONARY WAVES ARE FORMED WHEN TWO WAVES OF EQUAL FREQUENCY TRAVEL IN OPPOSITE DIRECTIONS + INTERFERE.

- SUPERPOSITIONING: WHEN DISPLACEMENTS SUM AT EVERY POINT.

N   A   N   1st HARMONIC / FUNDAMENTAL
←——L——→ $\lambda = 2L$

N A N A N   2nd HARMONIC $\lambda = L$

REFRACTION

normal

$n_1 \sin\theta_1 = n_2 \sin\theta_2$ air $n = 1$ n_2

REFR INDEX

n_1

TIR: angle of inc. > crit angle, & $n_1 > n_2$.

- To find θ_c, $\theta_2 = 90$, $\therefore n_1 \sin\theta_c = n_2$

↳ ALL LIGHT IS REFLECTED.