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Welcome!

Physics 194 - Lecture 14

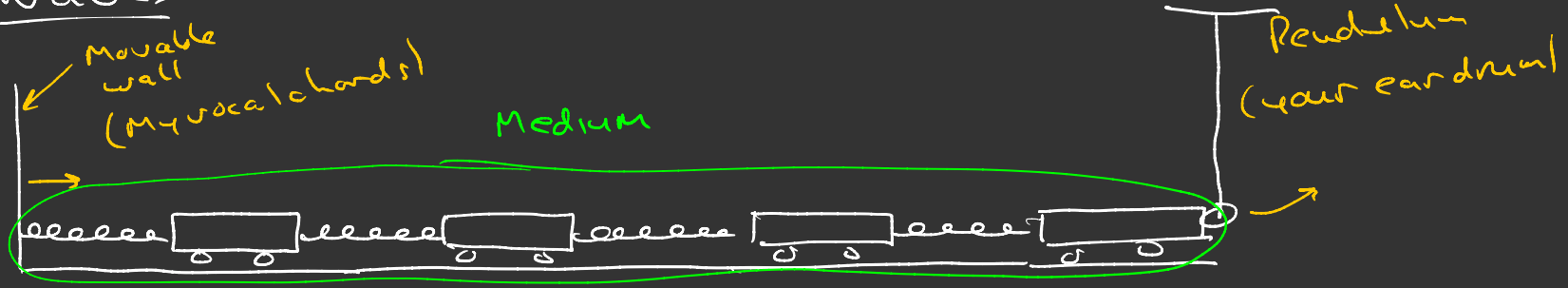
Have a question during class? Please ask it right away, even if it means interrupting in the middle of a thought. I want you to!

Agenda

- Waves + mediums
- wave speed
- Standing waves + resonant frequencies

Class
starts
@ 2:15 pm

Waves

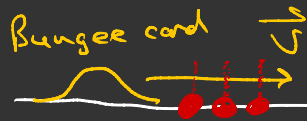


Necessary conditions for a wave to happen:

- 1) Need an interacting medium (the physical components, and the interactions between them)
- 2) Added energy.

Elastic property

Continuous medium



Wave speed $v = \sqrt{\frac{F_{BC \text{ on } BC}}{\mu}}$

Linear mass density $\mu = m/L$

Wall

Transmitted wave

Reflected wave

Bungee cord on Bungee cord

Inertial property

Force $F_{BC \text{ on } BC}$

Force $F_{BC \text{ on } W}$

Force $F_{W \text{ on } BC}$

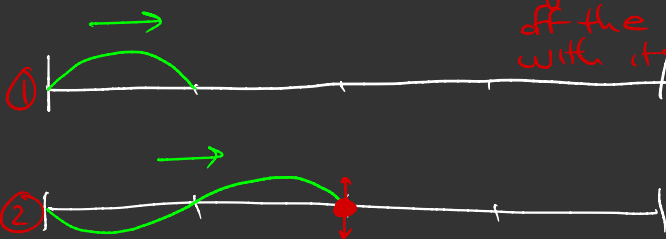
Force $F_{W \text{ on } W}$

String instruments

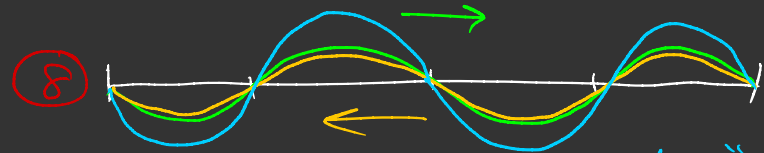
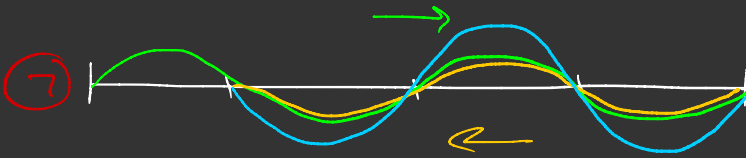
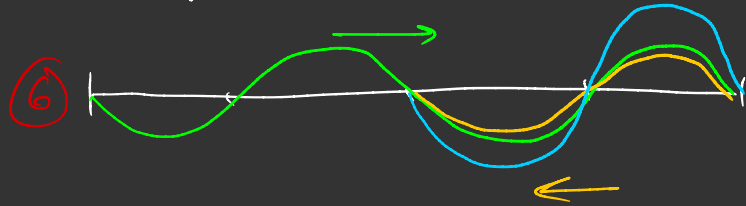
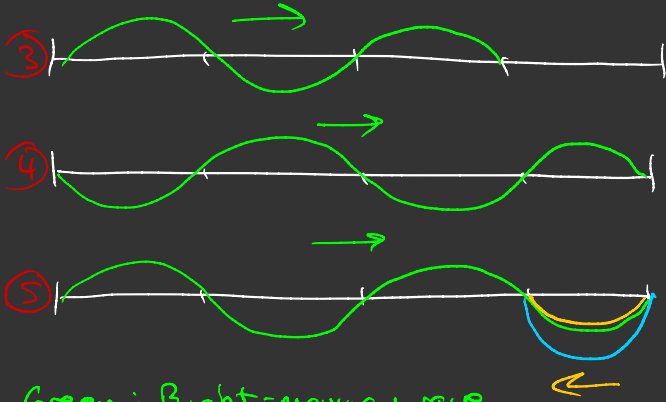
① through ⑧ is a wave traveling rightward on a string, then reflecting off the right end and overlapping with itself to form a standing wave.

$$v = \frac{\lambda}{T} = \lambda f$$

v → wave speed
 T → period of vibration of the string
 f → frequency of +



This is one wavelength, λ . As the single ^{wavelength} travels through the • that point on the vibrating string completes a single cycle up & down. That takes one period T in time to happen.



Green: Right-moving wave

Yellow: Left-moving wave

Blue: Superposition of green & yellow, a standing wave vibrating in place. The "note" you hear.