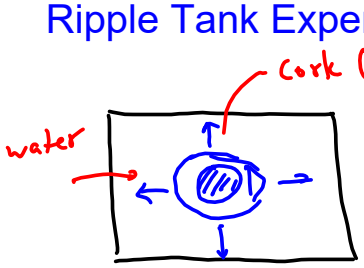
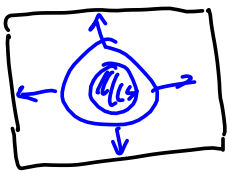
# Waves

Chapter 8.1, 8.2

## Ripple Tank Experiment




Push down on PWG, water moves outward, waves moves outward.
We have done work ($F \cdot d$), which has changed the PE of the cork/water system.



Release the PWG, water moves inward (underneath the PWG) BUT waves move outward!
The PE has changed to KE, but the PWG stops moving quickly (energy "loss")

The waves are caused by the movement of the PWG and the water, but AREN'T the same as the movement of either.

What do the waves do?

Waves transmit energy from one point to another (or many others).

Brainstorming - What types of waves do you know?

Water
Sound
Light
Radio

X-rays
MRI - creates magnetic waves
AC (electrical)

Gravitational

Flag wave
Earthquake (p-, s-waves)

Hand wave
Heat wave
Shock wave (sound)

## Classifying Waves

### By Type:

Mechanical Waves - require a medium (substance) through which to travel.

- water waves, sound

Electromagnetic Waves - do not require a medium through which to travel

- light (radio waves, micro waves, infrared, visible, ultraviolet, X-rays, gamma rays)

Gravitational Waves - do not require a medium

By behaviour

Transverse - medium vibrates ⊥ to direction the wave travels


EM, gravitional, water, S-wave (earthquake), surface wave

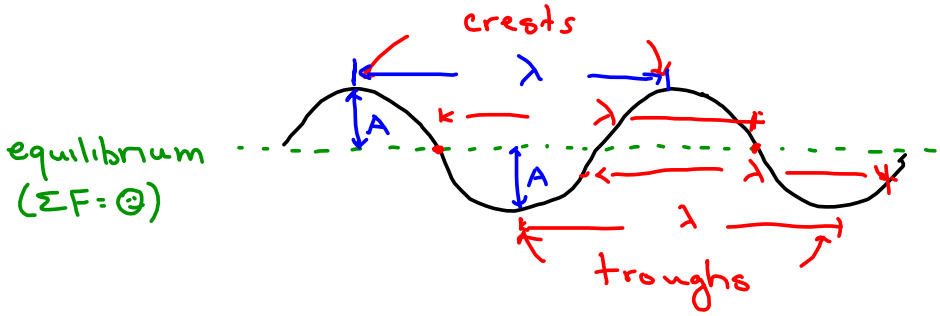
Longitudinal - medium vibrates || to direction the wave travels


-Sound, P-waves (earthquake)

## Parts of a Wave

A = amplitude

λ = wave length




λ - lambda = wavelength = the distance between two successive equivalent points on a wave.

## Frequency and Period

$f$ = frequency ($\nu$ = nu) = # of times something happens per unit time.

waves → # of waves per second.

measured in Hertz ⇒ Hz $\quad 1\,Hz = \frac{1}{s} = 1s^{-1}$

2 waves move past a point in 1 s.

$f = 2\,Hz$

$T = 0.5s$

T = period = the time for wave to be formed/pass a point in space.

In general $\boxed{T = \frac{1}{f}}$ (or $f = \frac{1}{T}$)

# The Wave Equation

Homework: p. 341 #1-4
p. 349 #5-8