

Unit IV - Wave Phenomena

I. Introduction to Waves

Wave – _____ disturbance that travels through a material or space

Ex) _____

A. Waves and Energy

1. Waves _____ from one place to another with no transfer of _____

2. Waves can be produced in two ways:

a. Vibration of _____ (requires a medium for transfer)

ex) _____

b. Small _____ in the strength of an _____ (requires no medium for transfer)

ex) _____

B. Pulses & Periodic Waves

1. Pulse – _____ vibratory disturbance that moves from point to point

a. When the pulse reaches a boundary with another medium, part is

_____ and part is _____

b. When a pulse reaches a _____, unyielding boundary, then the

pulse is completely _____

2. Periodic Wave – series of evenly timed disturbances in a medium

pulse

periodic wave

C. Vibrations and Waves

1. Longitudinal – a vibrational disturbance which is _____ to the direction in which the **wave travels**

ex) _____ (think of a guitar string)

2. Transverse – vibrational disturbance which _____ to the direction in which the wave travels

***** Unlike longitudinal, transverse waves can be _____ in many different planes.

Ex) _____

II. Characteristics of Periodic Waves

A. Frequency - $f =$ _____

How many cycles are shown from dot to dot? _____
(one single vibration)

Ex) 10 cycles pass a fixed point in a wave transferred in 5 seconds. What is the frequency of the wave?

Top view of a periodic wave (Each line is a crest)

A wave generator operating for 4 seconds produces the waves drawn above. What is the frequency of this periodic wave train?

How many waves are drawn? _____ (Be careful!!)

$f =$ _____

- In Sound, frequency determines _____.
- In Light, frequency determines _____.

The human ear can detect a frequency between _____

B. Period – time for an entire wave cycle to pass a given point in a medium

$\frac{\text{(seconds)}}{\text{cycle}} \quad T \quad =$
Period

C. Amplitude – maximum change in position of a particle from its rest position during a single vibration

1. _____ of a wave shows the **amount of** _____ in the wave

a. Amplitude is a measure of _____

D. Phase _____

"In Phase" – points on a single period wave that has the **same displacement**, equal position, and moving in the same direction

Whole number of wavelengths apart

A & ____ A & ____ A & ____ B & ____ B & ____

Out of Phase "– (_____) **same displacement** from equilibrium position but going in a _____ direction

E. Wavelength – _____