Assignment:

Name: Pilmer Hour: 3

Vocabulary

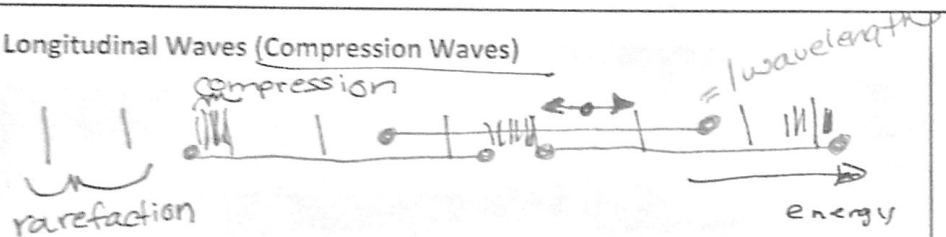
Wavelength: the distance it takes to complete one wave cycle (m)

Amplitude: the distance particles move from rest position (m)

Frequency: the number of waves in a given time

① Lowf
② Higherf

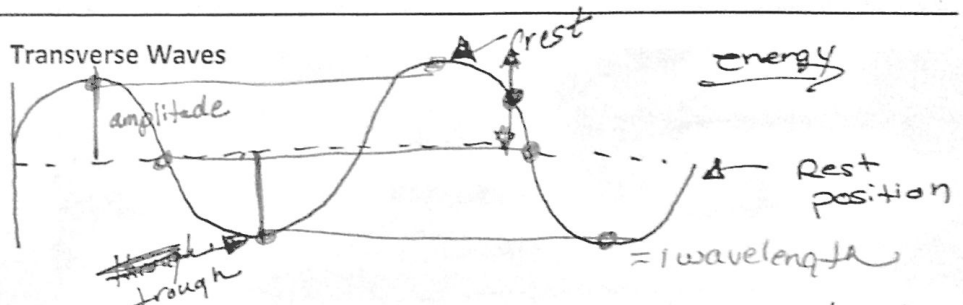
Longitudinal Waves (Compression Waves)



Particles move side to side, parallel

Wavelength = 1 compression and 1 rarefraction

Transverse Waves



Particles, move up + down, perpendicular

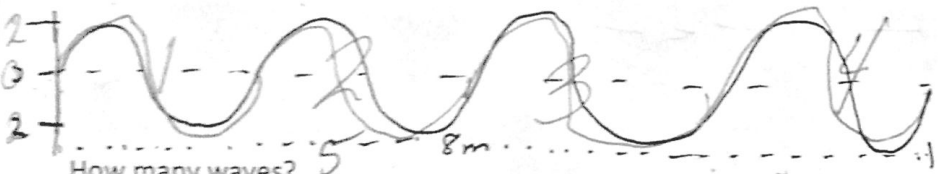
Wavelength = from the point on one wave to the same point on the next

Amplitude = distance particles move from rest position

How many waves? 4 Amplitude? 2m

What is the wavelength? 2m

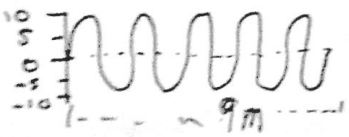
What is the frequency? 4 (assume the picture below represents waves captured in 1 second)



How many waves? 5

What is the wavelength? 1.8m Amplitude? 10m

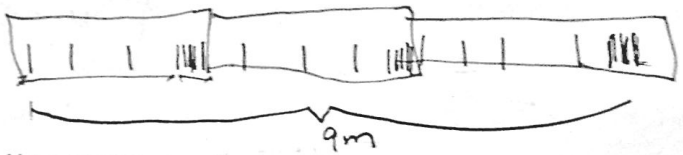
What is the frequency? 5 (assume the picture below represents waves captured in 1 second)



How many waves? 3

What is the wavelength? 3m

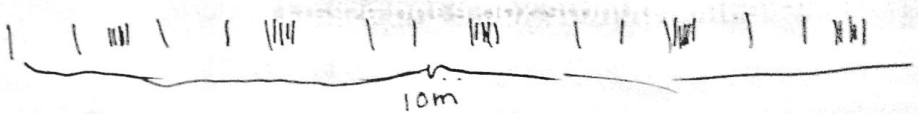
What is the frequency? 3 (assume the picture below represents waves captured in 1 second)



How many waves? ___

What is the wavelength? ___

What is the frequency? ___ (assume the picture below represents waves captured in 1 second)



Calculation and Units:

You must show work and units to get credit!

Please put a box around your answer!

(m/s) (m) (Hz)

wave speed = wavelength × frequency

(S) (λ) (f)

1. The lowest pitch that the average human can hear has a frequency of 20.0 Hz. What is the wavelength of a 20.0 Hz wave with a speed of 331 m/s?

$\frac{S}{f} = \frac{331 m/s}{20 Hz} = 16.55 m$

2. A drum is struck, producing a wave with a wavelength of 1.1 m and a speed of 2.42×10^4 m/s. What is the frequency of the wave?

$\frac{S}{\lambda} = \frac{2.42 \times 10^4 m/s}{1.1 m} = 22{,}000 Hz$ → 24,200

3. One of the largest organ pipes is in the auditorium ~~organ in the~~ convention hall in Atlantic City, New Jersey. The pipe is 38.6 ft. long and produces a sound with a wavelength of 10.6 m. If the speed of sound in air is 346 m/s, what is the frequency of this sound?

4. If the speed of a standing wave is 335 m/s and its frequency is 67 Hz, what is its wavelength?

5. A wave with a frequency of 60.0 Hz travels through steel with a wavelength of 85.5 m. What is the speed of this wave?

6. A dolphin can typically hear sounds with frequencies up to 150,000 Hz. What is the speed of sound in water if a wave with this frequency has a wavelength of 0.01 m?

7. A dog whistle is designed to produce a sound with a frequency beyond that which can be heard by humans. If a particular whistle produces a sound with a frequency of 25,000 Hz, what is the sound's wavelength? Assume the speed of sound in air is 331 m/s.

8. A ship anchored at sea is rocked by waves that have crests 14 m apart. What is the speed of these waves if their frequency is 0.5 Hz?