

Unit 7 – Waves and Sound Study Guide Physics

Name: key
 Period: _____ Date: _____

Vocabulary:

Wave Anatomy

Medium

Crest

Trough

Amplitude

Wavelength

Transverse Waves

Longitudinal Waves

Surface Waves

Period

Frequency

Wave Velocity

Wave Equation

Interference

Standing Waves

Doppler Effect

Red Shift

Universe Expansion

Medium for Sound

Shock Waves

Loudness

Potential Questions:

1. A physics student sits on the bench and notices that a wave hits the beach every 5.0 seconds. The waves are 15 m apart. What is the speed of these waves?

$$\frac{15\text{m}}{5\text{s}} = 3\text{m/s}$$

2. What is the frequency of light that has a wavelength of 623nm? What would be the period of this light?

$$c = \lambda f \rightarrow \frac{c}{\lambda} = \frac{3 \times 10^8}{623 \times 10^{-9}\text{m}} = 4.8 \times 10^{14}\text{Hz}$$

3. Describe the difference between a transverse wave and a longitudinal wave? Give examples and draw diagrams of each.



T: wave propagates perpendicular to direction of travel

L: wave propagates in the same direction as the direction of travel

4. What is the source for all sound? How does it travel through certain media?

Vibration? travels in a longitudinal wave.

denser material = faster travel

5. What is interference? What are the two types and explain what happens in each situation. Draw a diagram of each.

Constructive: crests overlap w/ crests → amplifies $m+w = M$

Destructive: crests overlap w/ troughs → cancels out $m+w = -$

6. The decibel scale is logarithmic (i.e. for every 1 point of increase on the decibel level, the sound source intensity increases by ten levels). If ten violins produce a sound intensity level of 60 dB in a concert hall, how many violins are needed to produce a level of 100 dB?

4. 40 dB change

$$\left(\frac{100}{60} \right)^{10} = 10^4 = 10,000$$

10,000 violins