

HOLT PHYSICS

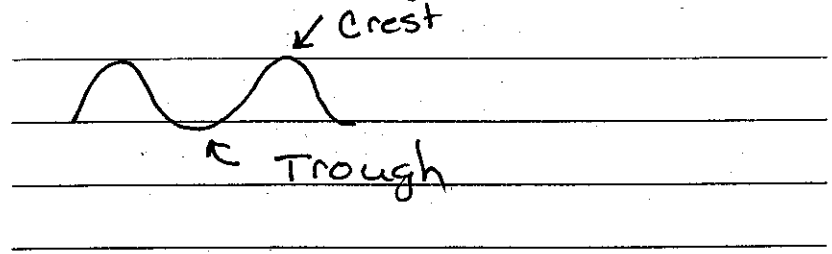
MODULE 12

Frequency and Wavelength

Fill each blank below with the word or phrase that completes the statement.

- 1. Light behaves as a Transverse wave.
- 2. Any isolated segment of a transverse wave oscillates in a direction that is Perpendicular to the motion of the wave.
- 3. The movement of an isolated segment of a transverse wave is a form of Simple harmonic motion.
- 4. In the stapler example, simple harmonic motion is due to the oscillating mass in the stapler.
- 5. In a longitudinal wave, the motion of isolated segments of the wave is parallel to the wave's motion.
- 6. Sound waves are an example of a longitudinal wave.
- 7. Sound waves are created when Each molecule of air moves back & forth in the direction of wave motion as the wave travels.

8. Differentiate between a crest and a trough of a wave.



- 9. A Compression is formed when the medium through which the wave moves becomes densely packed.
- 10. Compressions and rarefactions alternate in longitudinal waves.

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MODULE 12

11. Wavelength in a longitudinal wave equals the distance between two Compressions or two rarefactions

12. The distance between two successive troughs describes the wavelength for a transverse wave.

13. Wavelength, measured in meters, is a length measurement, while the period of a wave is a time measurement.

14. Describe the relationship between period and frequency.

The frequency is the inverse of the period

15. What equation would one use to find the speed of a wave if its period is known?

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

16. As the frequency of a sound decreases, an observer will hear its Pitch decreasing.

17. Classify each of the following waves as transverse or longitudinal.

- a. wave generated by a drop of water falling on the surface of a quiet pond
- b. a shock wave from a sonic boom

A) Transverse

B) longitudinal

18. A tuning fork produces a sound with a frequency of 256 Hz. What is the period of the sound wave?

$$T = \frac{1}{f} = \frac{1}{256 \text{ Hz}}$$

$$T = 3.91 \times 10^{-3} \text{ s}$$

19. Suppose a trough of a water wave is separated from the successive crest by 2.5 m. If 33 crests pass a single point in 30.0 s, find the speed of the wave.

① $\lambda = 2L$
 $\lambda = 2(2.5 \text{ m})$
 $\lambda = 5.0 \text{ m}$
 $f = 1.1 \text{ Hz}$

② $\frac{33 \text{ crests}}{30.0 \text{ s}} = 1.1 \text{ Hz}$

③ $v = f \lambda$
 $= (1.1 \text{ Hz})(5.0)$

$$v = 5.5 \text{ m/s}$$

5.5 m/s