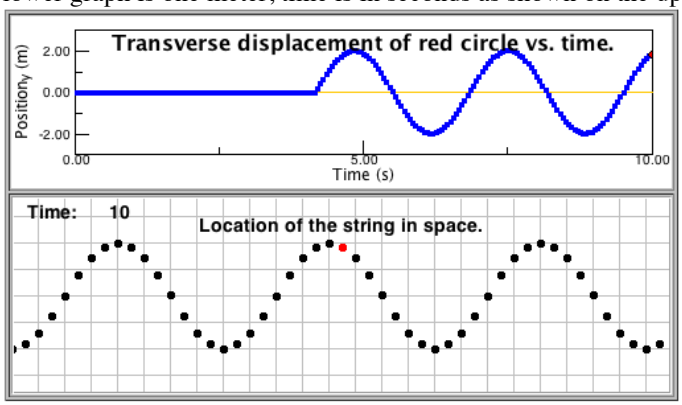
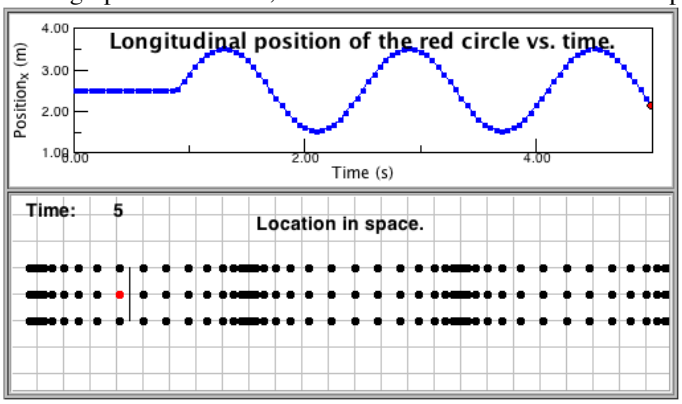
Questions on Wave Types*.

$f = 1/T, v = f\lambda, v = \omega/k, \quad k = 2\pi/\lambda, \omega = 2\pi f, \quad y(x,t) = Acos(kx - \omega t + \phi), \quad v = \sqrt{B/\varrho}$

1. Give a definition of wavelength. In what units is wavelength measured?
2. What is the difference between wavelength and period? How do you measure each?
3. Give a definition and example of a transverse wave.
4. Give a definition and example of a longitudinal wave.
5. Give a definition and example of a torsional wave.
6. Suppose you have a slinky stretched between you and another person. Describe what you would do you your end to make a) a transverse wave b) a longitudinal wave c) a torsional wave.
7. In the following graph, determine the period and wavelength of the wave on the string. Each block on the lower graph is one meter, time is in seconds as shown on the upper graph.



8. In the following graph, determine the period and wavelength of the wave on the string. Each block on the lower graph is one meter, time is in seconds as shown on the upper graph.



9. Why are longitudinal waves sometimes called compressional waves?
10. What are compressions and rarefactions in sound waves?
11. How is simple harmonic motion (a mass on a spring) connected to wave motion for transverse waves?
12. How is simple harmonic motion (a mass on a spring) connected to wave motion for longitudinal waves?
13. What are S-waves and P-waves?
14. Is a water wave longitudinal, transverse or both? Explain.
15. What are electromagnetic waves? Give some examples.
16. Light travels at 3.0×10^8 m/s but sound waves travel at about 344 m/s. What is the time delay for light and sound to arrive from a source that is 10,000 m away?
17. What two mistakes are made in science fiction movies where you see and hear an explosion in space at the same time?
18. What is the difference between sound waves and radio signals?
19. What is the difference between a gamma-ray and visible light?

20. Why can't cell phone signals cause cancer but x-rays can (aren't they both electromagnetic waves)?

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* Many of these ideas came from *Conceptual Physics* 11th Ed. by Paul Hewitt (Addison Wesley, 2011).