A-Day: Due Tues., Feb 12 (Assigned: 2/8)
B-Day: Due Wed., Feb 13 (Assigned: 2/11)

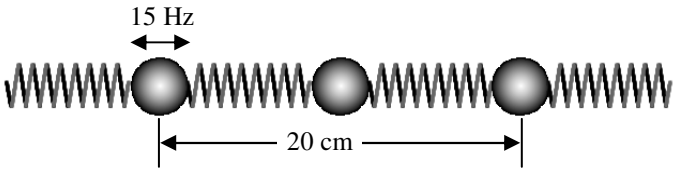
2008 Harmonic Motion 4

1. For pendulums, springs, or waves:
   A. How many times do they pass the equilibrium position in one cycle?
   B. How many amplitudes do they move in one cycle?
   C. If a pendulum completes 6 cycles, how many times did it pass the equilibrium position?

2. How is that a radio can play music that is sent from a radio station miles away?

3. A wave has a speed of 120 m/s and vibrates back and forth 45 times per second. Calculate its wavelength.

4. Three ping pong balls are attached by springs.
   The first of the balls has a frequency of 15 Hz.



   A) What is the frequency of the third ball?
   B) What kind of wave is it: transverse or longitudinal?
   C) If it takes 0.6 seconds for the wave to move from ball 1 to ball 3, calculate the speed of the wave. (*Notice distance is in cm [hint, hint]*).

   D) Calculate the wavelength of the wave.

5. What's the medium that the waves travel through?
   A. Sound in a room:
   B. Waves in the ocean:
   C. The slinky in class:

6. What happens to a wave with no medium?

7. Can we hear sound in space?
8. Why or why not?

9. Transverse or Longitudinal Wave?
   A. ___ The wave vibrates up and down and moves up.
   B. ___ The wave vibrates left and right and moves forward (away from you).
   C. ___ The slinky if you push it.
   D. ___ The slinky when you move your hand left and right.

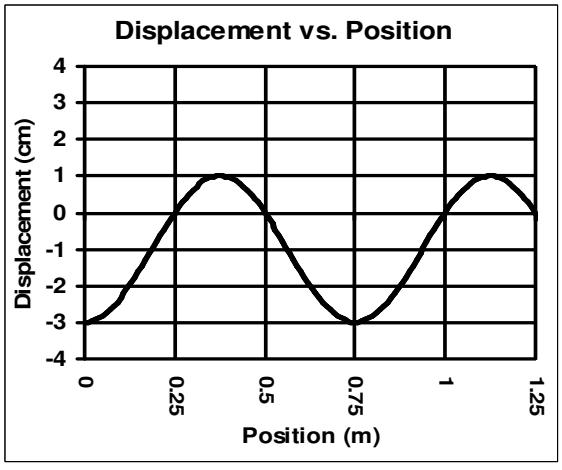
10. Use the graph at the right to answer the following.
    A. What is the wavelength of the disturbance?

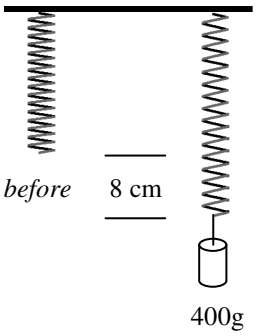
    B. What is the amplitude of the wave?

    C. If the wave is vibrating at 380 Hz, what is its speed?

    D. If the amplitude doubles, how will the wave's speed change?

    E. If the frequency were to get smaller, how would λ change?





11. (This should look familiar, now.) A 400 g mass causes a spring to stretch 8 cm.
    A. Mass must be in kg or g? B. Distance must be in cm or m?

    C. How much force is pulling down on the spring?

    D. Find the spring constant.

12. Wave A: f = 85 Hz, λ = 0.3 m. Wave B: f = 60 Hz.
    A. Calculate the speed of Wave A.

    B. What is the speed of Wave B?

    C. What is Wave B's wavelength?

13. Give two ways that you could increase the speed of a wave in a medium.