# 2009-10 Harmonic Motion 4

1. *From the "Waves" notes:*
2. What is the medium for water waves?   For sound in a room?
3. What moves in wave motion: the actual particles in the medium or the energy?

4. A wave has a wavelength of 45 m and a frequency of 13 Hz, what is its speed?

5. What kind of wave: longitudinal or transverse?
    A. When the slinky is moved side to side.
    B. When the slinky is pushed.
    C. If the slinky vibrate perpendicular to the direction it travels.

6. Which has a faster wave: a loose slinky or a tight slinky?
7. Will a wave move faster if the molecules are close together or far apart?

8. 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]*).
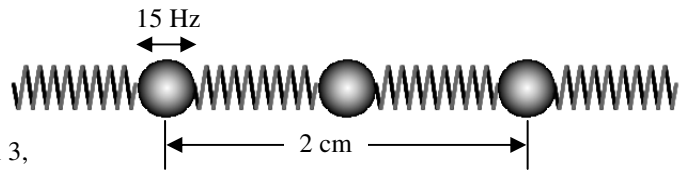
From the "Standing Waves Lab". Also, use your "Standing Waves" notes.

9. A. What harmonic is shown at the left?
    B. How many antinodes does it have?
    C. How many nodes does it have?
    D. What is the wavelength of the harmonic (in m)?
    E. If its frequency is 100 Hz, what is its velocity?

    F. What would be the frequency of the 1st harmonic?

    The frequency of vibration is changed until the shape at the right is shown.
    G. What harmonic is it?
    H.   Mark the nodes and antinodes.
    I.   What is its frequency?

    J. What would be the velocity of this harmonic?

    K. During the lab, when the frequency went up (bigger #), the
   wavelength went _____ and the velocity:
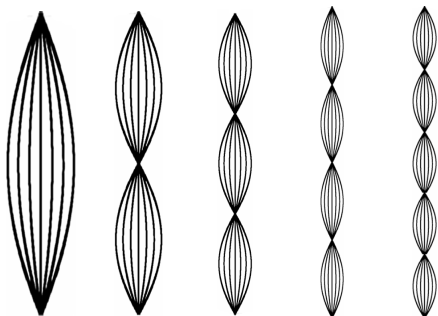
10. A string is vibrated at different frequencies. The harmonic
    are shown at the left. The frequency of the first harmonic
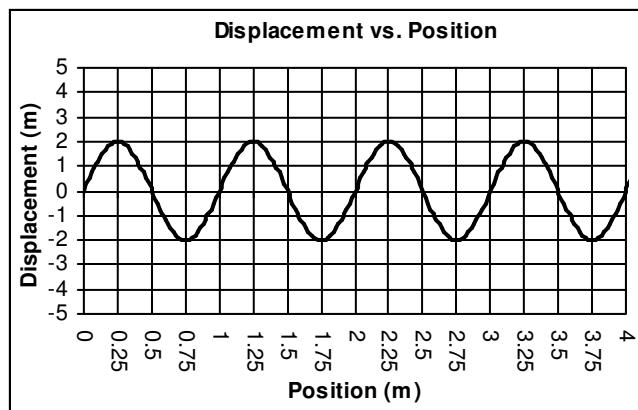   (also known as the f_____ f_____) is given.
    A. Fill in the table.

    B. Which harmonic is 2 wavelengths long?

    C. If the string is 1.2 meters long, what is the length of the
        first harmonic (H1)?

Harm	H1				
Freq	6 Hz				
# of λ		1λ			

11. On the graph at the right, draw a graph that has a period of 4 second and a 3 cm amplitude.

12. How would the graph change if the period were smaller (faster)?

13. A pendulum has a period of 0.75 seconds. How long is the pendulum? (*Use the notes on the back of "Harmonic Motion 2" if you need help with the algebra.*)

Position vs. Time
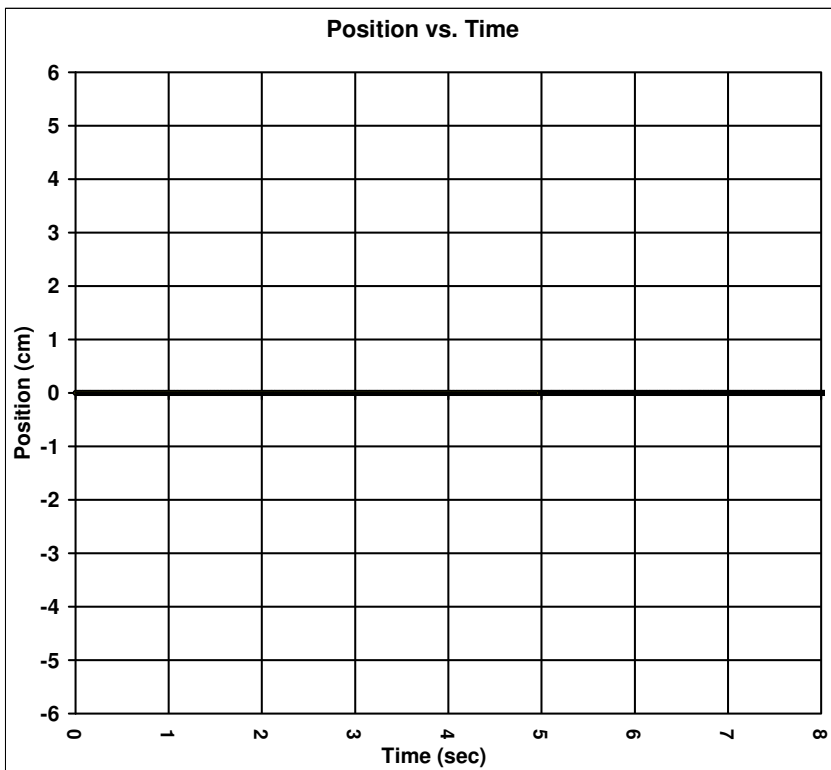
Again, from the "Waves" notes.

14. What is the wavelength of the motion shown on the graph?

Displacement vs. Position

And do the TAKS homework.