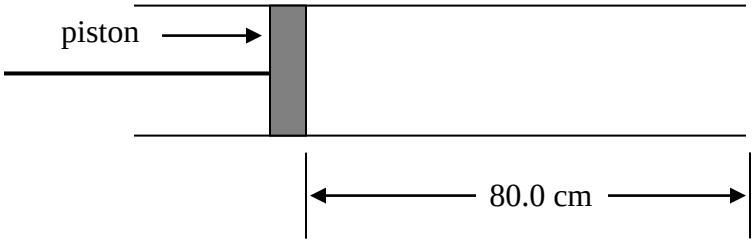
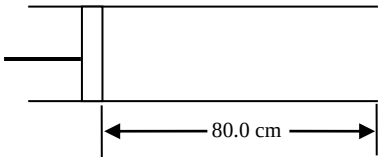
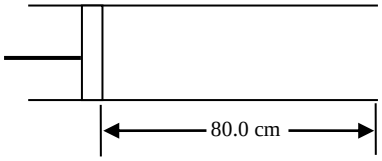
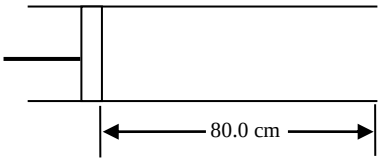
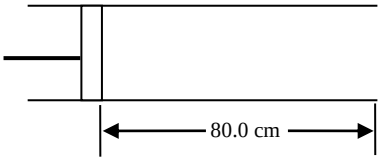
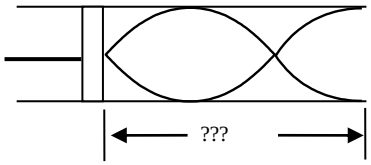
Name _____ **Date** _____ **Pd**____

AP Waves, Worksheet 10

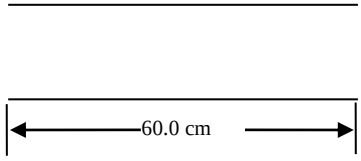
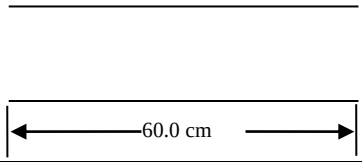
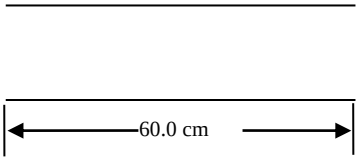
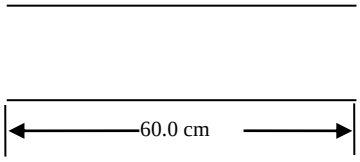
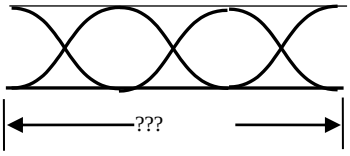
1. A tube has a piston located as shown in the diagram.



a. Sketch the indicated mode of vibration for this setup
b. Determine the unknown value in each box
c. Place the name of each mode in the frequency box

MODE	DIAGRAM	WAVELENGTH	FREQUENCY	WAVE SPEED
1st				340. m/s
2nd				340. m/s
3rd				340. m/s
4th				340. m/s
??		92.0 cm	388 Hz	

2. This time fill in the chart for a tube open on both ends.
   a. Sketch the indicated mode of vibration for this setup
   b. Determine the unknown value in each box
   c. Place the name of each mode in the frequency box

MODE	DIAGRAM	WAVELENGTH	FREQUENCY	WAVE SPEED
1st				340. m/s
2nd				340. m/s
3rd				340. m/s
4th				340. m/s
??		134 cm	256 Hz	

3. Patty Melt is holding a tuning fork over a tube that has been inserted into a container of water. The first resonance is at 45.2 cm, and the speed of sound in air that day is 345 m/s.

   a. What is the frequency of the fork?

   b. She then raises the tube until she gets a second resonance. How much of the tube is now out of the water?

4. A pipe open on both ends is resonating to produce a note. What could you do that would cause the same pipe to produce a note of a different frequency? Describe the change that each one would produce in the pitch of the sound. (Hint: you should be able to identify at least four changes that affect the pitch.)