

This exercise is to be handed in at the beginning of lab; no lab quiz!!!

STEP 1: It is a **very** hot day in Dallas, and the speed of sound is 400 m/s. Given the formula $c=331\pm 0.6C$, determine the present temperature. (We will use $c=400\text{m/s}$ for the pre-lab exercise ONLY to make the numbers come out nicely.)

STEP 2: OPEN PIPE: Draw the resonant standing wave patterns corresponding to the lowest 3 frequencies of an OPEN pipe. (You may draw pressure or displacement--your choice.)

$$L = \frac{\boxed{}}{2} \lambda$$

$$L = \frac{\boxed{}}{2} \lambda$$

$$L = \frac{\boxed{}}{2} \lambda$$

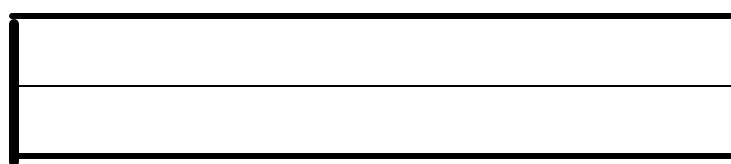
You should observe a pattern. We will now calculate the frequency.

If $L = (N/2)\lambda$ where $N=1,2,3,\dots$, then $1/\lambda = 2L/N$. Using $c = \lambda f$, we have:

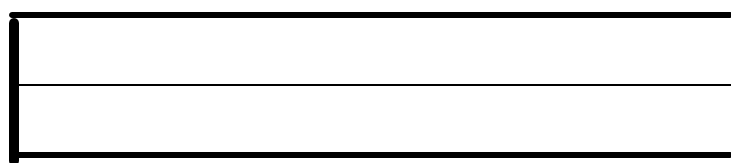
$\boxed{f = \frac{c}{\lambda} = \frac{c}{2L} N.}$ Use this formula, with $c=400\text{m/s}$ to compute the first 3 resonant frequencies.

For the length of the pipe, assume $L=1\text{m}$.

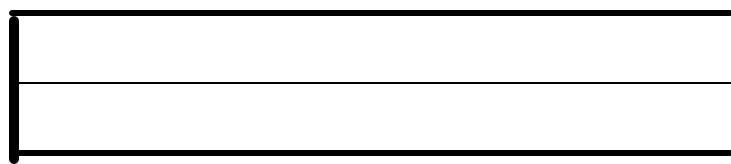
STEP 3: CLOSED PIPE: Draw the resonant standing wave patterns corresponding to the lowest 3 frequencies of an CLOSED pipe. (You may draw pressure or displacement--your choice.)



$$L = \frac{\boxed{}}{4} \lambda$$



$$L = \frac{\boxed{}}{4} \lambda$$



$$L = \frac{\boxed{}}{4} \lambda$$

You should observe a pattern. We will now calculate the frequency.

If $L = (N/4)\lambda$ where $N=1,2,3,\dots$, then $1/\lambda = 4L/N$. Using $c = \lambda f$, we have:

$$\boxed{f = \frac{c}{\lambda} = \frac{c}{4L} N.} \quad \text{Use this formula, with } c=400\text{m/s to compute the first 3 resonant frequencies.}$$

For the length of the pipe, assume $L=1\text{m}$.

STEP 4: COMPARISON:

Fill in the following tables. (Yeah, we only calculated the first 3 resonances, but you're smart and can figure out the pattern--we make use of this in the lab.)

OPEN PIPE	
Resonance	Frequency
1	
2	
3	
4	
5	

CLOSED PIPE	
Resonance	Frequency
1	
2	
3	
4	
5	

STEP 5: REMARKS:

Comments and Conclusions.