

Name _____
Physics _____ Period _____
Date _____

Musical Instrument LAB

Purpose: To use the physics of music ideas to construct a crude instrument with four graduated cylinders.

Procedure:

1. Choose a team of three or four.
2. Decide what equation will be necessary in order to calculate the proper length of the graduated cylinder in order to play the fundamental tone for the given frequency.

NOTE – The graduated cylinder is a tube with one closed end.
Sounds travels through the air in the tube (not the water)

3. Show me your proposed equation and what measurements you plan to take.
4. Make your calculations for the lengths of the tubes to produce each of the following frequencies:

C = 524 Hz

D = 588 Hz

E = 660 Hz

G = 784 Hz

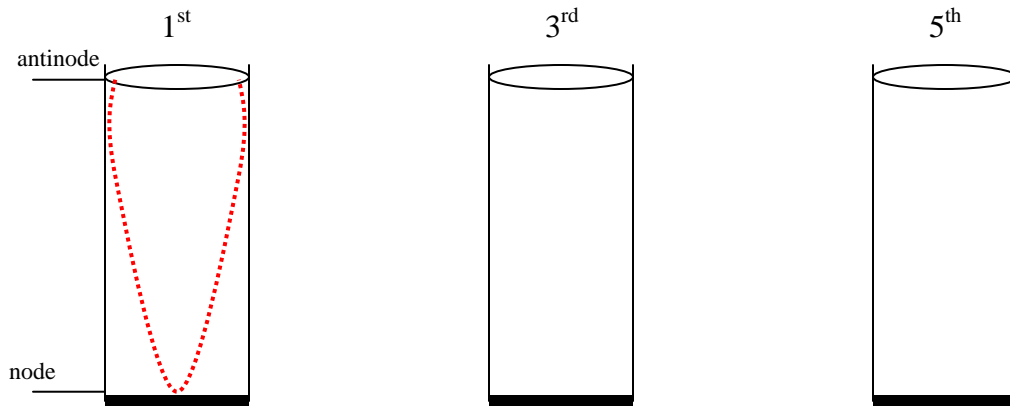
Show calculations here (be careful of units):

5. Fill graduated cylinder with the appropriate amount of water.
6. Check for accuracy by practicing the following song:

E D C D E E E D D D E G G E D C D E E E E D D E D C
7. When you are ready, show me your calculations and play the practiced song.
8. For extra credit, come up with your own song using the above notes. It must be recognizable to me.

Complete the conceptual questions on the reverse side.

1. Draw the standing waves for the 3rd and 5th harmonic frequency for sound in the tube. Label all nodes and antinodes. (The 1st harmonic is done for you)



2. As the frequency of sound increases for each note, what happens to the *wavelength* of the sound? How does this affect the length of your air column?
3. As the frequency of sound increases for each note, what happens to the *speed* of the sound?
4. What would happen to the tube length if the pipe were **open** at both ends? Show your new calculations.