Resonance Lab

Purpose: To observe resonance in columns of air and use the property to calculate the speed of sound

Materials: large plastic graduated cylinders, PVC pipe, tuning forks with rubber mallets, meter sticks

Pre-Lab Questions:

1. What factors change when a sound gets louder? What factors change when a pitch gets louder?
2. What happens if a vibrating tuning fork is placed near another tuning fork of the same frequency?

Procedure:

1. Fill the graduated cylinder with water and place the shorter PVC pipe into the cylinder.
2. Strike the tuning fork with the mallet and hold the vibrating fork just above the open end of the PVC pipe.
3. Slowly move the tube upward, increasing the length of the air column until you hear the sound grow much louder. This will happen when the air column resonates.
    a. Measure the distance from the top of the water to the top of the tube and record as **¼ wavelength**. (Record as meters NOT centimeters)
4. Continue raising the tube until you hear the second loud sound.
    a. Measure the distance from the top of the water to the top of the tube and record as **¾ wavelength**. (Record as meters NOT centimeters)
5. Using the following formula to calculate the **λ.** "L" is the distance from the top of the water to the top of the PVC pipe. Make sure to use meters NOT centimeters.

    a. $\lambda = 4L + (1.6 * \text{Diameter of PVC pipe})$

6. Calculate the speed of sound given the frequency and wavelength ($v = f * \lambda$)
7. Calculate the temperature (in °C) of the classroom ($v = 331 + .6T$)

Frequency of tuning fork	¼ λ	¾ λ	½ λ	1 λ	Speed of Sound