Name: ____**Date:** _______________ **Class:** _____________

What's a Wavelength?

Draw the Demonstration presented by your teacher.

What happens when the teacher strikes the tuning fork?

Procedure: Now let's measure the distance of a wavelength.

Setting up the Experiment:

1. Strike a tuning fork and hold it over the tube. Move the tube up and down until you create the loudest sound. If more than one location is found, use the shortest length from the top of the water.
2. Measure, in cm, the Length from the top of the water to the top of your tube. Record.
3. Measure, in cm, the Diameter of the tube. Record.
4. Look at your tuning fork, and record the frequency, in Hz.
5. You were given four different tuning forks, repeat steps 2 – 5 with the other three.

Data: Where numbers are used to make analysis.

Length (cm)	***Length (m)***	***Diameter (cm)***	***Diameter (m)***	***Frequency (Hz)***

**Remember 1 m = 100 cm.*

Data Analysis: Let's calculate the distance of a wavelength.

Using the following formula, calculate the wavelength of sound that was produced in the tube.

$$\lambda = (4 \text{ X } L) + (1.6 \text{ X } D)$$

Frequency (Hz)	***Wavelength (m)***

**Remember λ is wavelength (m) L, Length in meters (m), D, Diameter in meters (m).*

Check to see if the frequency on the fork matches the frequency calculated using the speed of sound in air using your formula for waves.

$$c = \lambda\upsilon$$

Given Frequency (Hz)	***Wavelength (m)***	***Calculated Frequency (Hz)***

**Remember c is the speed of sound in air (340 m/sec), λ is wavelength (m), and* υ is frequency (1/sec).

Conclusion: Now let's make some sense of this.

1. How did your value for frequency compare to the given value for frequency for each fork?

2. What are two reasons for you not obtaining the exact same value?

3. What could be a way to improve our Data in the experiment above?

4. Sound waves travel differently according to the medium through which they travel – the wavelength changes, but the frequency of a sound source stays the same. Using the calculated frequencies of the tuning forks, find the wavelength of each if they were used under water. The speed of sound in freshwater is about 1,500 m/sec.

Calculated Frequency (Hz)	***Wavelength in water (m)***