Name:

**Sound Tube Lab**

Purpose: Determine four harmonic frequencies of a two-sided open eneded tube.

Materials: meterstick, sound tube, frequency tuner or cell phone with tuner app

Measure the length of the sound tube using the meterstick. Actual length: \_\_\_\_\_\_\_\_\_

Now we must include an ‘end-pipe correction’ in the length measurement of the tube. Due to the fact that pressure nodes are located outside the pipe, the actual length requeires an ‘end-pipe correction’ such that (radius of the tube)\*(.6) is added to each open end. If L is the length of the pipe and r the radius, then the corrected length L’ will be: L’ = (L + X) where X = 2\*(r\*.6) given that *both* ends are open.

Corrected length: \_\_\_\_\_\_\_\_\_\_\_\_

Using the corrected length of the tube, the speed of sound (≈ 340 m/s), and the wave speed equation (velocity = lambda\*frequency) determine frequencies of four harmonic frequencies.

First: \_\_\_\_\_\_\_\_\_\_ Second: \_\_\_\_\_\_\_\_\_\_ Third: \_\_\_\_\_\_\_\_\_\_ Fourth: \_\_\_\_\_\_\_\_\_\_

What is the most common unit of frequency? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Draw diagrams of the first, second, third, and fourth harmonic waves in the spaces below:

First: Second:

Third: Fourth:

Using your phone and a free app (e.g. ‘Pano Tuner’), find the actual frequencies of the harmonics.

First: \_\_\_\_\_\_\_\_\_\_ Second: \_\_\_\_\_\_\_\_\_\_ Third: \_\_\_\_\_\_\_\_\_\_ Fourth: \_\_\_\_\_\_\_\_\_\_

Please find the percent differences between the actual and predicted frequencies.

First: \_\_\_\_\_\_\_\_\_\_ Second: \_\_\_\_\_\_\_\_\_\_ Third: \_\_\_\_\_\_\_\_\_\_ Fourth: \_\_\_\_\_\_\_\_\_\_

Please list at least two reasons for any discrepencies between the predicted and actual results.