Resonance of Sound lab

Name______________________________

Purpose: To calculate the speed of sound in air, and to understand resonance.

Procedure: Take a tuning fork, start it vibrating **** ONLY USING RUBBER STARTER **** and hold it over the top of your tube. Slowly lower the volume of water until you achieve a resonant situation. Measure the height of the air column. Repeat for a different tuning fork. Find out air temperature and column diameter. Cleanup & calculate.

Results/Questions:

Data/Calculations:

Trial	One	Two
Frequency of fork (Hz) (f)		
Measured Resonant Length (cm)		
Corrected length (m) (unit change!)		
Corrected full wavelength (m) (λ)		
Calculated Velocity of sound (m/s) (v)		
% difference		

Air Temperature:	°C
Column Diameter:	cm

1. The column length is corrected because the air just above the column vibrates as if it was in the tube. Put your answer in the calculations table.

Corrected length = Measured length + .4 x tube diameter

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2. How much of a wavelength does resonance #1 represent? Why?

3. Calculate the speed of sound using $v = f\lambda$ and put it in the table.

4. To calculate the actual speed of sound, use the following formula:

$$v_{actual} = 331 + .6\,T$$

v_{actual} = ___________m/s

5. Calculate % difference and place in calculations table.

$$\frac{(\text{Actual} - \text{Calculated})}{\text{Actual}} * 100$$

6. What other wavelength portions could you use to get resonance using this setup?

7. What is the smallest length tube you need to hear your fundamental resonance if the air temperature was 120 degrees and you used a 279 Hz tuning fork?
