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**Speed of Sound Lab**

**Purpose:** To determine the speed of sound in air

**Materials:**

* Plastic tube
* Pvc pipe (air column)
* Rubber stopper
* Tuning forks
* Meter stick or ruler

**Procedure:**

1. Plug one end of the plastic tube with the rubber stopper.
2. Place the pvc pipe in the plastic tube and fill the plastic tube almost full with water.
3. Tap a tuning fork on a book or relatively soft surface.
4. Hold the tuning fork over the pvc pipe and raise the pipe until you hear the sound amplified.
5. Use the meter stick to measure the height of the pipe above the water. Record in table below.
6. Use the measured length to calculate the wavelength and speed of sound in the pipe.

**Data:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| f (Hz) | L1 (m) | L2 (m) | Lavg (m) | v (m/s) | % error |
| 256 | 0.32 | 0.33 | 0.325 |  |  |
| 288 | 0.28 | 0.29 | 0.285 |  |  |
| 320 | 0.25 | 0.255 | 0.2525 |  |  |
| 384 | 0.21 | 0.21 | 0.21 |  |  |
| 425.5 | 0.19 | 0.19 | 0.19 |  |  |
| 480 | 0.165 | 0.16 | 0.1625 |  |  |
| 512 | 0.155 | 0.155 | 0.155 |  |  |
| 523.2 | 0.15 | 0.15 | 0.15 |  |  |

**Calculations:**

**Analysis:**

1. Explain what type of wave was created inside the pipe. i.e. open-closed, closed-closed, open,-open
2. Which harmonic of each frequency was heard? How can you be sure?
3. What external factors could have contributed to your error? How could you control those variables to create a more precise experiment?
4. Create a linear graph showing the speed of sound as the slope. Include the equation of your line.

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