

Research question:

Measuring the speed of sound using the resonance in an end opened tube.

Introduction:

This lab uses the resonance phenomenon in an air column in order to measure the speed of sound. Using a tuning fork we generate sounds with different frequencies above an air column, which can be moved easily in water to change the length of the tube. The other goal of this experiment is to compare the speed of sound calculated from different resonance generated, compare them to each other to see whether they are different or the same and further explore the reason behind the differences if there is any.

Apparatus:

1. 3-4 Tuning forks with different
2. A tube of at least 60 cm(both ends open)
3. A marker
4. A big jar (or any other container) of water to move the tube easily in it.

Physics behind it:

Using the tuning forks. We generate sounds above the tube, then move the tube until the sound reaches its maximum volume due to resonance.

Record the length of the at which the volume is at peak.

Trying different frequencies and using the formulas below:

$$v = f\lambda, \quad L = \lambda/4, 3\lambda/4, 5\lambda/4$$

Conclusion: we can solve for the speed of sound multiple times