Lab report on measuring the speed of sound

Alexander Zhuk

March 3, 2016

Date Performed:	February 3, 2016
Partners:	Whole class
Instructor:	Me

1 Objective

The objective of this following lab is to measure the speed of sound.

2 Background

In this lab as I already mentioned I am going to measure the speed of the sound. This can be done with the help of the "Water", "Ruler", "Graduated Cylinder", "Iphone with the application "f generator"" and "Conical flask". By using this materials I will be able to measure the speed of the sound. We will take 340.29 m/s as the distance traveled per unit time by a sound wave propagating through an elastic medium.

3 Definitions

V - wave speed

The speed of a wave - its wave speed - is related to its frequency and wavelength, according to this equation: wave speed (metre per second) = frequency (hertz) wavelength (metre)

$\lambda - wavelength$

Wavelength is the distance between successive crests of a wave, especially points in a sound wave or electromagnetic wave.

f- Frequency

Frequency is the number of occurrences of a repeating event per unit time. It is also referred to as temporal frequency, which emphasizes the contrast to spatial frequency and angular frequency.

Resonance

Resonance is a phenomenon that occurs when a vibrating system or external force drives another system to oscillate with greater amplitude at a specific preferential frequency.

Standing wave

A standing wave also known as a stationary wave is a wave in a medium in which each point on the axis of the wave has an associated constant amplitude. The locations at which the amplitude is minimum are called nodes, and the locations where the amplitude is maximum are called antinodes.

4 Materials

Water

Ruler

Graduated Cylinder

Iphone with the application "f generator"

Conical flask

5 Method

The first thing I had to do was to measure the length of the distance between the speaker of the Iphone and the water in the Graduated Cylinder. After that I had to multiply the length of that distance by four. Then I had to multiply the wavelength by the frequency that was creating the loudest sound (resonance). After that I could see the speed of the sound, which was close to the actual 40.29 m/s in many cases.

6 Data

Number	L	F
1	0.23m	350Hz
2	0.17m	485Hz
3	0.28m	303Hz
4	0.38m	224Hz

Table 1: Experimental data

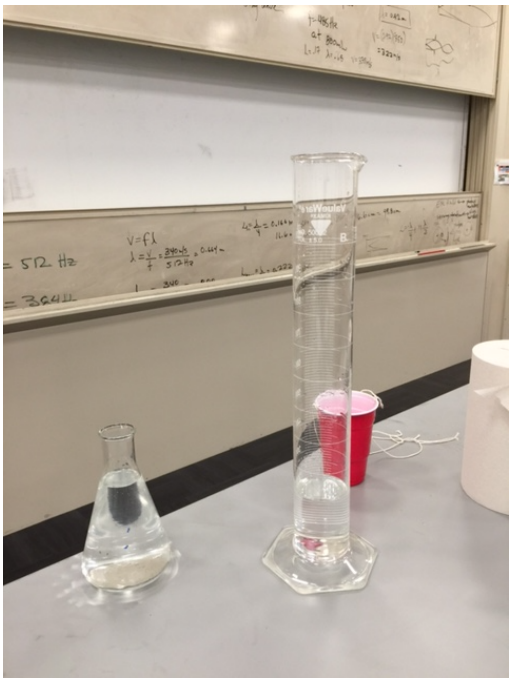
Number	λ	v
1	0.92m	336m/s
2	0.68m	330m/s
3	1.12m	345m/s
4	1.52m	339m/s

Table 2: Experimental data

7 Discussion of error

Through my whole lab I found that the lesser amount of water we have in the Graduated Cylinder , the more precise and accurate data we get. Consequently, we get much more closer values to 340.29 m/s. We can see it through the data.

8 Picture



9 Conclusion

Through this lab of measuring the speed of sound, I was able to measure the speed of sound, see how different amount of water impacts on the effect and

accuracy of getting precise data, which leads a person to the proof that the speed of sound must be 340.29m/s.

References

Wikipedia, 2016, Physics: Frequency

Wikipedia, 2016, Physics: Standing waves

Wikipedia, 2016, Physics: Resonance

(n.d.). Retrieved March 01, 2016, from http://www.bbc.co.uk/schools/gcsebitesize/science/aqa$_p re_2$011/$radiati$