# LAB 7 Report (The oscilloscope)

## Abstract

This lab involves using an oscilloscope in order to visualize the waves of the sounds through electrical signals which were focused by a microphone input. The microphone senses the small amount of pressure when it experiences sound and converts and amplifies it to voltage. The voltage is sent through a BNC cable to the coaxial cable which is capable of sending signals and is used in things like computer networks, TVs and radio. The BNC cable is then plugged into the oscilloscope which converts it to normal input and the x axis of the screen represents time while the y axis represents the voltage and the combination of these things would represent the sin wave of sound. The conclusion of the experiment is that the range of frequencies that I have encountered is between 606ms and 1.5 ms and the range of the amplitude is 139mV and 3.8 mV. I found that the louder the sounds the bigger the amplitude and the frequency and that some of the sounds that were recorded had many different waves in them which made the wave appear obfuscated.

## Procedure

The materials needed in this lab are an oscilloscope, a microphone and a BNC cable. To set up the oscilloscope, first connect the microphone to the BNC cable and to the oscilloscope and plug the power cable to the wall and turn it on. To control the oscilloscope press the DEFAULT SETUP to reset it, use the SEC/DIV knob to adjust the time and use the VOLTS/DIV to adjust the voltage seen on screen. Press the TRIG MENU to set it to channel 1 and select AC power on the channel. Press the TRIG MENU in order to specify how much voltage is needed to see on the screen and lastly use the RUN/STOP to freeze the screen.

## Calculation and reasoning (Preliminary Observation)

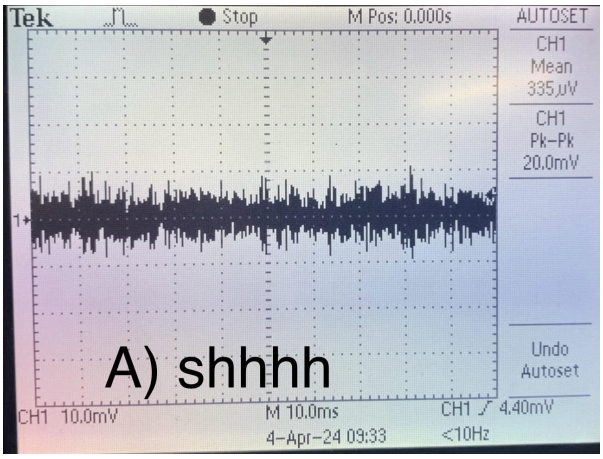
Measure the period and frequency of the sound from a tuning fork. **The frequency of the tuning fork is .16μs and the period is 65ms.**

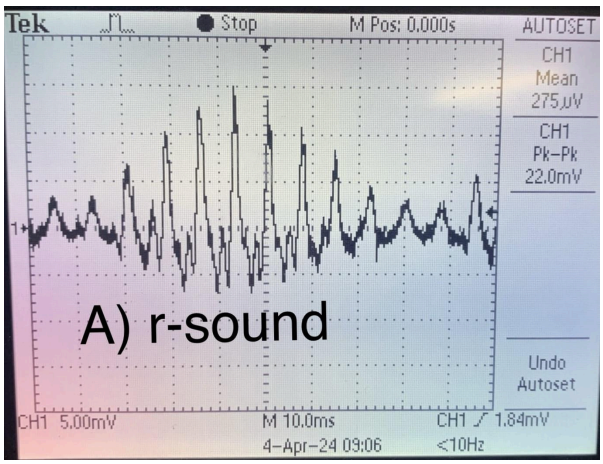
Which vowels or certain consonants are periodic and which are not? **The r-sound and the high frequency sing are not periodic and don't follow a pattern.**

## Calculation and reasoning (Part A-E Observations)

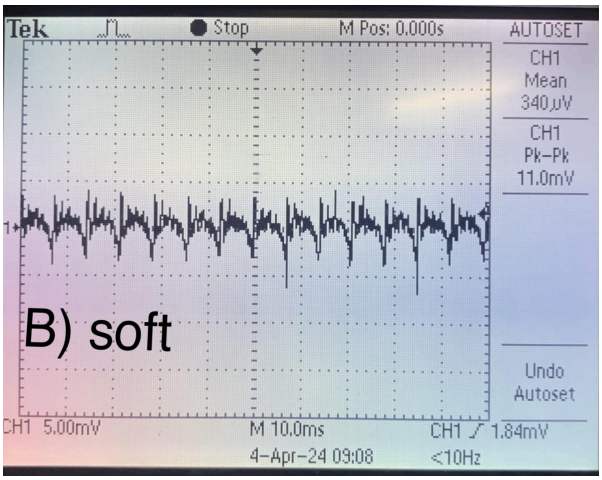
Part A: make various speech sounds. Which are periodic and which are not? **The r-sound sound is not periodic as it does not have a repeatable pattern; it seems like it has multiple different waves. While the shhh sound is periodic as it does have a repeatable pattern.**

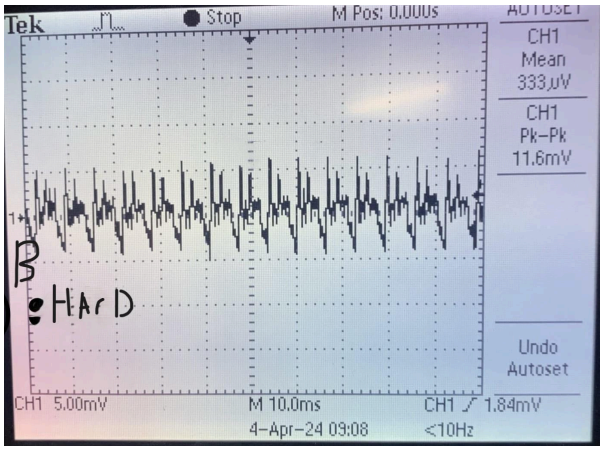
# LAB 7 Report (The oscilloscope)



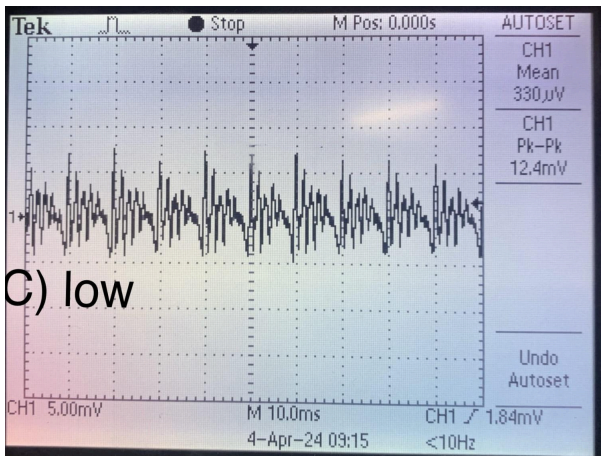

Part B: What differentiates a loud "aaah" sound from a soft one?
**The difference between a loud aah versus a soft aah is the amplitude of the sound. The loud aah has an amplitude of 69.6mV while the soft sound has an amplitude of 33mV so more than double and the frequency is the same regardless.**

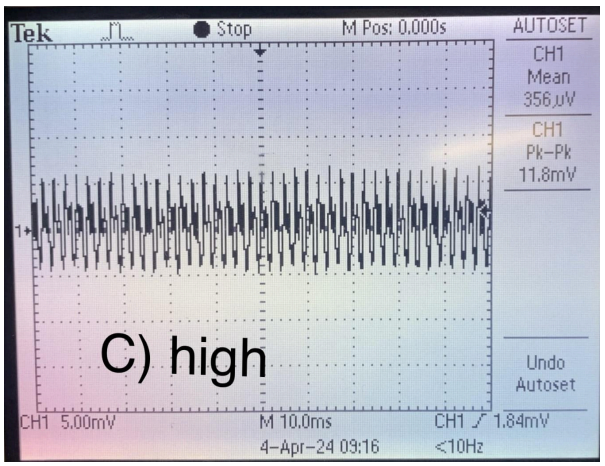


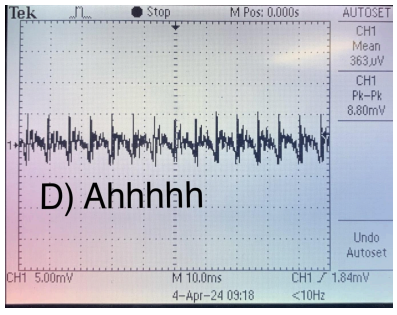

Part C: Try singing a vowel and then singing a higher note with the same vowel. What changes?
**The amplitude is mostly the same, the low is 99.2mv while the high is 70.8 mv. The frequency is the same being around 10 ms however the period of the wave is different for the low it is 60ms and the high is 20ms. A reason there might be a change in period rather than frequency is because there might be multiple waves interfering.**

# LAB 7 Report (The oscilloscope)

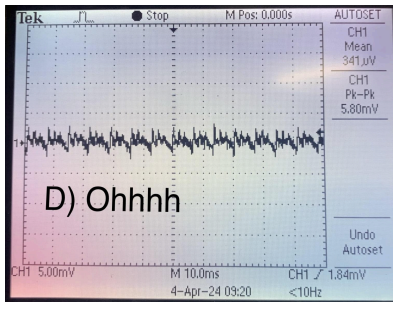


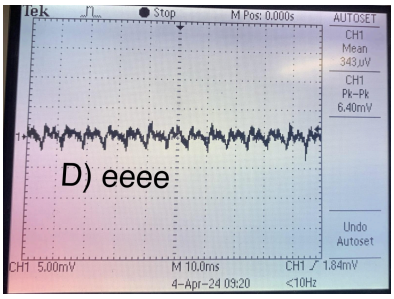

Part D: What differentiates the different vowel sounds? **The aah sound has the highest amplitude of all of the sounds, the eeh and the eee have the same amount of amplitude but the eeh has a higher frequency than the eee. The eee and the ooh have a similar frequency but the amplitude is a little different and the ooh tends to stay at a low frequency for longer and rises up much faster. Lastly the ooo has the least amount of amplitude and frequency.**

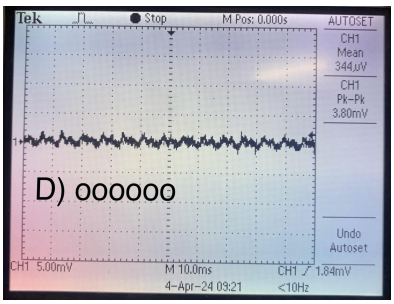






# LAB 7 Report (The oscilloscope)




Part E: Find the lowest and highest frequency you can sing. **The highest frequency recorded is 1.5ms while on the low is 606ms**