

## SCRIPT FOR PODCAST ON DIGITAL HEARING AIDS

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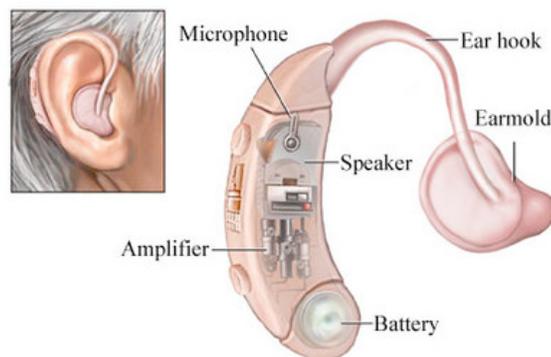


Hello and welcome to our first pod cast for MATH 2590.

My name is Stephanie Colangelo and my name is Sara Russo and we are going to be talking about digital hearing aids.

A hearing aid is a device used by a person who has difficulty hearing. It fits behind their ear and helps amplify and regulate sound.

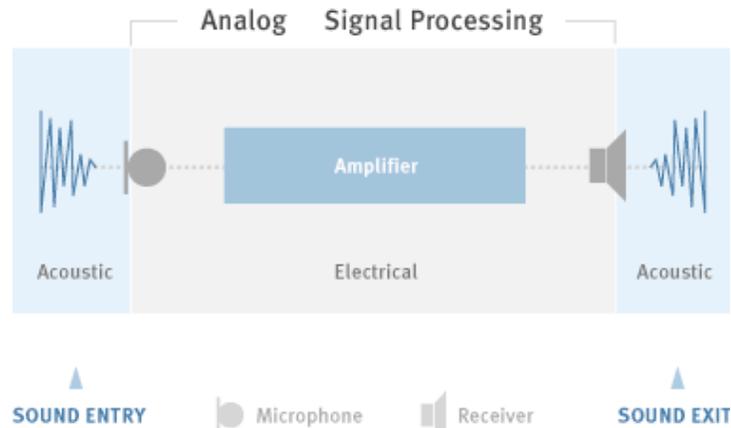
A hearing aid is made to increase the loudness of sounds that hits the ear drum in order to allow the hearing impaired person to understand speech.



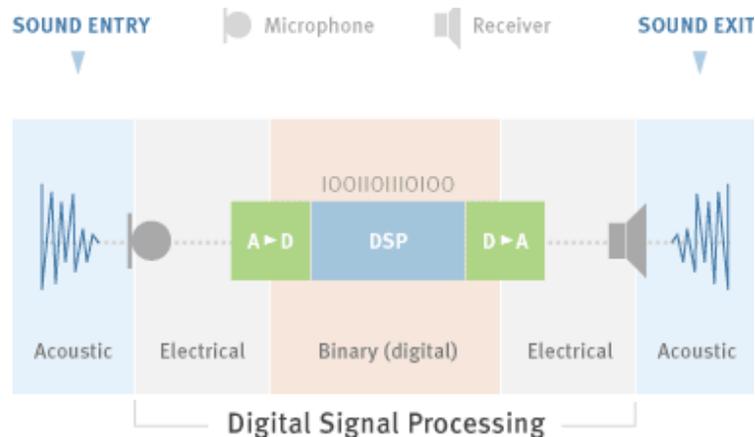
In order for this to occur, the hearing aid needs three parts:

- (1) A microphone, which collects sound waves from the air and changes them into electrical waves.
- (2) An amplifier, which increases the strength of electrical waves.
- (3) A receiver, which is like a small speaker, that changes electrical waves back into sound waves.

There are two different types of hearing aids: an analog hearing aid and a digital hearing aid.



An analog hearing aid picks up the external sound wave and converts it into electrical waves, and uses that electrical wave to provide a precise sound reading directly into the ear.



On the other hand, a digital hearing aid picks up the external sound waves and breaks it up into very small, distinct bits of information using digital signal processing (DSP).

An important part in the development of digital hearing relies on the use of computer and digital technology. The first digital hearing aid was successful through the use of computer technology.

The way that digital hearing aids amplify and process sound is different than analog hearing aids because digital hearing aids change the sound waves using precise mathematical calculations, processed by a computer.

Similar to analog processing, digital processing picks up the sound waves and converts it into electrical waves.



The difference is that digital signal processing then takes these electrical sound waves and converts them into binary numbers (“0”s and “1”s).

These binary numbers are manipulated through a small computer in the hearing aid.

The binary numbers, which represent sound, are manipulated and processed using algorithms.

<b>Binary Number</b>	<b>Algorithm (Instruction)</b>
11001	Increase volume
100101	Decrease volume
110101	Block out background noise

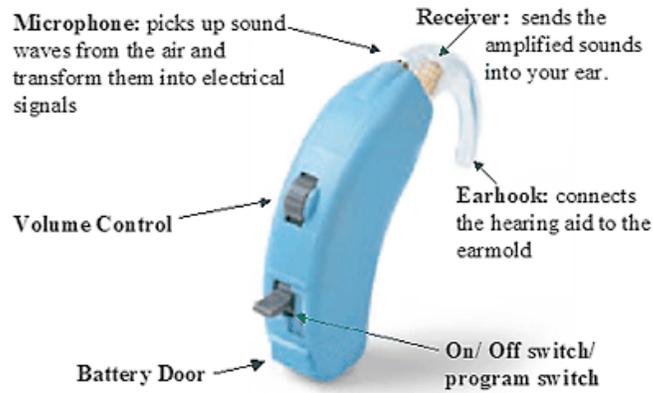
Algorithms are a set of instructions that adjust the volume of sound.

For example, if the sound is too high, algorithms are able to manipulate and process the binary numbers. This allows the sound to be changed to the appropriate volume.

Algorithms also provide a set of instructions that help distinguish between sounds that you want to hear and sounds that you do not want to hear, like background noise.

Finally, these binary numbers are converted back into electrical waves and then back into sound waves, which are then heard by the individual.

However, just because a hearing aid is digital does not mean it is better than an analog hearing aid.



Analog hearing aids do not differentiate between different external sounds as precisely as digital hearing aids do. Therefore, some sounds are heard too loud and some sounds are barely heard at all. The individual controlling the volume of the hearing aid fixes this problem.

Also, the hearing aid is able to save programs, which are then switched depending on the environment that the individual is in.

For example, there may be a program the individual uses while in a conversation and a different program they use while watching a movie.



On the other hand, a digital hearing aid, through its mathematical calculations, is able to produce better quality sound. This allows them to amplify the lowest sounds, like speech, while simultaneously blocking out any unwanted noise, like background sounds.

Also, digital hearing aids are able to monitor sounds on its own.

For example, whether an individual is in a conversation or watching a movie, the digital hearing aid automatically adjusts to the environment.

Furthermore, digital hearing aids are designed to be less noticeable and fit each individual persons needs, depending on their level of hearing loss.

Therefore, through digital signal processing, the digital hearing aid has allowed for more precise and better quality sound for the hearing impaired.

## Works Cited

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