



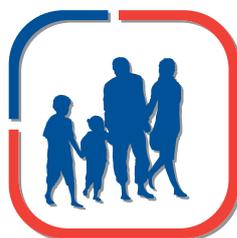
DeafHearie

Services for Deaf & Hard of Hearing People



Hearing Loss Explained

A Factsheet for Parents of Deaf and Hard of Hearing Children



Parents Corner



Hearing Loss Explained

This Factsheet provides information on sound, how the ear works, and different types and levels of hearing loss.

Understanding Sound

In order to understand hearing loss, we must first understand sound and how we hear it. Sound is made up of vibrations of energy which knock together to produce sound waves. The waves travel on air particles, spreading outwards from the source of the sound. Sound has two dimensions:

- A - 'pitch' or frequency; and
- B - 'intensity' or loudness.

Most sounds are made up of different frequencies; they are described as the pitch of a sound. Frequency is measured in Hertz (Hz), as shown horizontally in the diagram below across the top of the grid. The frequency of a sound affects the pitch that it is heard at. For example if you look at a piano keyboard from left to right, the low pitch notes are on the left and high pitch notes are on the right.

Loudness is measured in decibels (dB) and is shown vertically on the left column in the diagram below. The sounds are getting louder as you move down the column. The diagram shows how loud some everyday sounds can be.

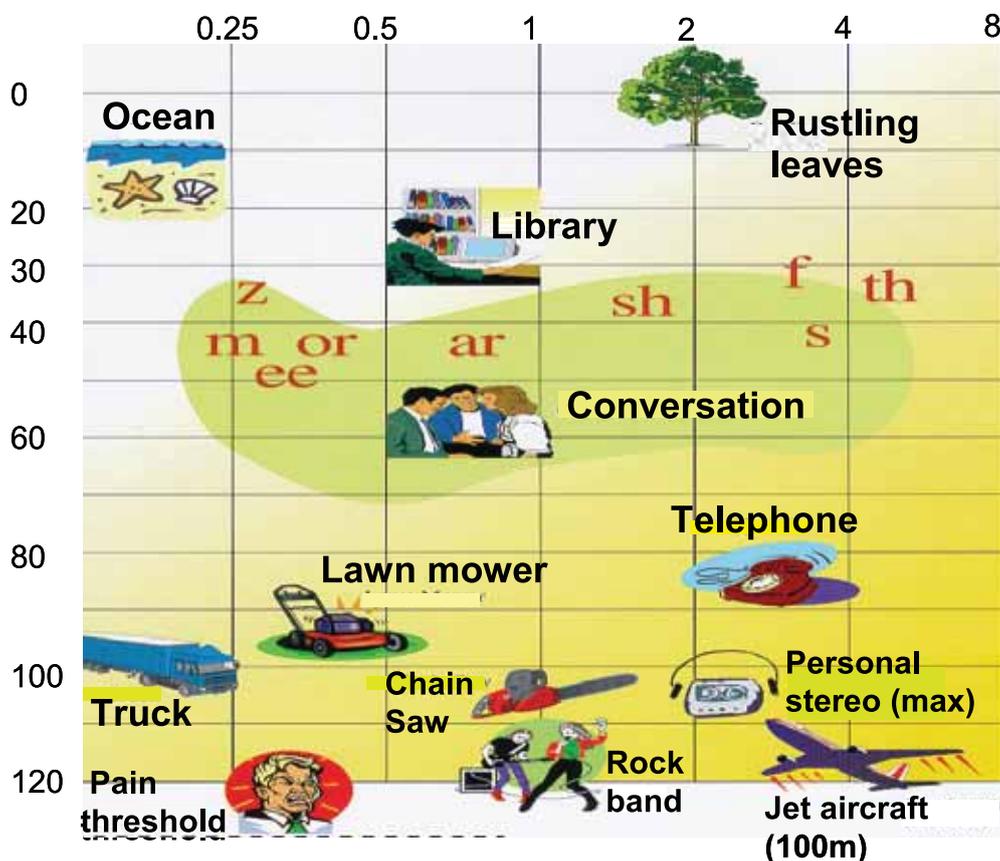
How We Hear

The ear is made up of three different sections: the outer ear, the middle ear, and the inner ear. These parts work together so you can hear and process sounds. The outer ear, or pinna (the part you can see), picks up sound waves that then travel down the ear canal.

When the sound waves hit the eardrum, the eardrum starts to vibrate. When the eardrum vibrates, it then causes three tiny bones in the middle ear to vibrate. These bones are called the ossicles (hammer, anvil and stirrup). They conduct sound through the middle and into the inner ear.

The vibrations then travel to the cochlea, which is filled with liquid and has thousands of tiny hairs. The sound vibrations make the tiny hairs move and different hairs vibrate in response to different frequencies. The function of the hairs is to change the sound waves into electrical impulses that then travel along the auditory nerve to the brain. When the electrical impulses reach your brain, you 'hear' the sound. In order for us to hear sound properly, all parts of the ear must be working properly

Diagram illustrating the loudness and pitch of the sound components of speech and a variety of common sounds in our environment.



Hearing Loss Explained

Levels of Hearing Loss

Hearing loss is often classified by means of different levels. The same definitions are not always used, but the following are among the most common.

Normal

On average, the quietest sounds heard by people with their better ear are up to 20 dB.

Mild

On average, the quietest sounds heard by a person with their better ear is between 20 and 40 dB. The effects for someone with a mild hearing loss when having a conversation are if the other person is too far away or if the other person's voice is quiet or the background environment is noisy, then the person with the hearing loss may not be able to understand all the conversation.

Moderate

On average, the quietest sounds heard by a person with their better ear is between 40 and 70 dB. People who have a moderate hearing loss have difficulty keeping up with conversations when not using a hearing aid and even then they may struggle if the listening environment is noisy or the other person is not facing them.

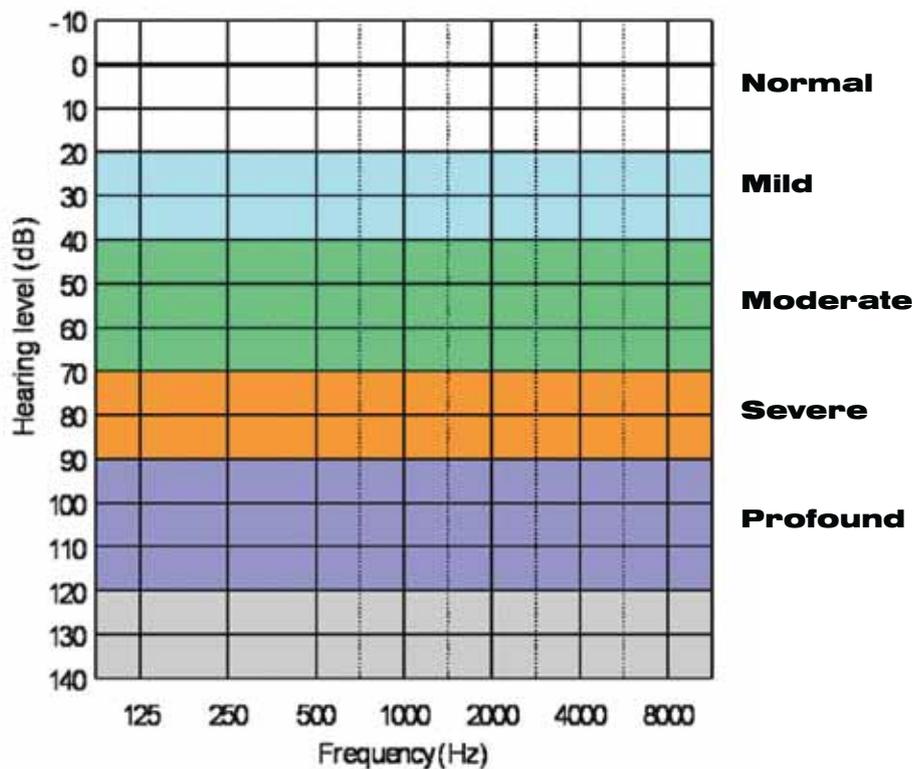
Severe

On average, the quietest sounds heard by a person with their better ear is between 70 and 95 dB. People who have a severe hearing loss could benefit from powerful hearing aids, but often they rely heavily on lip-reading, even when they are using hearing aids and would be assisted by quieter and brighter listening environments. Some people would also use sign language.

Profound

On average, the quietest sounds heard a person with their better ear is from 95 dB or more. People who have a profound hearing loss are very hard of hearing and typically rely on lip-reading, and/or sign language. They may hear loud sounds.

The levels of hearing loss are shown on an **Audiogram**



Hearing Loss Explained

Understanding Audiograms

The audiogram is a picture of how well we hear. It is a graph on which the thresholds at which a person can hear sound at different frequencies (pitch) and loudness (intensity) are recorded.

Modes of testing

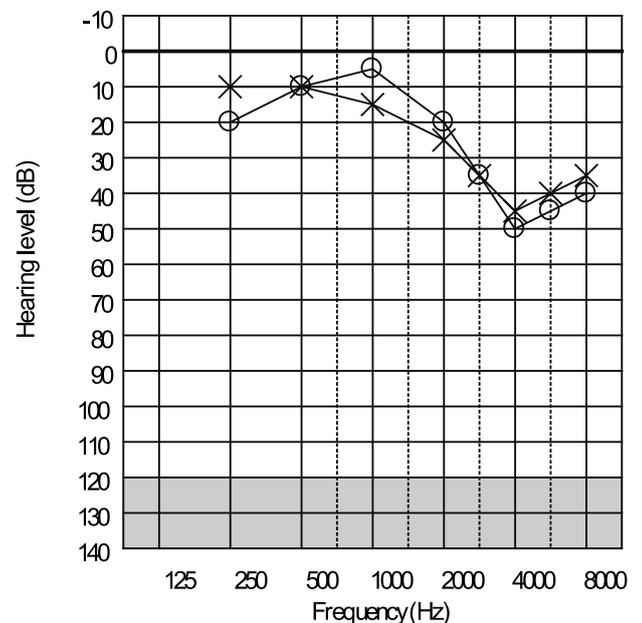
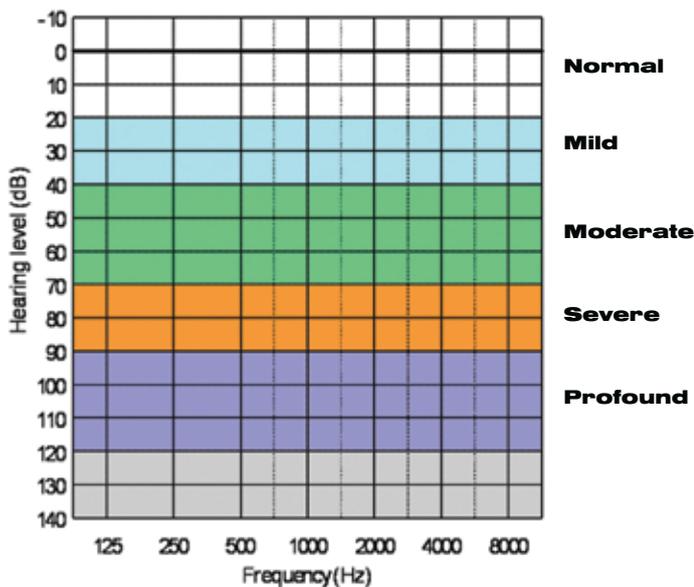
- Air conduction – what your child can hear through their external ear.
- Bone conduction – vibrates the bone behind the ear to bypass the outer/middle ear and stimulates the inner ear directly to determine the type of hearing loss.

This may include conductive (hearing loss in the outer and/or middle ear) or sensorineural (hearing loss in the inner ear). These tests enable the audiologist to determine the type and level of hearing loss.

Symbols

- Left ear air conduction, represented by an **X**
- Right ear air conduction, represented by an **O**.
- Bone Conduction by an **△**

A hearing loss may be unilateral (affecting one ear), or bilateral (affecting both ears). The diagram below demonstrates that the person has a bilateral mild hearing loss in the low frequencies and a bilateral moderate loss in the high frequencies.



www.deafhear.ie

35 North Frederick Street, Dublin 1. Tel: 01-8175700 Text: 01-8783629. Email: info@deafhear.ie