Hearing: How We Hear and Understanding Your Audiogram

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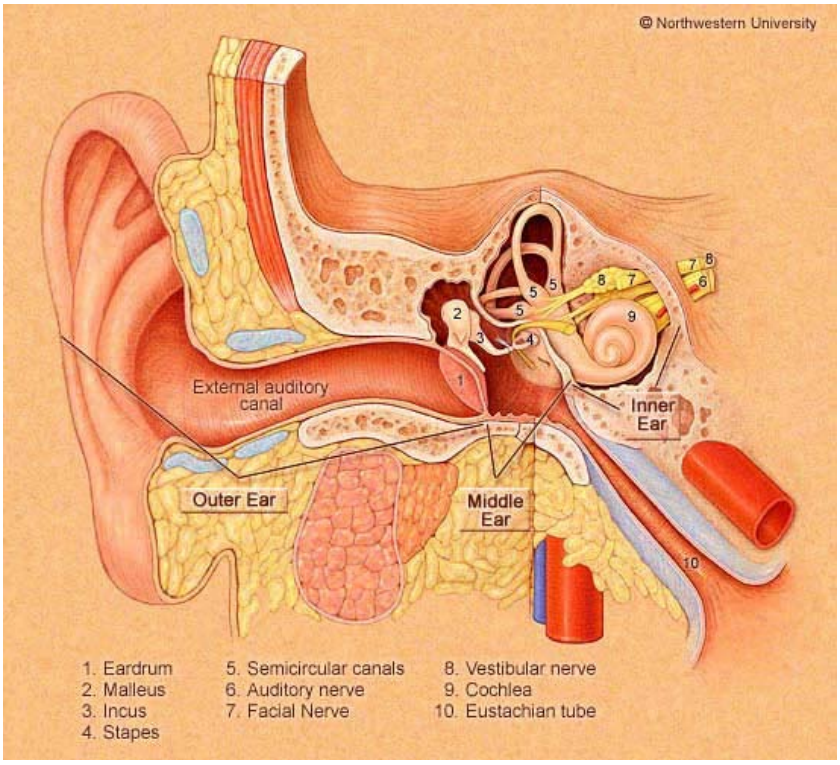
How We Hear



The ear is made up of three main parts: the **outer, middle,** and **inner ear**.

The outer ear
The visible part of the outer ear is called the auricle or pinna. It collects sound waves and channels them into the **external auditory canal**. The sound waves then travel toward the **eardrum** (1), which is also called the tympanic membrane. When the sound waves reach the eardrum, they make it vibrate - just like when you hit a real drum.

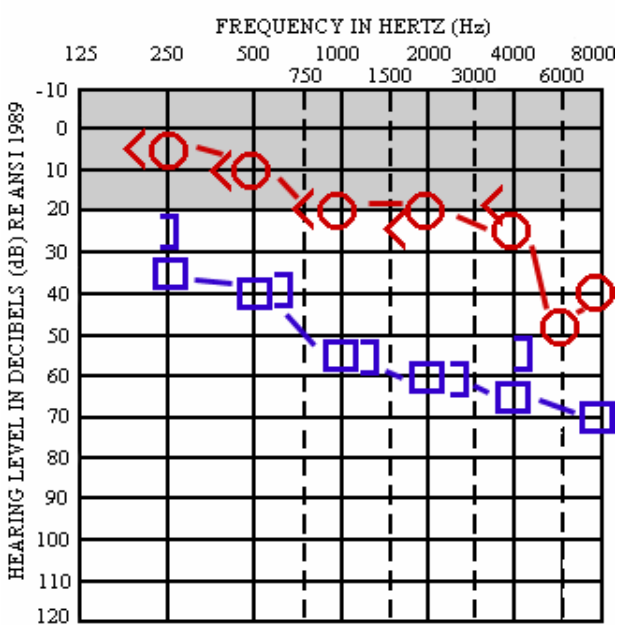
The middle ear
The vibrations from the eardrum then pass into the middle ear, which contains three tiny bones: **the malleus** (2), **the incus** (3) and **the stapes** (4). These bones are the tiniest in the human body. The sound vibrations then pass through a membrane called the oval window and into the fluid of the inner ear. A tube at the bottom of the middle ear, called the **Eustachian tube** (10), connects to the back of the nose to control the air pressure.

The inner ear
When the sound waves reach the inner ear, they enter the **cochlea** (9), a system of tubes shaped like a snailshell. The cochlea is filled with fluid, which moves in response to the vibrations of the bones in the middle ear. As the fluid vibrates, 25,000 tiny nerve endings are set in motion. These movements are converted into electrical impulses along the **auditory nerve** (6) to the brain. The brain then interprets these signals as sound.

Understanding the Audiogram

An **audiogram** is a graph that shows the results of a hearing test**.** The sound **intensity** in decibels (dB HL) is plotted along the side of the audiogram with the quiet sounds near the top, loud sounds at the bottom. The pitch, or **frequency**, in Hz is plotted with the low-pitch sounds to the left, high-pitch to the right.

The audiogram shows the softest sounds a person can hear, and if there is hearing loss, what kind it is, and how severe it is (see classification of hearing loss below). This will help the audiologist decide what solution is best for the hearing loss. The audiogram below shows that the person has normal hearing in the low frequencies sloping to a mild to moderate hearing loss in their right ear. In the left ear he/she has a mild to moderately-severe hearing loss. The type of hearing loss shown below is sensorineural.

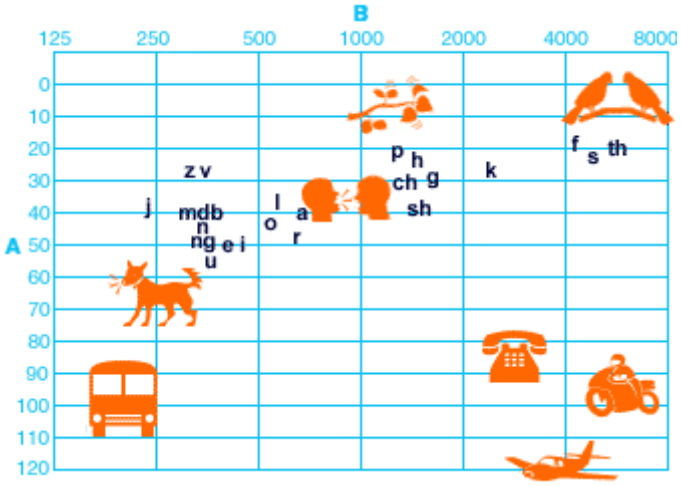


O = Right ear results
X = Left ear results

S = Soundfield results
(listening with both ears to sounds through speakers)

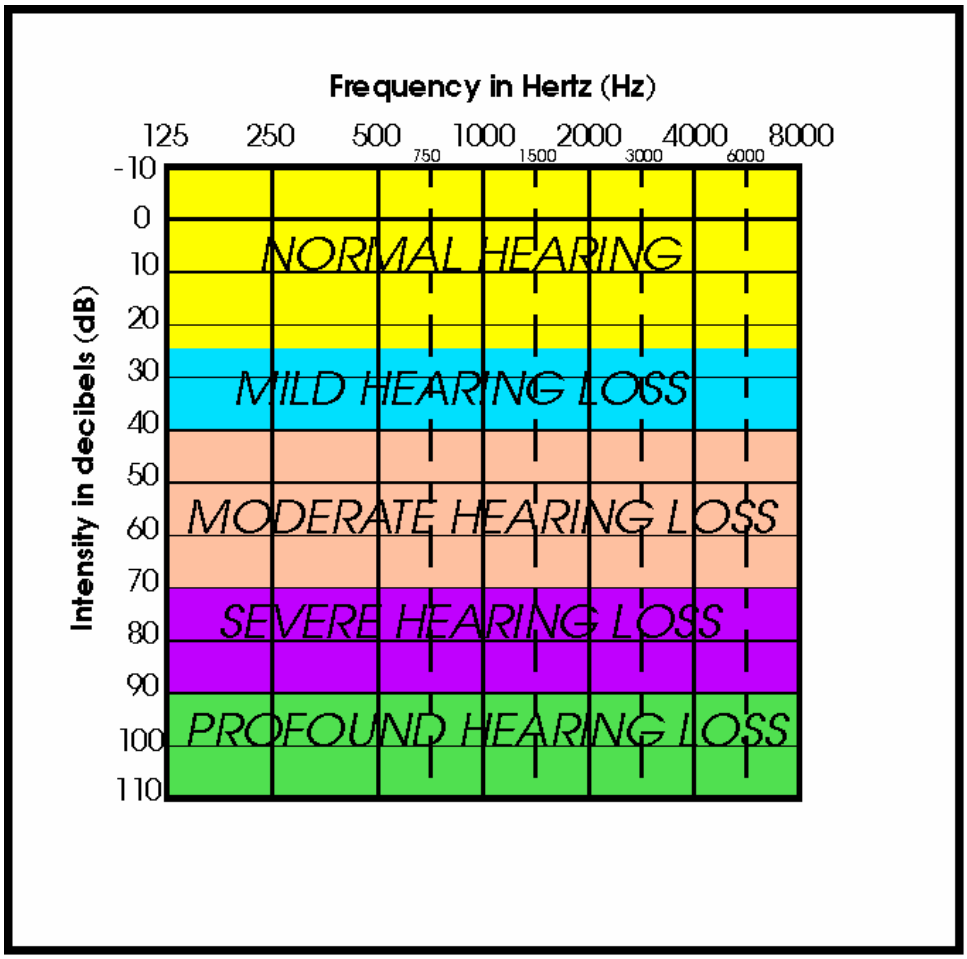
[< = Right ear bone conduction results
] > = Left ear bone conduction results

Look at the audiogram below to get an idea of the placement (by pitch and intensity) of familiar sounds such as a dog barking or a telephone ringing or different sounds of speech.



Speech Discrimination, or **Word Recognition**, is scored as a percentage of words that can be repeated correctly at a comfortable intensity level in quiet with no background noise.

Classification of Hearing Loss



Classification of hearing level	Hearing Threshold Range
Normal hearing	0—25 dB HL
Mild hearing loss	26—40 dB HL
Moderate hearing loss	41—55 dB HL
Moderately-severe hearing loss	56—70 dB HL
Severe hearing loss	71—90 dB HL
Profound hearing loss	91+ dB HL