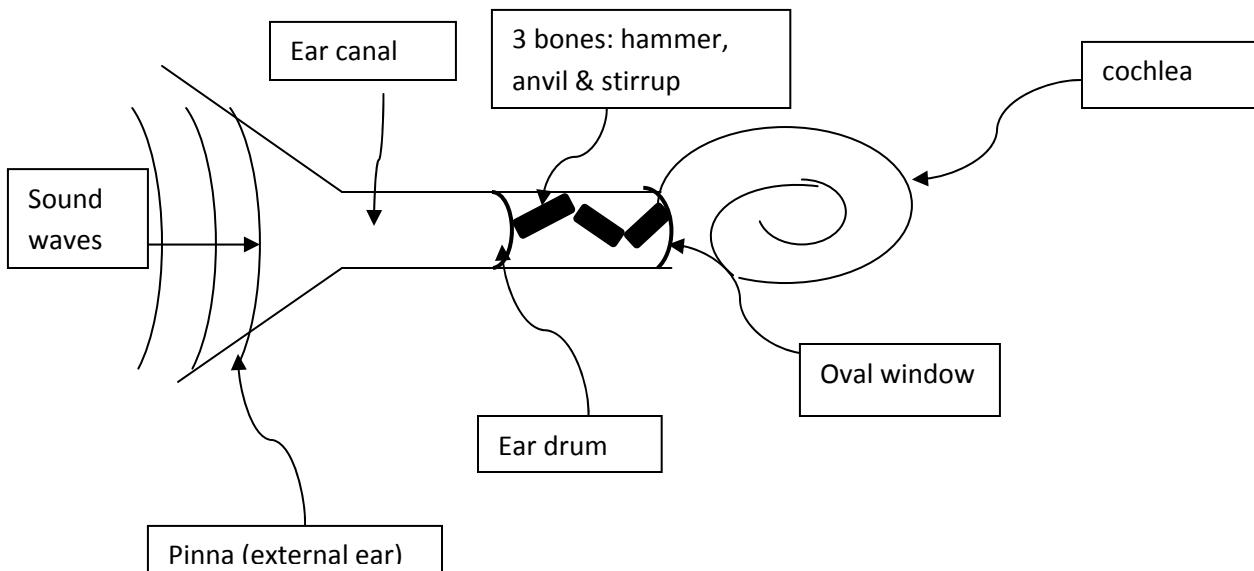


How the Ear Works



Sound waves are collected by your pinna (external ear) and funneled down into your ear canal. Let's say I hit the tuning fork which vibrates at 256 Hz. At the end of your ear canal is a membrane that vibrates at the same frequency as the sound wave (256 Hz)– this is your ear drum. Attached to your ear drum is the hammer bone, which connects to the anvil bone, which connects to the stirrup bone. These 3 bones vibrate together (at 256 Hz) like connected levers. They cause the oval window to vibrate at the same frequency (256 Hz). The oval window sends the vibration into the cochlea which is a snail-shaped structure. Inside the cochlea are small hairs (which I did not draw but they are there!). Each hair vibrates to a specific frequency and it is connected to an auditory nerve. Only the hair or hairs (few in number) that is specific for 256 Hz will vibrate. The others do not! If it vibrates (thus indicating a 256 Hz sound frequency), then it sends an electrical signal to the brain via the auditory nerve. Voila! Your brain knows you heard a certain note.

Hearing Aids

1) A traditional hearing aid insert or the ones that hook behind the pinna pick up sounds and merely amplify them (make them louder) as they enter the ear canal. That makes useful sound (like people talking) easier to hear. In this hearing aid, the person's ear drum is still functional. Unfortunately, the hearing aid also amplifies the unwanted background noise too (like a vacuum cleaner, or a dog barking). However, hearing aids do improve the quality of life for those that require them.

2) Cochlear implants are a multi-part hearing aid. One part is on the outside of the skull, usually behind the ear. The other part is surgically implanted. These implants pick up sound and redirect the vibrations past the ear drum. Those that wear cochlear implants have something wrong with the ear drum so it cannot be used. The signal is rerouted to the hammer, anvil and

stirrup bones as a vibration or...more recently...can be rerouted as an electrical signal straight to the auditory nerve.

No Hearing Aid possible – if there is something wrong with the auditory nerve currently there is no hearing aid that will help this person.