



*Independent Hearing Care Services*

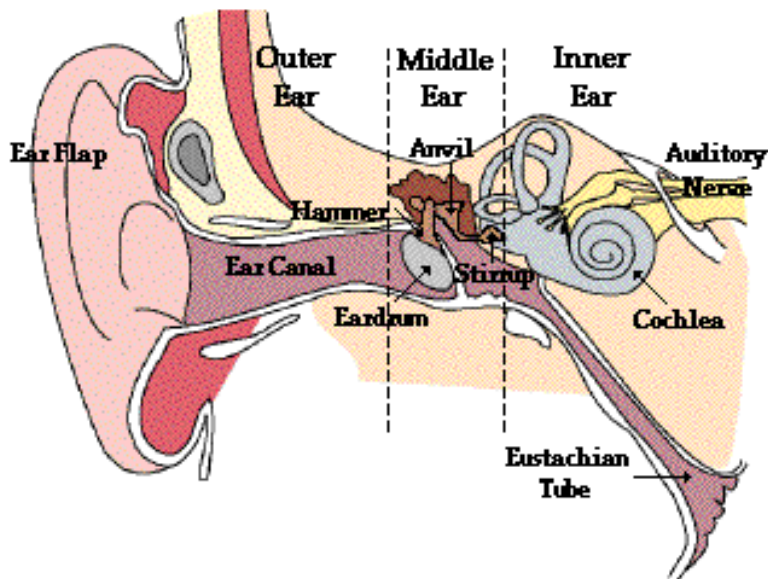
## HEARABILITY INFORMATION SHEET

### HOW THE EAR WORKS

The ear is divided into three parts – the outer ear, the middle ear and the inner ear.

#### The Outer Ear

The outer ear is also known as the Auricle or Pinna and is made of cartilage and soft tissue and skin. Moving into the ear, the outer 1/3rd of the external Auditory Canal is constructed in much the same way but also contains tiny hair cells and glands, which produce wax. The inner 2/3rds are encased in bone. At the end of the canal is the eardrum or Tympanic Membrane, which separates the outer ear from the middle ear. It is circular in shape and supported around the edge by bone.



#### The Middle Ear

The middle ear is beyond the eardrum and is a cavity filled with air from the Eustachian Tube. This tube connects the middle ear with the nose

and throat. Blowing your nose or swallowing causes the tube, which is normally closed, to open and lets air into or out of the middle cavity. When air pressures change this leads to a 'blocked up' feeling, like that experienced on a plane. This is because the air pressure inside the ear differs from the air pressure around us, and we 'feel' the difference. Airline staff may hand out boiled sweets, as the sucking action causes the Eustachian tube to open. This equalizes the

pressure inside our ears. The Eustachian tube also acts as a drain for the mucus produced in the middle ear, which is swallowed.

The middle ear also contains the three smallest bones in the body. Collectively these are known as the Ossicles. They consist of the Malleus (or hammer), the Incus (or anvil) and the Stapes (or stirrup). These names give a broad clue as to how they work, and looking at their shapes it is easy to see how they have been named.

At the end of the Ossicular chain, the handle of the Malleus is embedded in the eardrum, with the other bones balanced against it acting as a lever. At the other end there is a wall of bone with two openings, the oval and round windows, separating the middle and inner ears. The base plate of the stapes is fixed to the oval window.

### **The Inner Ear**

The fluid filled inner ear consists of a bony compartment in which three important components are situated: the Semicircular Canals, the Vestibule and the Cochlea. The Semicircular Canals are concerned with our sense of balance and the ability to stand upright, while the shell-like Cochlea is connected with hearing.

### **How Sound Reaches the Brain**

The outer ear collects sound waves and passes them along the auditory canal to the Tympanic Membrane. This reacts by vibrating, which in turn causes the Ossicles to rock back and forth, passing the sound waves (as vibration) along to the Cochlea where the inner-ear fluid is disturbed, causing thousands of small hair cells to be stimulated. These hairs convert the sound waves into electrical impulses, which are then conducted along the Auditory Nerve to the brain.

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