

Loud Shirt Day school kit

Listening Facts & Figures

Fun Facts About Hearing...

- Cicadas have their hearing organs in their stomachs.
- Butterflies are deaf.
- Crickets have their hearing organs in their knees.
- Male mosquitoes hear with thousands of tiny hairs growing on their antennae.
- Fish do not have ears but they can hear. They hear pressure changes through ridges on their bodies.
- Snakes do not have ears, but their tongues are sensitive to sound vibrations.
- In World War I parrots were kept on the Eiffel Tower in Paris, France because of their remarkable sense of hearing. When the parrots heard the enemy aircraft coming they would warn everyone of the approaching danger long before any human ear would hear it.

About our ears

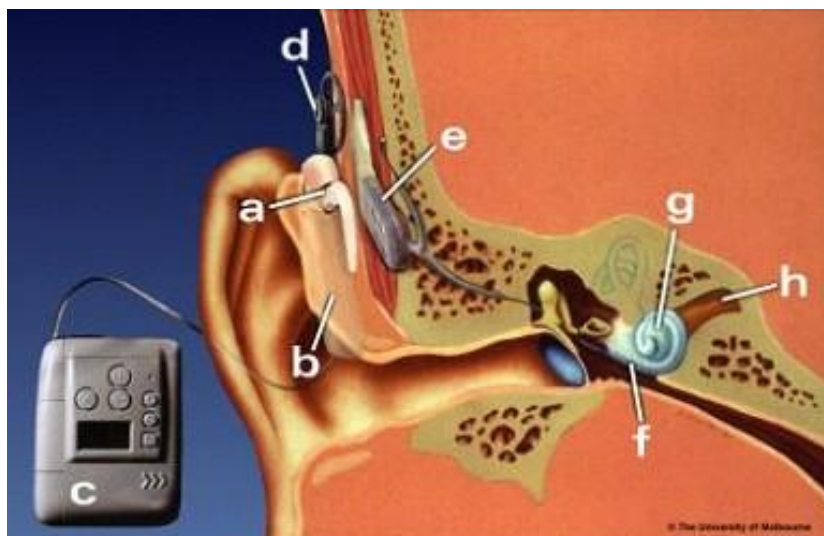
- The ears contain structures for both the sense of hearing and the sense of balance. The eighth cranial nerve (vestibulocochlear nerve made up of the auditory and vestibular nerves) carries nerve impulses for both hearing and balance from the ear to the brain
- Sounds reach our ears as sound waves. These move through the ear to the eardrum which vibrates. This in turn causes the three little bones of the middle ear to move backwards and forwards and amplify the vibrations as they pass them into the inner ear (cochlea). Fluid in the cochlea is set in motion and the vibrations are picked up by special sensory cells known as hair cells, which send electrical signals through the hearing nerve to the brain, so we can hear. (www.deafnessresearch.org.us/How+the+ear+works+1974.twl)
- If you spin around in circles you will get dizzy. But do you know why? When you spin, fluid in the semicircular canals of your ear moves around. This stimulates the hair cells. When you stop spinning, the fluid still moves a bit. Because the fluid is still activating hair cells, your brain still gets a message that you are moving and you feel dizzy.
- The ear has over 25,000 tiny hair cells to help you hear the nuances of sound.
- Animals and humans do not hear at the same frequencies. Here are some examples of hearing ranges of different animals compared to a human.

About cochlear implants

How do cochlear implants work?

Simplified Summary:

- a. Sounds and speech are picked up by the microphone.
- b. The information from the microphone is sent to the speech processor.
- c. The speech processor analyses the information and converts it into an electrical code.
- d. The coded signal travels via a cable to the transmitting coil in the headset. Radio waves from the transmitter coil carry the coded signal through the skin to the implant inside.
- e. The implant package decodes the signal. The signal contains information that determines how much electrical current will be sent to the different electrodes.
- f. The appropriate amount of electrical current passes down the lead wires to the chosen electrodes.
- g. The position of the stimulating electrodes within the cochlea will determine the frequency or pitch of the sounds. The amount of electrical current will determine the loudness of the sounds.
- h. Once the nerve endings in the cochlea are stimulated, the message is sent up to the brain along the hearing nerve. The brain interprets the stimulation as a meaningful sound.



How do cochlear implants work?

Detailed explanation:

Speech and other sounds are picked up by the microphone and sent to the speech processor. The processor codes the sounds into an electrical signal which is sent via a cable to the transmitting coil (which is held in place by a magnet). The coil then passes the signal through the skin via radio waves to the implant which transforms the signal to electrical pulses. The radio waves also provide power to the implant, as there is no battery in the internal part. The pulses pass from the electrode array and stimulate hearing nerve fibres within the cochlea.

The speech processor does not just make sounds louder like a hearing aid. Instead, it selects out some of the important information in the speech signal and then produces a pattern of electrical pulses in the patient's ear. This pattern is selected to be as close as possible to the original speech sound. It is not possible to make sounds completely natural, because there are only 22 electrodes that are replacing the function of tens of thousands of hair cells in a normally hearing ear.

The electrical patterns are different for each person and need to be programmed into the speech processor by a trained clinician. The differences arise because the electrodes are not always in the same position relative to the surviving nerves and the nerves vary in sensitivity to electrical currents. The clinician must measure the lowest and greatest current for every electrode to determine the softest and loudest sounds that will be heard. The different electrodes produce sounds with different pitch. The speech processor combines sounds on different electrodes with different loudness, to build up something as close to the original sound as possible.

Did you know?

Young people today are exposed to three times as much social noise as in the 1980s. Visits to nightclubs, discos and concerts are among the most common activities responsible for this, as well as listening to in-car music and attending sports events.

**If you want to maintain your good hearing for as long as possible,
*you must take care of it.***

Did you know that MP3 and CD players can cause hearing damage?

MP3 players make listening to music easy but the noise level combined with sustained listening on a daily basis can be highly damaging. In an Australian study the researchers stopped 55 random people with personal stereos in Melbourne and Sydney. The researchers measured the volumes at which they were played and found that 25% played their music at noise levels that risked hearing damage.

Researchers from the British RNID hearing organisation examined the use of MP3 players among 18-24 year-olds. They found that 42% believed that they were listening to the music at excessive volumes and 66% reported that they frequently experienced ringing or hissing noises in their ears.

When listening to music for long periods at a time, the sound level should not exceed 85 - 95 decibels

What about sports events?

Unlike heavy industry, sports events are not subject to noise regulations – and those who attended the World Cup in South Africa certainly had their hearing pummelled by the noisy vuvuselas! An excited spectator in a football stadium may not experience even the most extreme and dangerous noise level as unpleasant or painful,” stated Hans-Heinrich Grübmeier, an ear, nose and throat specialist from Neustadt, Germany. But Dr Grübmeier recommended that all World Cup fans should use earplugs in the stadium. Even while watching the games at home you should try to keep your television volume at a moderate level, eliminate or avoid other sources of noise, whether from the street or household appliances, and give your ears a break regularly.

Hearing Loss

- Excessive noise is the number one reason for hearing loss.
- Experts agree that continued exposure to noise of 85 dB or louder, over time, will eventually harm hearing.
- If you cannot carry on a conversation in the presence of noise, it is too loud for your ears and can potentially cause hearing loss.
- 1 in 4 people exposed to high levels of noise will develop a hearing loss.
- The number one reason people seek a hearing solution is the recognition that their hearing has worsened. Usually this occurs from making a serious mistake, family pressure or safety concerns.
- Professions at risk of hearing loss include firefighters, police officers, factory workers, farmers, construction workers, military personnel, heavy industry workers, musicians, and entertainment industry professionals.

What can you do to prevent hearing loss...

- Be aware of how long you are being exposed to loud sounds, and give your ears ample time to recover. Take regular breaks from the music or other noise source. Aim for at least 10 minutes' break every hour.
- Exposure to a 100 dBA sound for around two hours requires at least 16 hours of rest for the ears if the hearing loss is not to become permanent. A minority of people are more sensitive and a longer period of rest may be required.
- Turn off all unnecessary noise sources and limit the stress on your ears.
- Wear ear protection when using power tools, lawn mowers, etc.

- At rock concerts or night clubs, give your ears a break and don't stand close to loudspeakers.
- Reduce the volume on your television, Ipod or MP3. Make an effort to reduce the sound level while listening to music or at least reduce the time you spend listening to loud music. Take special care if you use headphones and when listening to your car stereo. Apple has an update for their iPods that allows the listener to set the maximum volume. It also comes with a code, so parents can stop their children from undoing it.
- Don't increase the volume on your MP3 in order to drown out background noise such as a train or traffic.
- Always be aware of the noise in your workplace. The noise level must not exceed 85 dB. Reduce the noise or wear ear protection.
- If you have pain in your ears, hear a ringing sound or feel a tingling in your ears this is a warning that the sound levels are too high and you should walk away immediately from the source of the noise.
- Felt pads under the legs of chairs and tables on hard floors reduce clattering. Doors can be fitted with door closers, making them shut more quietly.

How loud is too loud?

dB Level	Activity/Frequency	Probable Outcome
85	Normal sound level	OK
85+	For eight hours continually	Permanent hearing loss
90+	Background noise	Difficult to hear conversation even when shouting
90+	Frequent participation in leisure activities at this level or above	increases of hearing loss by 10%.
100	Continual exposure	Safe for only 15 minutes
130	Any exposure	Ears hurt
140	Few seconds exposure	Permanent loss
180	At the level of an explosion	Ear drum bursts causing permanent damage

How loud are things around you?

NOISE SOURCE	Db LEVEL	COMMENTS
Ticking of a watch	20	
Whisper	30	
Normal conversation	60	
Car Traffic	70	
Hair Dryer	80-90	
MP3/CD	80	
Kindergartens	80-85	Continued exposure above this level can be harmful
Restaurants	88+	Equivalent to a pig house at feeding time
Harry Potter & the Chamber of the Secrets – battle with the snake scene	93	
Motorcycles	95-120	
Football Stadium & Nightclub	110	
Stereo with headphones	112	
Live music concerts	120+	
Firecrackers	125-155 (distance of 10 feet)	
Rock Bands	130+	Same as an aircraft at 30 metres. 73% of people who have ever been to a club, gig, concert or festival have had ringing in their ears after a night out.
“Boom” Cars	140+	
Infants’ squeaky toys	140+	
Gunshots	150-167	
Explosion	180	