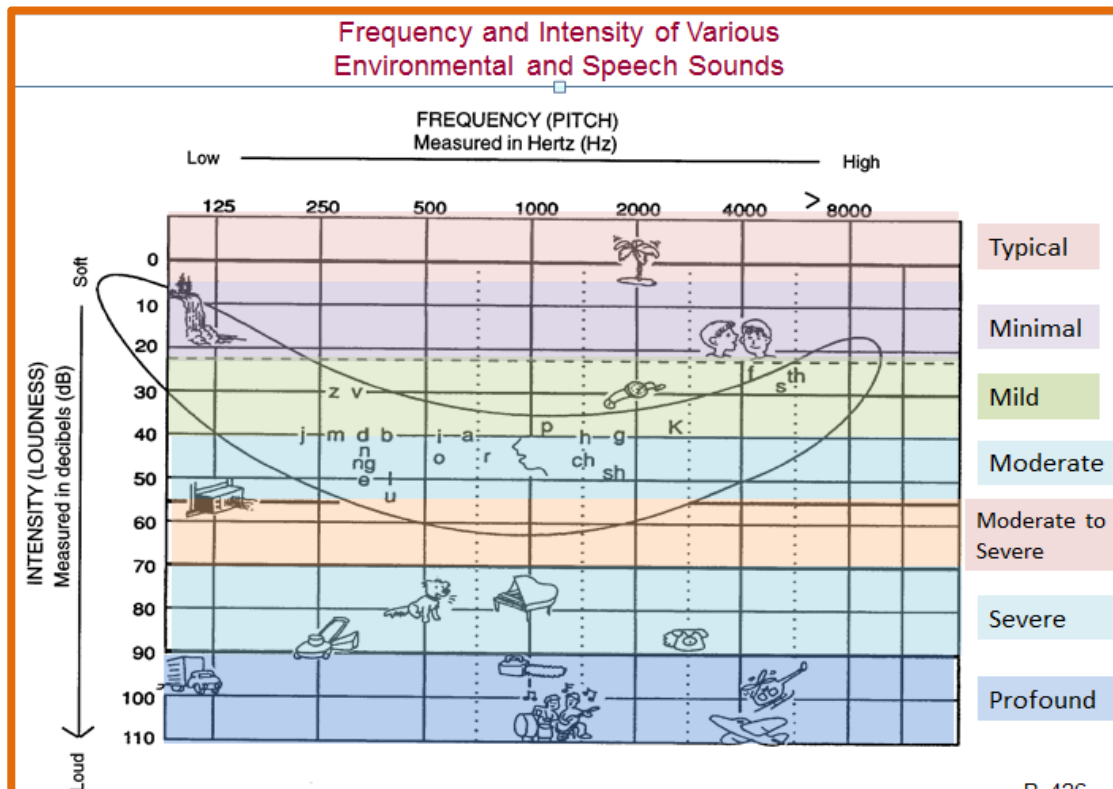




## The Speech banana

By: Selvarani Moodley, Audiologist and HiHopes Parent advisor



(SKI HI MANUAL Vol 1 Pg 426)

The speech banana is an approximation of where different speech sounds are on the audiogram in terms of frequency and intensity at typical conversation levels. Most speech sounds are within the 250 to 4000Hz range, with a few high frequency sounds between 4000Hz and 6000Hz.

A plotting of the child's thresholds at each frequency on the speech banana will show the speech sounds which are within the range the child is able to hear. Any sound which is

below the level of the child's threshold will be heard, and anything above this threshold line will not be heard. A child with a mild loss may miss out on f, v and z in the low frequencies and f, s and th in the high frequencies. Sounds in the light blue area will be heard. Thus, children with mild losses develop speech and respond to sounds, and the hearing loss is identified at a later age. These children will often have difficulties with pronunciation of words, depending on the sounds they are unable to hear. Difficulty will be experienced in noisy environments such as the classroom.

A moderate loss will result in missing out on any number of consonants in the blue area, depending on the shape of the loss, while a moderate to severe (and greater) loss will result in all speech sounds being missed. However, environmental sounds (like the piano, dog barking, lawnmower) will be heard. These children will respond to sound but, without amplification, will not have sufficient access to sounds to develop speech.

With amplification the threshold at which sounds are heard will be improved and thus access to speech sounds will improve. However, the hearing aid or cochlear implant will amplify sounds based on the number of channels that the aid has and the ability to amplify speech sounds (as opposed to environmental sounds) will depend on the quality of the hearing aid.

Hearing aids amplify sounds according to the number of channels, taking the frequency spectrum and dividing it into the channels that the hearing aid has. So for example if the hearing aid has 8 channels, it takes the speech frequency spectrum from about 250Hz to 6000Hz and divides it into 8 overlapping bands to fit into the 8 channels. The sound quality will thus not be the same as typical hearing, with the severity of the loss and amount that sound has to be amplified most likely resulting in decrease in quality. This is further compromised by the amplification of environmental sounds (including e.g. wind and sounds like cutlery and shifting of chairs). While more expensive aids have the ability to cut out amplification of environmental sounds and mainly amplify speech sounds, the compression of these environmental sounds may have an effect on the quality of speech sounds.

For development of speech and language in the auditory only modality, intervention and specific focus on speech sounds that are difficult for the child to hear (falling at or below the threshold) is necessary. However, it is also important to be aware of the chronological progression at which typical hearing children develop speech sounds, so there is not an unrealistic expectation for children with a hearing loss to develop accurate production of speech sounds beyond their developmental age.

A useful way for parents to check the functioning of the hearing aid and whether sounds heard by the child are clear is to do the Ling 6 sound test. The parent listens to the Hearing aid (either through a mould custom made for them or through a stethoscope) and listens to the quality of the amplified sound as they say the Ling 6 sounds: aaaa, eeee, oooo, shhhh, sssss, mmmm. If you look at the speech banana diagram, these sounds cover the range of low, mid and high frequencies. This gives an idea of how the sounds are amplified for the child across the frequencies. If sounds are unclear, or there is a cracking or poor quality of sound, check with the audiologist on how this can be fixed.