The Ling 6 Sound Test

Peter Keen, Educational Audiologist, offers his thoughts on the new Ling-Madell-Hewitt (LMH) test battery

The Ling 6 Sound Test is an excellent daily hearing aid check if used appropriately. I am concerned that the justification for the new Ling-Madell-Hewitt (LMH) test battery uses inappropriate criticisms of the 6 sound test.

In the March 2022 BATOD magazine the authors write:

As soon as the tester's mouth is covered, some children will begin reciting "a, oo, ee, sh, s, m" even before the tester speaks... other children have admitted that, since the test is repeated daily, they are so bored that they pay little attention as they are responding.

I was taught that, as a daily 'quick check' it should be played as a fun game. With only 6 sounds, they have to be mixed up differently every time with some being used twice AND with different time elapsing between the presentations. If a child does not hear the [s] at all they might guess that it is an [s] if the timings are the same between each sound so they know they've missed one. If they say 'oo' instead of 'ee' it is because they have not heard the 2kHz Second Formant of 'ee', the first formant of 'ee' sounding like 'oo' on its own. The Ling 6 Sound Test is not a health 'screening' or 'diagnostic' test, but it is a good indicator that something is not right today which was all right yesterday, meaning that something has gone wrong and needs investigating.

Also stated:
…the authors began to note that there were children who "passed" the Ling Six Sound Test but still had poor speech perception. …the authors began to wonder if testing only six sounds and also only these specific 6 sounds provided sufficient information about speech perception.

The 6 Sounds give a 'quick check' to see if these key sounds can be heard as expected. They cover the whole speech frequency range but obviously not the whole 44 phonemes possible – it's a 'quick check'. Poor speech perception should be addressed by the Programming Audiologist.

These statements are followed by a table of 'speech perception errors' which are not relevant to the Ling Test and should be the concern of the hearing aid/implant programmer. I am concerned that only ten sounds are being recommended for the LMH test as a diagnostic test should be looking at a full range of sounds appropriate to the child's potential speech development age. According to David Crystal (Child Language, Learning and Linguistics published 1976) the 'j' phoneme (in the LMH test) would be first used by a hearing child at four years old, so a deaf child who is fitted at six months old and only fully appropriately programmed at one year old will be five years old before they might use the sound. The 'h' sound in the LMH test is very quiet in normal speech and unlikely to be picked up by a hearing aid; if made abnormally loud there will be frequency distortions making it, in my opinion, a poor choice of stimulus. I could go on…

Peter Keen is a Consultant Educational Audiologist at Keenhearing and Information and Research Officer British Association of Educational Audiologists (BAEA).

Peter's publication 'The Ling 6 Sound Test'

A day-to-day hearing aid check or a frequency-specific analysis of hearing aid provision by Daniel Ling

An analysis of the test and how it can be used and interpreted; presented by Peter Keen, Consultant Educational Audiologist. The science behind the test, pitfalls, new ways of conducting it by professionals and score sheets using the Pure Tone Audiogram that give a basic outcome or detailed frequency-specific analysis of a range of speech sounds that may or may not be heard.

The Ling 5 Sound Test, later improved to the 6 Sound Test, is an excellent way of checking that speech sounds across the whole speech spectrum are likely to be heard. This may be a **daily pass/fail check** done by a parent and/or teaching assistant to ensure that hearing aids,[1] cochlear implants etc are working much as expected first thing in the day and at lunchtime. It may be a **diagnostic assessment** done by a Teacher of the Deaf (ToD) or Educational Audiologist (Ed Aud) to confirm normal function of hearing provision or show frequency-specific shortfall. The author recommends that other **weekly speech discrimination** tests which use more sounds (AB lists etc) are also used by the ToD and Ed Aud as they give a better range of speech sounds covering more of the speech banana.

The three vowels and three consonants have sound frequency information specific to areas of the Pure Tone Audiogram. Failing to copy the sound presented by the tester appropriately will indicate problems in that area of the Audiogram. This could indicate a possible hearing aid fault or that the programming needs improving.

1 'hearing aid' is used by the author to include all instruments worn to assist hearing for speech: cochlear implants, bone-anchored hearing aids (BAHAs), implanted hearing aids, behind-the-ear (BTE), in-the-ear (ITE), receiver-in-canal (RIC) etc.

The sounds are:
"mm" "oo" "ah" "sh" "ee" "ss"

Age range: three years and above (possibly well into junior school).

Some **two year olds** can do it, most can do it **younger than that** using picture-pointing or toy-pointing. Hearing children usually have all local vowel sounds – and these three consonants – in their speech by three years old. Some children will be using most or all of these sounds before age three, so it is worth trying it with younger children – even from two years old. If a child is able to reliably copy some or all of the sounds without lipreading, it is valid. A child who has worn hearing aids from the first few months of life is likely to follow the same ages and stages for speech as hearing children:

- **providing** that the hearing aids have been programmed and regularly fine-tuned appropriately for that child's personal listening needs (plus they are worn and the child is spoken to 'normally')
- **providing** that the child has amplifiable hearing across the speech frequency range
- **providing** that the hearing aid user has not had an additional transient hearing loss eg due to 'glue ear' and so has increased speech and language delay.
  By the time they are three years old a large number of hearing children will have had transient hearing losses due to glue ear, so the average ages for use of vowels and consonants for hearing children allow for a possible spell of weeks/a few months not hearing. This may well give them similar speech and language development as children born deaf, aided early but with no glue ear problems.

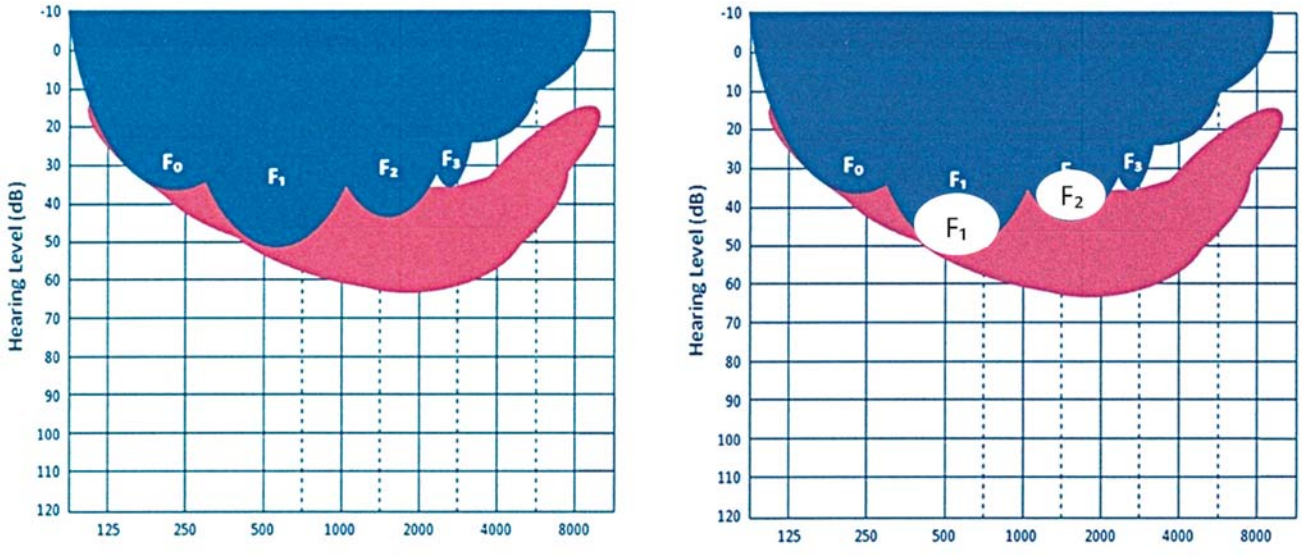
The South of England Cochlear Implant Centre (SOECIC) uses a series of pictures (and toys for even younger children) to enable children below age three (or children who have problems pronouncing the sounds) to do this test. The child points to the picture or toy for the sound heard **instead of copying the sound.**

Some relevant information about vowels:

There are variations in key sound frequencies: men usually have lower frequency vowels; women slightly higher and children's voices can be slightly higher again. Vowels are made up of harmonics – a series of 'pitches' or 'notes' made simultaneously on higher and higher frequencies which get relatively quieter and quieter. The lowest frequency is the Fundamental or F_1, made in the larynx – your personal voice 'pitch'. The next is the First Formant or F_1, the loudest of all the harmonics. The next is the Second Formant or F_2 with less energy (quieter) than F_1. The next is the Third Formant or F_3, which is quieter than F_2. The next is the F_4, and so on. Hearing people probably only use F_1 and F_2 to identify the vowel as F_3 is likely to be quieter than sounds used in speech (it might be heard in a sound-proof room) and the Formants above F_3 are definitely not heard in everyday listening conditions.

The reason that greater attention is paid to the child's perception of the F_2 harmonic is that, because it is significantly quieter than the F_1 the more difficult it is for the hearing aid to pick it up and amplify it. Also, the majority of hearing aid users have better hearing on the lower frequencies than the higher ones, requiring the hearing aid to 'work harder' at getting the higher frequency sounds like the F_2 up to the levels needed to follow speech. Because of these two factors, it is generally accepted that if the F_2 can be heard, the F_1 is

Figure 1: Average peaks of [æ] as in hat (with speech banana in red) on an audiogram showing
1: approximate sound intensities in blue 2: key areas in white



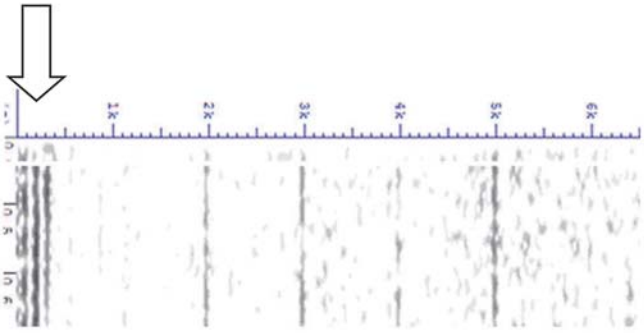
2 based on the author's experience of several years of paediatric hearing clinics.

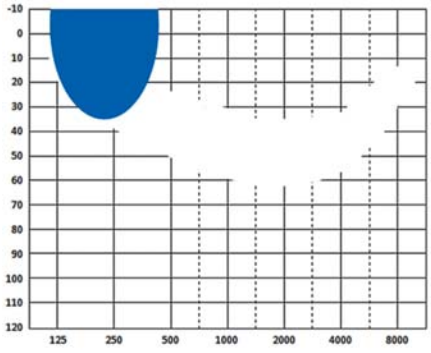
sure to be heard as well. This assumption does not work for 'reverse slope' hearing losses where the lower frequencies have a greater loss than the higher ones. In Figure 1 below is an approximate distribution constructed by Peter Keen (based on the research of others) to show the harmonics of a vowel on a Pure Tone Audiogram.

Both the F_1 and the F_2 of vowels must be heard for each vowel to be recognised – with the exception of "oo". Hearing the lower frequency **First Formant (F_1)** and its relative position from the higher frequency **Second Formant (F_2)** identifies the vowel whatever the pitch of the speaker's voice. Absence of F_2 information will result in a different vowel being heard.

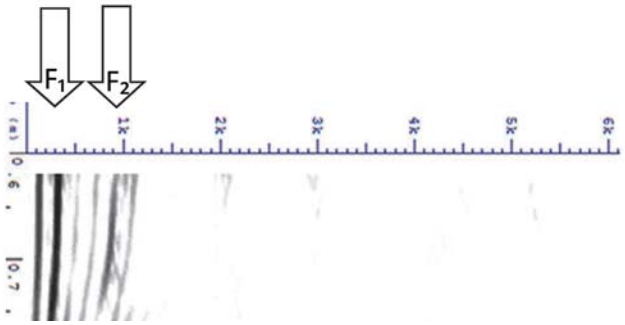
Figure 2: Frequency-specificity[3]/area of the audiogram of the sounds: The spectrograms are all Peter Keen's voice, so vowels will differ slightly from a female's or child's voice. For vowels, the F_2 is about 15dB quieter than the F_1. The spectrograms differ slightly from the audiograms as the Pure Tone Average (PTA) uses a logarithmic scale

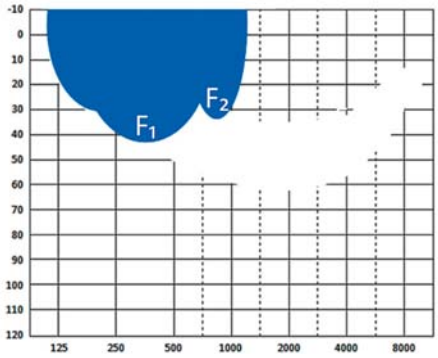
"mm": around 50Hz to 350Hz **(tests hearing below 400Hz)**



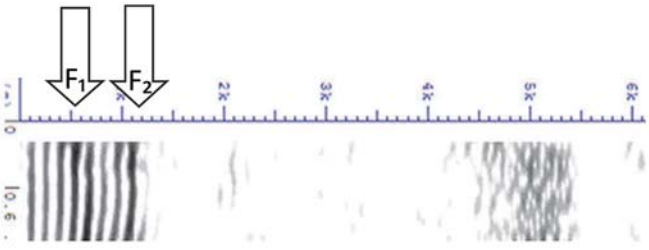


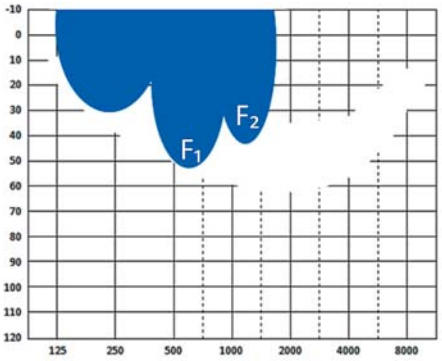
"oo" F_1 250 - 500Hz (= likely tested area) F_2 700 - 1200Hz





"ah" F_1 500 - 700Hz
F_2 1k - 1400Hz } = tested areas



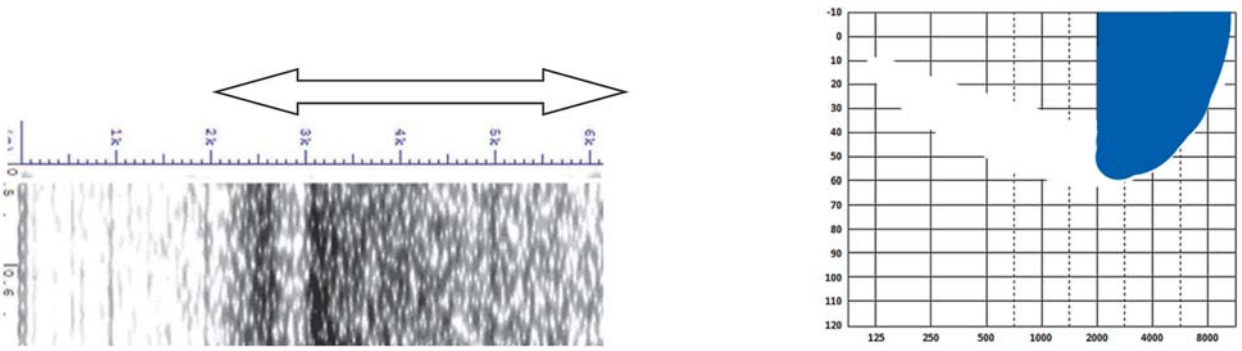


continued on next page

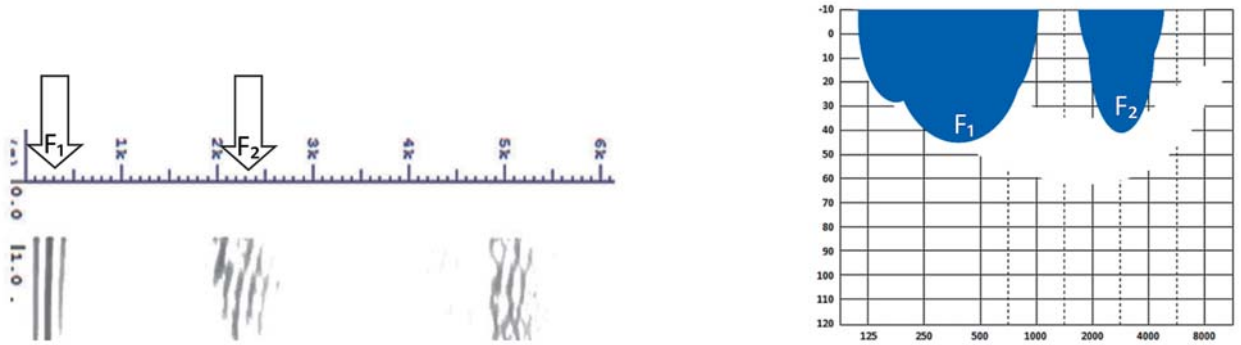
3 Sources: Denes & Pinson The Speech Chain, Peter Ladefoged, The Monitoring Protocol. Speech Spectrograms by Peter Keen using the 'SFS/WASP' (www.phon.ucl.ac.uk/resource/sfs) analysis program set for narrowband spectrum (stripes show 'most intense sound levels').

Figure 2: *continued*

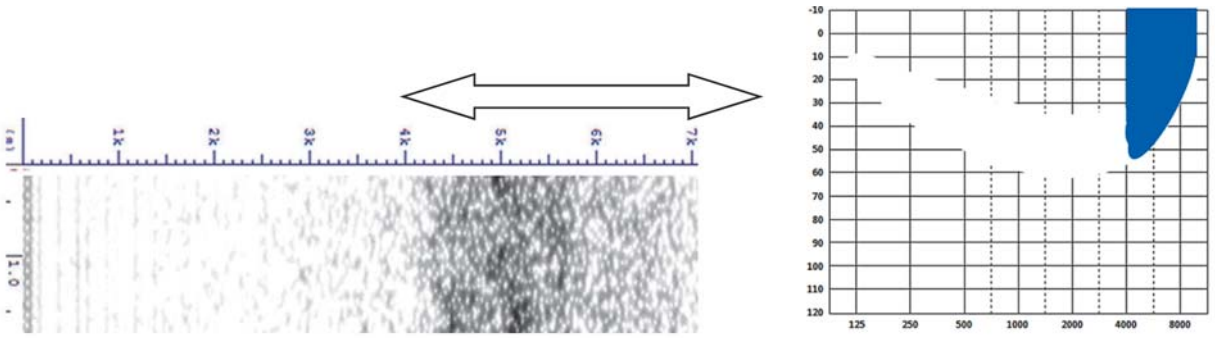
"sh" 2kHz - 4kHz+ **(tests hearing over 2kHz)**



"ee" (the 'high frequency vowel')
F_1 200 - 400Hz F_2 **2300 - 3500Hz (= likely tested area)**



"ss" 4kHz – 8kHz+ **(tests hearing over 4kHz)**



The vowels "oo" and "ee" have the lowest frequency F_1 of all the long vowels, and in the same area of the audiogram. Others with similar F_1 are not confused with these two because they are short vowels. The vowel "oo" is still heard as "oo" when only its F_1 is heard. Because the F_1 for "ee" is very similar to that of "oo", if the F_2 of "ee" is not heard, the listener thinks that "oo" has been said[2].

It could be argued that using "mm" and leaving "oo" out sometimes could give more easily interpreted results – no assumption can be made that the F_2 of "oo" has been heard. The "oo" stimulus must still be in the set, as the child must still expect to hear and copy "oo" to allow for them thinking it is "oo" when "ee" is misheard.

Conducting the Test

- The test should be played as a game: the child copies the sound heard (with no lipreading).
- The sounds should be presented without lipreading at 90cm (3 feet) in front of the child which is the optimum distance for a hearing aid microphone allowing word endings to be heard in normal speech.
- When presenting the sounds, mix them up differently

1 'hearing aid' is used by the author to include all instruments worn to assist hearing for speech: cochlear implants, bone-anchored hearing aids (BAHAs), implanted hearing aids, behind-the-ear (BTE), in-the-ear (ITE), receiver-in-canal (RIC) etc.

each time with more than one presentation of some sounds – 9 or 10 sounds each time the 'game' is played.

- Vary the time between presentations. If a child does not hear a sound and so does not copy it, another sound can be presented without the child realising that he has missed the one before.
- All the sounds should be presented at the intensity that they are used in speech. Do not exaggerate them. EG if "ss" is stressed more than in normal use it can distort, introducing lower frequencies and so negating any indication of hearing at or above 4kHz.
- The tester does not say "Yes, that's right" or make any comment about the child's response as interaction with the child can give clues or simply risk taking too long, distracting the child from listening. Praise should be at the end to encourage the child to do it again the next time.
- This is not a test to say "Did you hear that?" because part of the test is to listen to how the sound is copied. Also, asking a child if they heard it tells them that there has been a sound whether they heard it or not, so it allows for unreliable results.
- Do not 'cue the child in' that you are about to present a sound. Not being aware that a sound has been made indicates no amplified hearing in that frequency area.
- Saying "ss" quietly (providing you are close enough for the child to hear at the right level and you have a sound level meter to confirm the presentation level of 35 to 40dBA) can be used to assess hearing at just above 30 dBHL at 4kHz – 8kHz.
- If the child remains silent when a sound eg "ss" is presented, quickly move on to present a sound at a different frequency so that they do not realise that they have missed a sound. Return to "ss" again later with the same reaction if it is not copied.
- Write down exactly what the child copies so that detailed analysis can be done later.

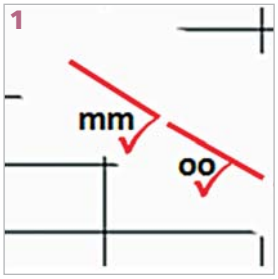
Diagnostic: Using the Test to identify areas of the audiogram where there are problems: some examples.

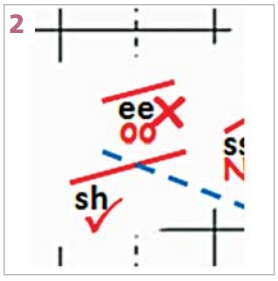
- Copying all the sounds indicates that the child is likely to be hearing most sounds used in speech, but not necessarily word endings.
- Responding to a pure tone is a reaction (pressing button, turning to look etc) even at threshold. Copying a speech sound requires hearing the sound and processing it to identify it. This requires hearing it at least 10 decibels above threshold. Scoring this test can only allow 10 decibels below the loudest part of the sound to be counted, even if the true threshold is lower ('tags' in ovals on the Pure Tone Audiogram (PTA) allow for this).
- Not hearing "ss" indicates no hearing at or above 4kHz (6 consonants not heard).
- Not hearing the "ss", "oo" is copied for "ee", but "sh" is copied correctly: the hearing threshold in the 2kHz to 3kHz area is between the louder "sh" and the quieter "ee" – possibly threshold of 40dBHL, but no useful hearing at or above 4kHz. (The F_2 component of "ee" is much quieter than the F_1 and also quieter than the "sh" by 15 decibels. If the child copies "oo" when "ee" has been presented, only the F_1 of "ee" has been heard, which is in the same frequency area as the F_1 of "oo") See this example on the score sheet in Example 1.
- Not hearing "sh", "ee" or "ss" indicates no hearing above 2kHz (14 consonantal phonemes not heard).
- Not hearing "ah", "sh", "ee" or "ss": no hearing above 1kHz (16 consonants, some vowels not heard).
- Not copying "mm" and "oo" indicates a low frequency hearing loss.
- Not copying "ah", "ee" and possibly "sh" indicates mid-frequency loss (cookie-bite). Not copying "ah" and either saying "oo" for "ee" or missing it completely (but still saying the other high frequency and low frequency sounds) also indicates a mid-frequency hearing loss.

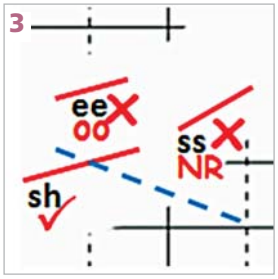
How to use Peter Keen's recording system.

1. For every correctly copied sound, put a tick by that sound and the threshold line
2. For every incorrectly copied sound put a cross by the sound and the line, write in what was actually said, then put a possible threshold line below the sound (ie the sound is quieter than the threshold).

   In the example here, the possible threshold line (in blue is drawn between 'heard' and 'not heard' sounds.
3. If there is no response to a sound, put NR and a cross by the sound and the line (the sound is quieter than the threshold).







In the example here, the possible threshold line (in blue) is drawn between 'heard' and 'not heard' sounds.

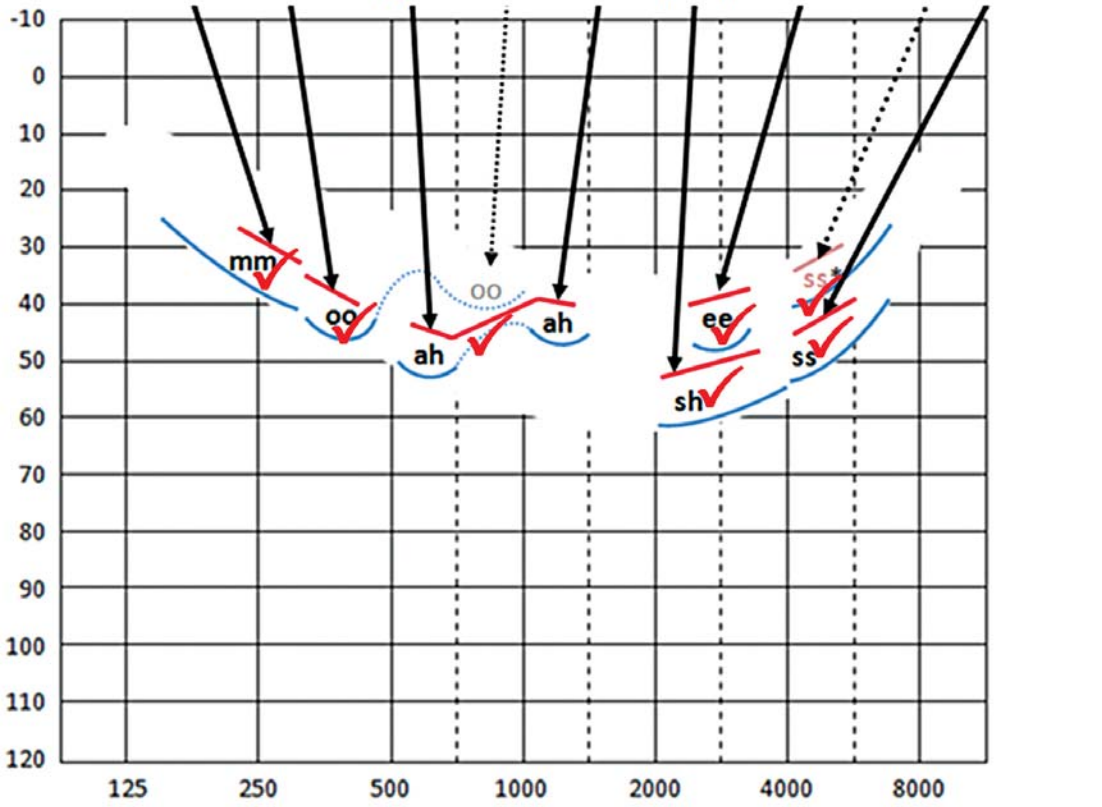
Even if all sounds are correctly copied, it is not a confirmation of normal hearing levels; nor is it a 'pass' for a (PTA), nor a confirmation that the hearing aid is functioning at optimum levels as programmed in the Audiology clinic. Example 2 shows the best hearing for speech that the tester can confirm if the child copies all sound correctly.

In Example 1 *(on next page)*, the results for child's responses have been recorded and used to show an approximate access to the speech banana. Note that if a child has failed to copy a sound, the threshold line has to pass below the loudest point of the oval (ie the part showing the likely peak of intensity) showing that even the 'loudest' area of the sound was not heard).

Example 1: Peter Keen's scoring format in use - ToD or Ed Aud PTA using a Sound level meter:

Frequency: Hz	50 – 350	250 – 500	500 - 700	700-1200	1 - 1.4k	2k – 4k+	2.3 -3.5k	4k - 8k +
Ling Sound	mm	oo (F_1)	ah (F_1)	oo (F_2)	ah (F_2)	sh	ee(F_2)	ss
child's version:	mm	oo	ah	ah		sh	ee	ss

On a Pure Tone Audiogram this is where the key frequencies are for each sound tested.



* "**ss**" presented at 35 to 40dBA measured at-the-ear with a type 2 sound level meter. All other sounds are presented as loud as when they are used at the beginning of a word eg "**ss**" **is** be presented as in "**S**ue".

"oo" The F_2 of "oo" may not be what the child heard, because "oo" can be identified by hearing only the F_1.

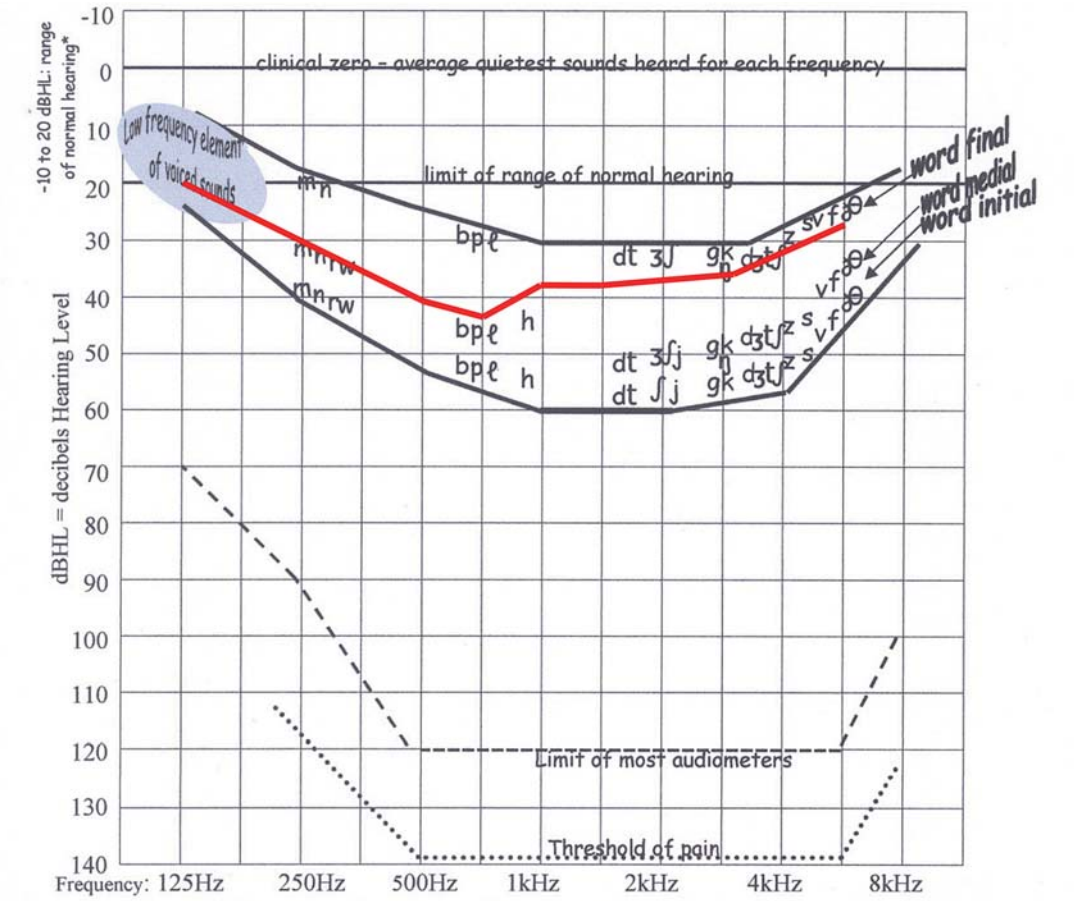
Blue lines show probable frequency range and relative 'loudness'.

Red line: the likely threshold if the sound was copied when presented at normal voice level. It could be better than this but that is all that this test has demonstrated.

We can add these **possible hearing thresholds** to the Consonantal Speech Banana to see which other consonants will be missed or misheard (at 90cm in a quiet room):

continued on next page

Example 1: *continued*



This speech banana is designed to show the key frequency areas needed by the ear/brain to identify each consonantal phoneme. Many of these phonemes have other frequency information which is not key to recognition. **Word Initial** phonemes are the loudest, **Word Final** are the quietest and **Medial** phonemes are a little quieter than Initial ones, but may be perceived better than Initial sounds for HF losses (2nd formant information).The banana approximates a 'normal' voice level used in a quiet room with the ear at 90cm (3 feet) from the speaker. These levels are for dBHL (not dBA or dBSPL). Raising voice levels or shouting will increase low frequencies, not high. Normal voice level moved closer to the ear will increase sound level for all phonemes equally, giving better amplified speech perception.

non-alphabet symbols		
ŋ	as in	sing
j	as in	you
ʃ	as in	ship
tʃ	as in	chip
ʒ	as in	beige
dʒ	as in	just
θ	as in	think
ð	as in	the

Voiceless phonemes: p t ʃ k tʃ s f θ

used with Low frequency element of voiced sounds

become voiced phonemes: b d ʒ g dʒ z v ð

BOTH the voiceless phoneme AND the low frequency element must be heard to identify the voiced consonantal phoneme.

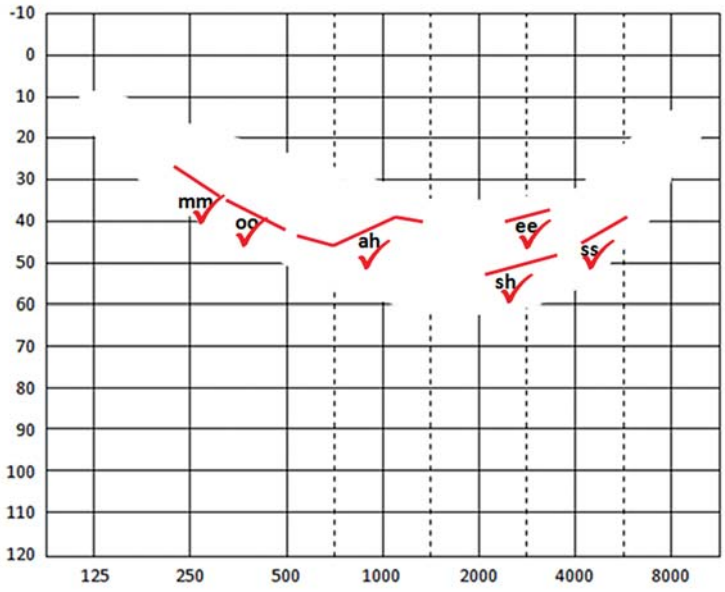
*Normal hearing: levels of hearing across the frequency range giving potential to perceive 95% to 100% of speech phonemes at 90 cm.

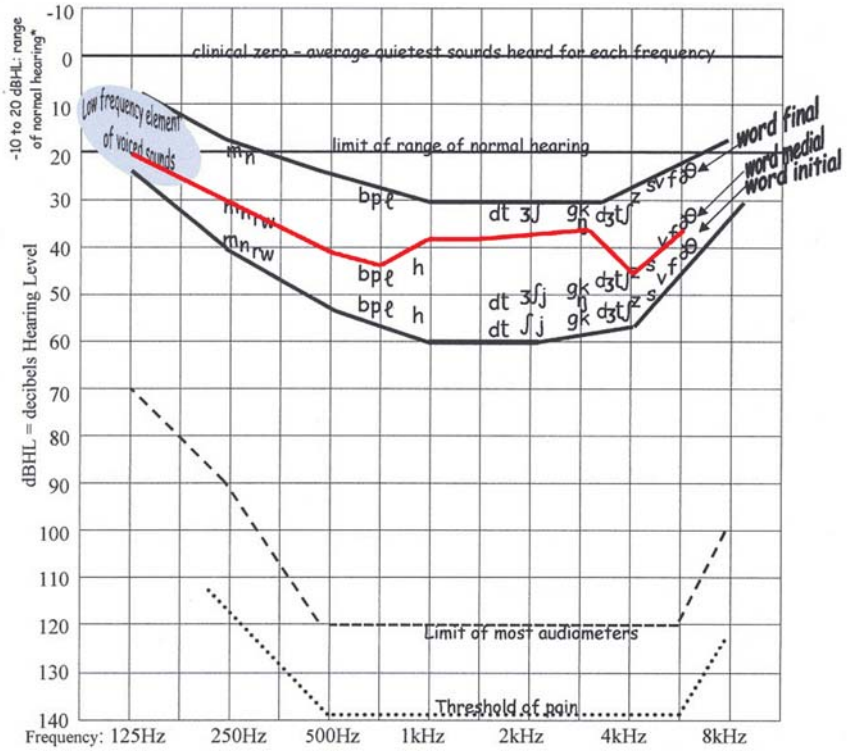
Hearing might be better than these results show, but the test does not cover quieter sounds than these. Also it has to be assumed that any accurate copying was achieved by hearing the sound around 10dB above threshold (ie minimum hearing to identify the sound and copy it) when in fact it could be 20 dB or more above true threshold.

- all 20 word final consonantal phonemes may be **missed or misheard** (including markers for plurals and verb tenses)
- at least 3 medial consonantal phonemes may be **missed or misheard**
- no initial consonantal phonemes missed or misheard

NB the above statements only apply to listening in a quiet room with the speaker 90 cm (3 ft) from the microphone – ideal listening conditions, not classrooms.

Example 2: the best indication of access to speech when used by Parent or Teaching Assistant (no sound level meter):





Even though the test has been 'passed', It is clear from the results on the Consonantal Speech Banana that:

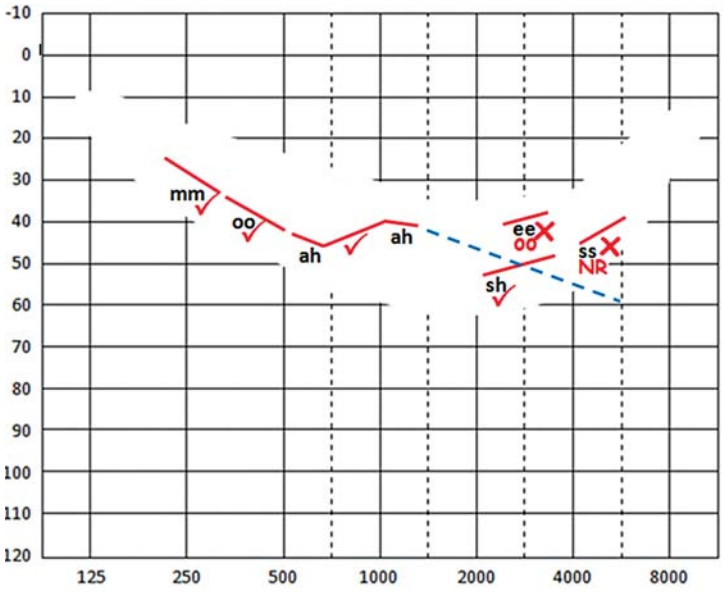
- all 20 word final consonantal phonemes may be **missed or misheard** (including markers for plurals and verb tenses)
- at least 9 medial consonantal phonemes may be **missed or misheard**
- no Initial consonantal phonemes are likely to be missed or misheard

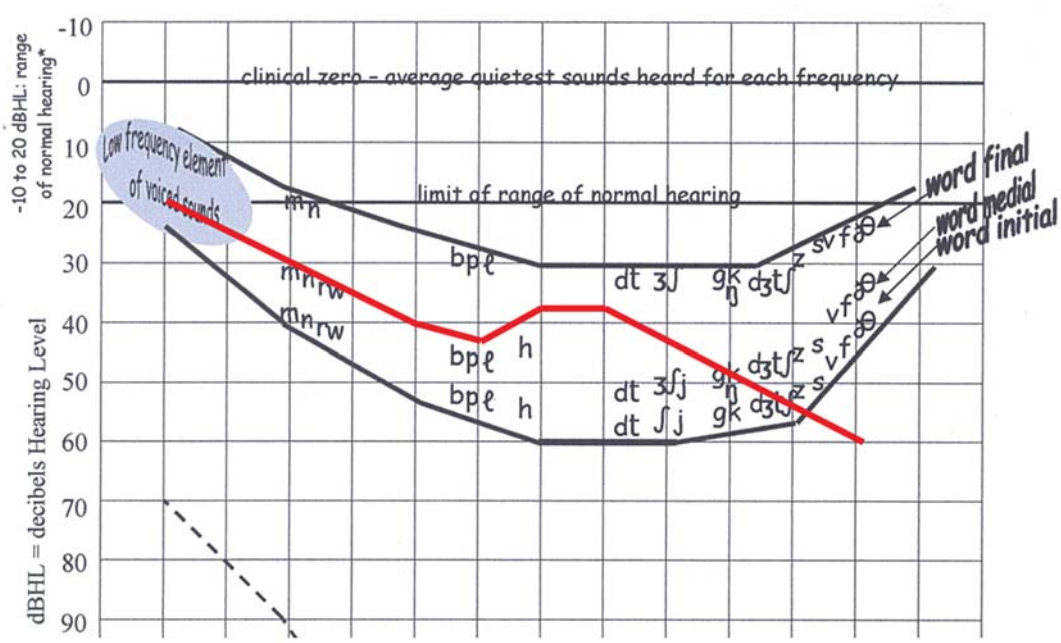
NB the above statements only apply to listening in a quiet room with the speaker 90 cm (3 ft) from the microphone – ideal listening conditions, not classrooms.

Despite the above shortfalls, **it is a good general check** – especially as it is so easy to do and the basic form requires no specialist equipment.

There should always be developmentally/language-appropriate weekly detailed speech discrimination checks by the child's ToD and/or Ed Aud to assess a much wider range of speech sounds and frequencies for essential checking of provision and to inform ongoing review.

Example 3: an apparent minor failure of the test: "ee" is copied as "oo"; "ss" is not copied at all





- all 20 word final consonantal phonemes may be **missed or misheard** (including markers for plurals and verb tenses)
- around 8 to 11 medial consonantal phonemes may be **missed or misheard**
- around 6 to 8 Initial consonantal phonemes are missed or misheard

NB the above statements only apply to listening in a quiet room with the speaker 90 cm (3 ft) from the microphone – ideal listening conditions, not classrooms.

THIS IS CLEARLY UNACCEPTABLE AND REQUIRES IMMEDIATE INVESTIGATION/CORRECTIVE ACTION

Different versions of the scoring system developed by Peter Keen and a Consonantal Speech Banana are given on the following pages. They can be printed or photocopied – the only reason for the copyright is to prevent others from claiming ownership and then charging for use.

The Ling 5 or 6 Sound Test

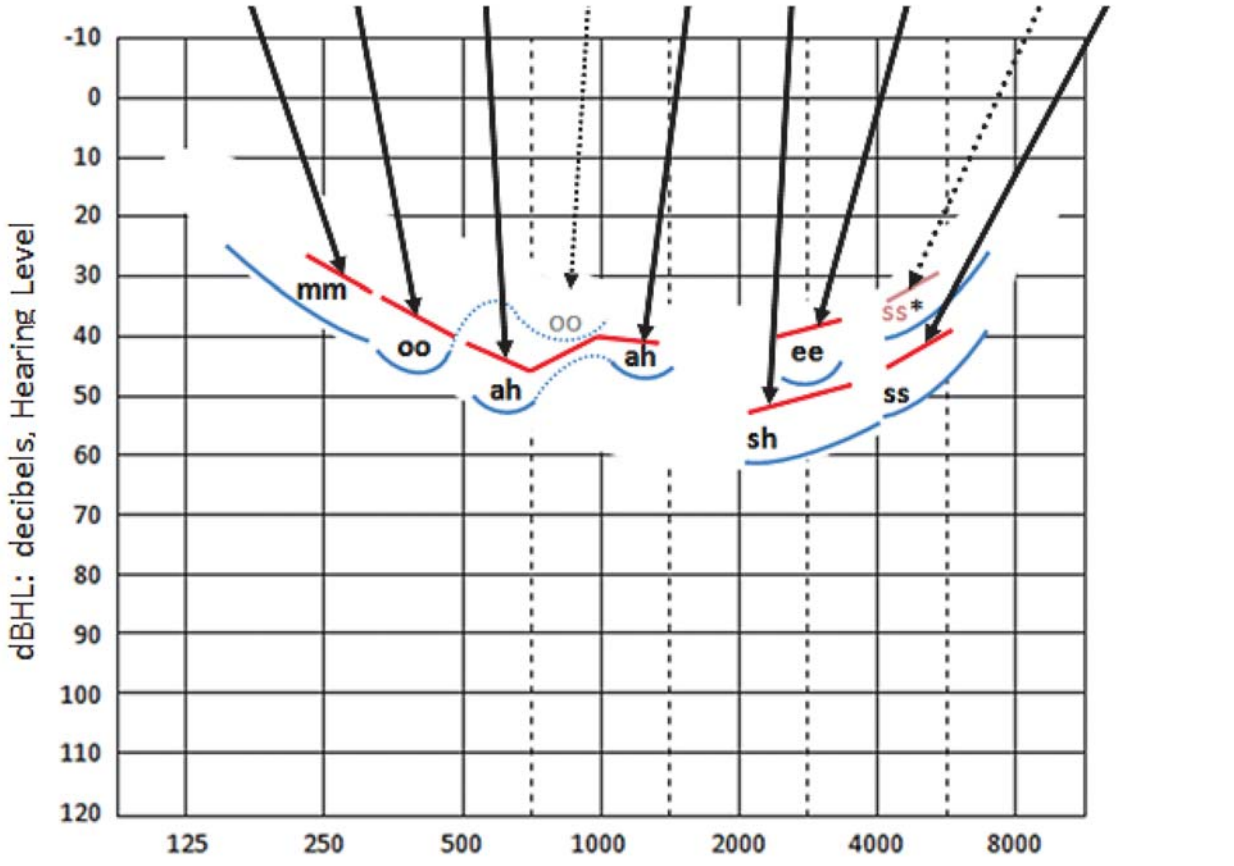
A scoring and reporting format by Peter Keen ©May2010 **Version A**

This form may be photocopied

Name of Child:
Date of birth: male / female
Home / School:

Frequency: Hz	50 – 350	250 – 500	500 - 700	700-1200	1 - 1.4k	2k – 4k+	2.3 -3.5k	4k - 8k +
Ling Sound	mm	oo (F_1)	ah (F_1)	oo (F_2)	ah (F_2)	sh	ee(F_2)	ss
child's version:								

On a Pure Tone Audiogram this is where the key frequencies are for each sound tested.



*the quiet "ss" measured at-the-ear at around 35 to 40 dBA with a sound level meter. All other sounds are presented as loud as when used at the beginning of a word eg "**S**ue"

Blue lines show probable frequency range and relative 'loudness'.

Red line: the likely threshold if the sound was copied when presented at normal voice level. It could be better than this but that is all that this test has demonstrated.

The F_2 of "oo" may not be what the child heard, because "oo" can be identified by hearing only the F_1

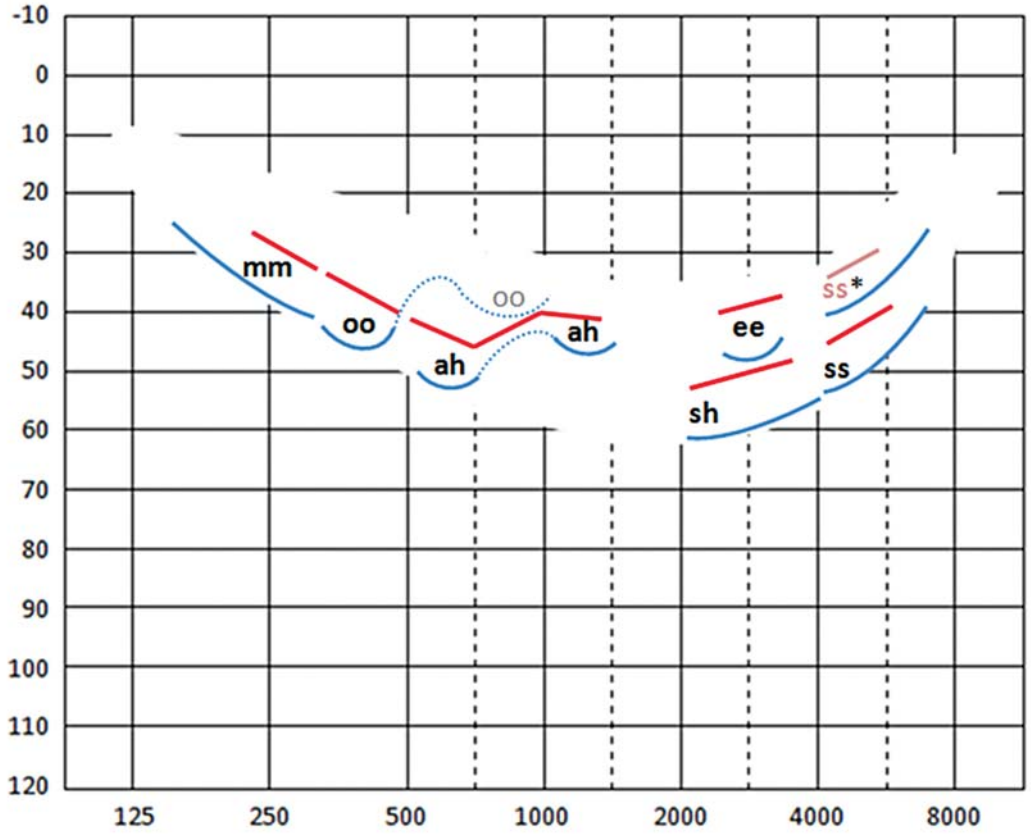
The Ling 5 or 6 Sound Test

A scoring and reporting format by Peter Keen ©May2010 **Version B**

This form may be photocopied

Name of Child:		date of test:
Date of birth:	male / female	
Home / School:		

(tick sound/red line when correctly copied, cross out sound/red line + write in what is said if incorrectly copied, cross out sound/line + write NR (No Response) if not copied at all.



*"**ss**" measured at-the-ear at around 35 to 40 dBA with a sound level meter. All other sounds are presented as loud as when used at the beginning of a word eg "**S**ue"

Blue lines show probable frequency range and relative 'loudness' of each sound.

Red line: the likely threshold if the sound was copied when presented at normal voice level. It could be better than this but that is all that this test has demonstrated.

The F_2 of "oo" may not be what the child heard as "oo" may be identified by hearing only the F_1

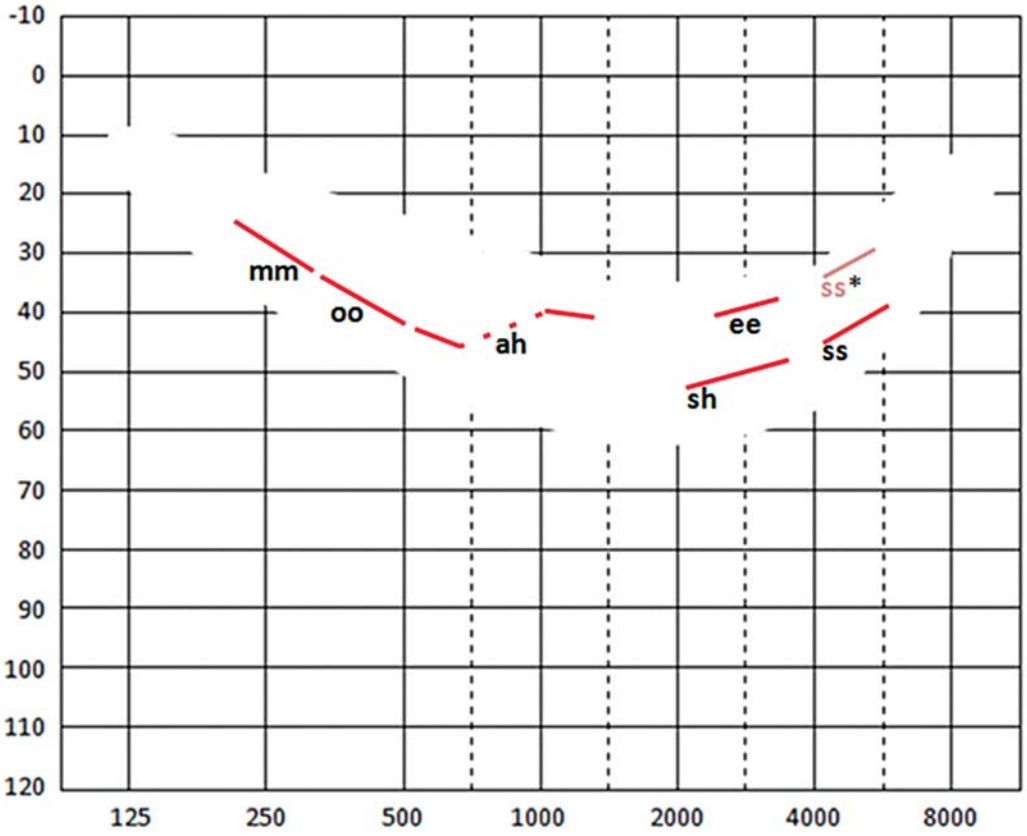
The Ling 5 or 6 Sound Test

A scoring and reporting format by Peter Keen ©May2010 **Version C**

This form may be photocopied

Name of Child:		date of test:
Date of birth:	male / female	
Home / School:		

tick sound / red line when correctly copied, cross out sound/ red line + write in what is said if incorrectly copied, cross out line + write NR (No Response) if not copied at all.



Red line: the likely threshold if the sound was copied when presented at normal voice level. It could be better than this but that is all that this test has demonstrated.

The F_2 of "oo" does not need to be heard for the child to hear "oo" (may be identified by hearing only the F_1)

All other sounds are presented as loud as when used at the beginning of a word eg "**S**ue"

"ah" is two simultaneous sounds (1st Formant just above 500Hz, 2nd Formant above 1kHz)

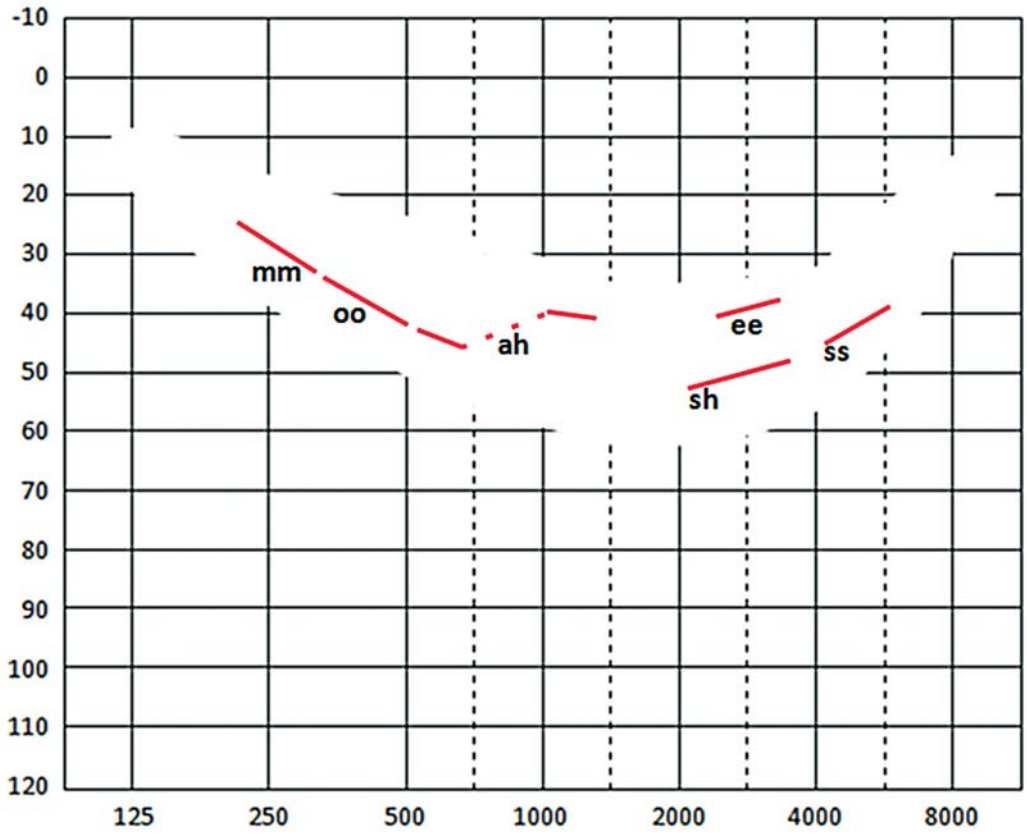
The Ling 5 or 6 Sound Test

A scoring and reporting format by Peter Keen ©May2010 **Version D**

This form may be photocopied

Name of Child:		date of test:
Date of birth:	male / female	
Home / School:		

tick sound / red line when correctly copied, cross out sound/ red line + write in what is said if incorrectly copied, cross out line + write NR (No Response) if not copied at all.



Red line: the likely threshold if the sound was copied when presented at normal voice level. It could be better than this but that is all that this test has demonstrated.

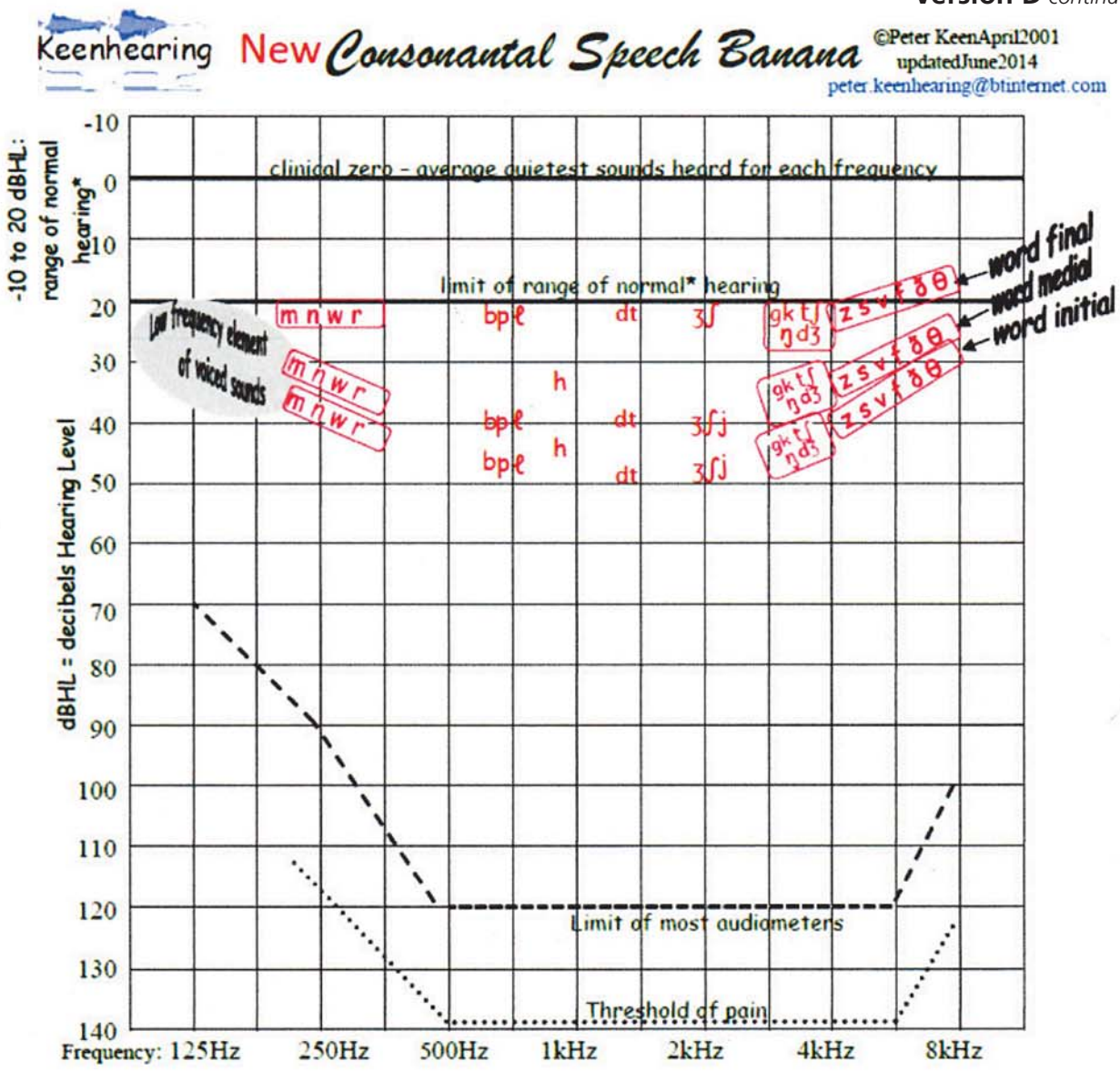
The F_2 of "oo" does not need to be heard for the child to hear "oo" (may be identified by hearing only the F_1)

All other sounds are presented as loud as when used at the beginning of a word eg "**S**ue"

"ah" is two simultaneous sounds (1st Formant just above 500Hz, 2nd Formant above 1kHz)

continued on next page

Version D *continued*



This speech banana has been updated to include new research for the Count-the-Dot** audiogram (2010). It shows key frequency areas needed by the ear/brain for each consonantal phoneme. Phonemes have other frequency information not key to recognition. **Word Initial** phonemes: loudest, **Word Final:** quietest, **Medials** are quieter than Initial (2nd formant transition both sides helps HF losses perceive Medials better than Initials). The banana shows 'normal' voice level in a quiet room, the ear 1 metre from the speaker. New placement of phonemes allows for the 10 to 12 dB above pure tone threshold needed to perceive the phoneme. Phonemes in boxes cover all area. The levels are dBHL (not dBA or dBSPL). Raising voice or shouting increases low frequencies, not high. Normal voice level moved closer will increase sound level for all phonemes equally, giving better amplified speech perception. P Keen has separate sheet for vowels.

Non-alphabet symbols:

ŋ	as in	sing
j	as in	you
ʃ	as in	ship
tʃ	as in	chip
ʒ	as in	beige
dʒ	as in	just
θ	as in	think
ð	as in	the

Voiceless phonemes: p t ʃ k tʃ s f θ

used with Low frequency element of voiced sounds

become voiced phonemes: b d ʒ g dʒ z v ð

BOTH the voiceless phoneme AND the low frequency element must be heard to identify the voiced consonantal phoneme.

*Normal hearing: hearing allowing perception of 95% - 100% of speech phonemes at 1 m: ≦20dBHL SNR

**Meuller & Killion: A New Count-The-Dots Method, The Hearing Journal, January 2010 Vol 63 No 1

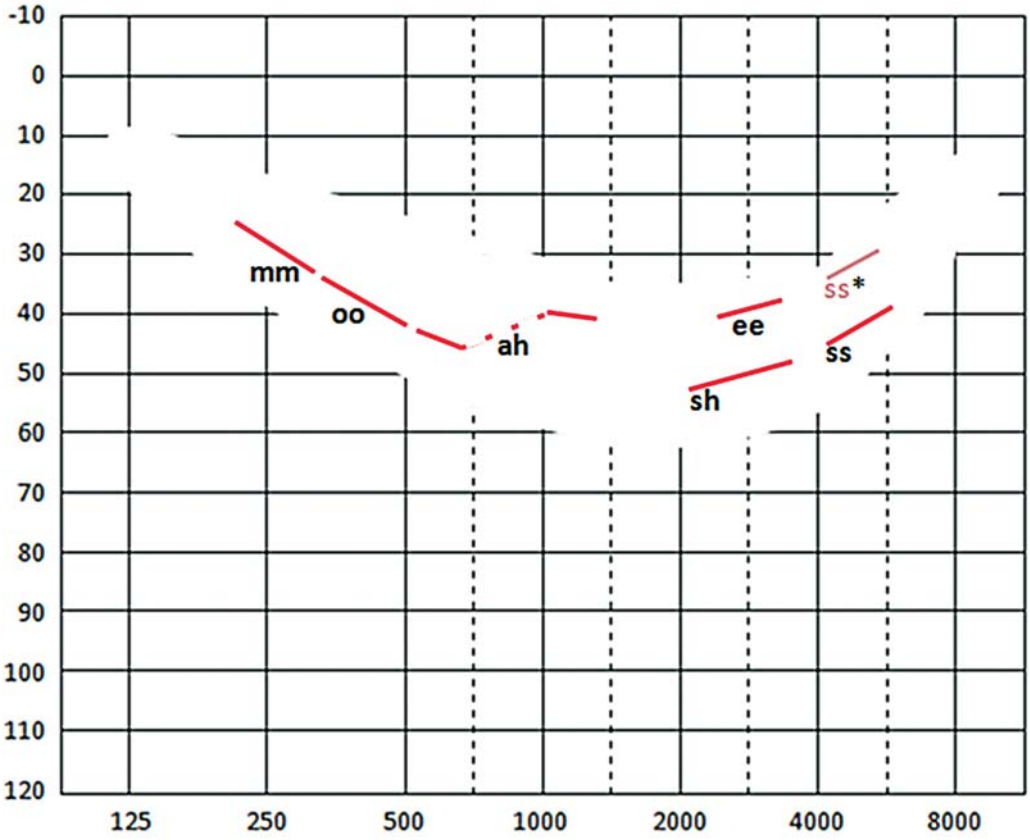
The Ling 5 or 6 Sound Test

A scoring and reporting format by Peter Keen ©May2010 **Version E**

This form may be photocopied

Name of Child:		date of test:
Date of birth:	male / female	
Home / School:		

tick sound /red line when correctly copied; cross out sound/ red line + write in what is said if incorrectly copied; cross out sound/ line + write NR (No Response) if not copied at all

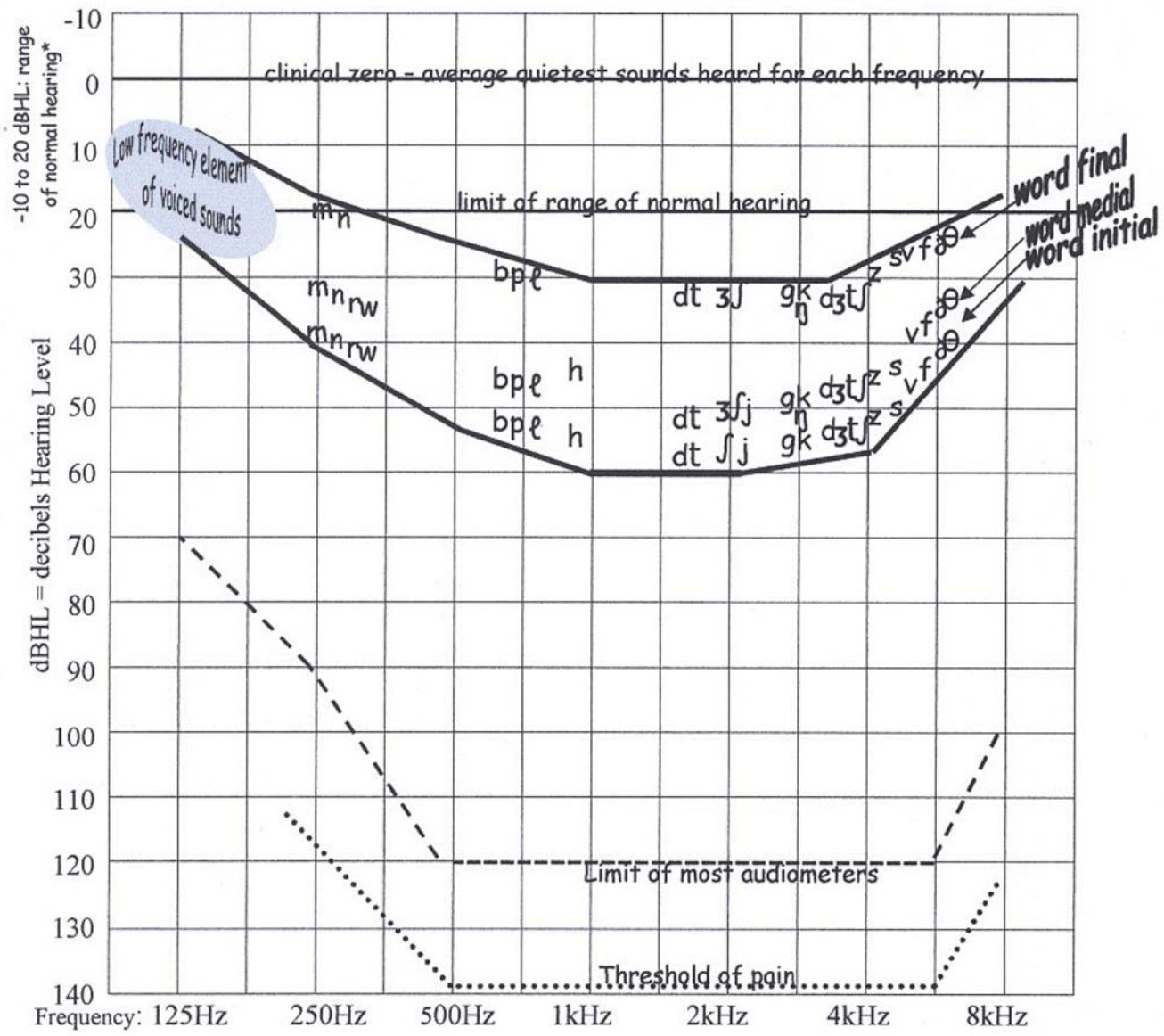


"ah" is two simultaneous sounds (1st Formant just above 500Hz, 2nd Formant above 1kHz)

*"**ss**" measured at-the-ear (35 to 40 dBA) with a sound level meter. All other sounds presented at normal level, eg "ss" as loud as the beginning of "Sue". If a sound is not copied correctly/ at all, no hearing is demonstrated at that frequency. Red line: the level of hearing confirmed if a sound is copied correctly (it might be better). Enter 'red line' levels on the PTA below to see phonemes misheard or missed.

continued on next page

Version E *continued*



NB the above only applies to listening in a quiet room with the speaker 90 cm (3 ft) from the microphone – ideal listening conditions, not classrooms.

BATOD Magazine

This article was published in the May 2022 issue.