

Impact of Hearing Loss on Listening, Learning, and Social Interactions

Suggested Instructions for Use

Individual use of the handouts: Purchasers of this digital product are licensed by copyright to share the handouts with parents, teachers, and other school staff for the purpose of raising awareness of student needs. Purchasers are not to share the handouts with their deaf/hard of hearing team members, at group meetings, or conferences. To use one handout, copy this file and delete all other pages. Save under new name, complete handout, save again.

Why the handouts are needed: Most students with hearing loss are hard of hearing and use hearing aids. Increasingly, we have students who have used hearing aids consistently since infancy. Other students have varying degrees of using their hearing aids inconsistently. For students who have used hearing aids (consistently) since infancy it is no longer appropriate to share information describing the impact of the hearing loss levels with teachers, as the students are actually functioning based on their hearing ability while aided.

Students with mild hearing loss (26 – 40 dB) and those with severe/profound hearing loss (71-90+ dB) are the most at risk to use their amplification inconsistently or not at all. In the case of students with 20-40 dB hearing levels, their family members can ‘see’ that they seem to hear and many do not strongly support consistent hearing aid use because they feel that their child can ‘get by’ or ‘do fine’ without use of the hearing aids. Those with severe to profound hearing loss perceive speech in a substantially fragmented manner even with the best fit hearing aids. In other words, even optimal hearing aid fitting for this severity is unlikely to provide access to the higher frequency speech sounds, which significantly impacts listening comprehension.

To recognize the unique characteristics of students who have consistently worn their hearing aids, versus those with inconsistent or frequent non-use (often by children with mild hearing loss), four versions of this new inservice handout were created: 20-25 dB, 25-30 dB, 30-35 dB, and 35-40 dB. For other types and degrees of hearing loss the freely available [Relationship of Hearing Loss to Listening and Learning Needs](#) handouts remain relevant.

Suggested Use:

1. **Consistent hearing aid users** (from early childhood to present)
 - a. If there is an aided audiogram available, use it as the primary means to identify which of the handouts to use. Unfortunately, clinical audiologists have been discouraged from performing aided audiograms as they are no longer necessary for hearing aid fitting in preference to real ear fitting methods. However, real ear measurement methods do not provide information about what is reaching the auditory brain, just the eardrum. Nor does it verify the level of detection necessary for perceiving phonemes, which are perceived and which are inaudible. Developing a personal relationship with the clinical audiologists of your students so that you can effectively share/discuss the use of these handouts and the need to identify aided hearing ability, is well worth doing! The following suggestions assume that there is no aided audiogram available (and maybe no current audiogram).
 - b. If the student is able to repeat the Ling Sounds while wearing their hearing aids, including /s/, at a distance of 6 feet in quiet without visual cues, then it is suggested that the 20-25 dB handout be used as this is reasonably assumed to be the range of aided hearing. Caution: speak in a conversational tone when presenting the sounds; do not raise your voice. Speak at a volume that you would use if you were talking to a person who has typical hearing ability. Present each sound multiple times and include ‘quiet’ trials.

- c. If the student is able to repeat the Ling sounds while aided, at a distance of 6 feet in quiet without visual cues, with the exception of /s/ and possibly inconsistent response to /sh/, /ch/ then it is suggested that the 25-30 dB handout be used to represent aided hearing.
- d. Students who have hearing loss in the 25-70 dB range should have aided hearing in the 20-30 dB range. If the student has hearing loss up to 70 dB but consistently does not respond to /s/, /sh/, /ch/ at a distance of 6 feet in quiet without visual cues then (a) the hearing aids may not be fit optimally, (b) the student has not been amplified consistently or may be very new to hearing aid use, which has delayed auditory development and the ability to discriminate distinct speech sounds, or (c) there may be a neural or central component to the hearing loss affecting consistent processing of auditory input.

2. Inconsistent hearing aid users

- a. Select the handout matching the student's unaided level of hearing loss and compare with the 20-25 dB and 25-30 dB handouts. Review the student's auditory, language, social and functional classroom performance skills in consideration of the descriptions provided in the handouts. Select the handout that is the best fit to what you know about the student's behavior and abilities. It may be that the student has 20-25 dB aided hearing levels, but due to inconsistent use or being new to consistent hearing aid use, they perform more similarly to a student with 25-30 dB aided hearing. As the student gains experience and direct teaching in auditory skill development and other areas of need, it is very possible that the 20-25 dB handout may eventually become the best description of impact.

3. Non-users of hearing aids; up to 40 dB of hearing loss (lack of family support, family choice, other factors)

- a. Use the handouts to improve understanding of the impact of hearing loss and benefit of consistent use of hearing aids. This is especially appropriate during early intervention.
 - i. Early intervention – A family has 'seen' their child respond to sound and feels that the hearing aids are not necessary. Provide the [handout](#) that describes the level of hearing loss and compare it to the 20-25 dB handout as a descriptor of aided hearing potential.
 - ii. Primary school – A student inconsistently wears his/her hearing aids and the teacher does not feel that the hearing aids make much difference. Use the handouts comparatively to get across the benefits of consistent use.
 - iii. Secondary school – A student has begun to resist hearing aid use, likely due to concerns about fitting in socially. Discuss the most appropriate aided hearing handout (20-25 dB or 25-30 dB), specifically the listening challenges, fragmented listening, expected learning issues, and appropriate accommodations. If you have previously administered the LIFE-R Student Appraisal, those listening challenge results can be discussed. Next, review the appropriate hearing loss level [handout](#). Compare the differences in fragmented listening, challenges, and needed supports. Discuss at length the accommodations and increased student responsibility required for the student to be able to continue to perform as he/she has been academically. It may become obvious that the student 'work' needed, even with appropriate accommodations, will be more than the student can/wants to do. Consider ways in which this will impact their achievement and potentially their life long opportunities. This should be a discovery self-determination discussion and not a punitive 'you must wear your hearing aids' discussion.

Information sources

1. Possible impact on the understanding of language, speech, social-emotional development and the potential educational needs information was modified from the [Relationship of Hearing Loss on Listening and Learning](#) handouts in consideration recent research ([example 1](#), [example 2](#), [example 3](#), [example 4](#), [example 5](#)) and professional practices ([example 1](#), [example 2](#), [example 3](#), [example 4](#), [example 5](#)).
2. Classroom and/or instructional accommodations are required and references to equal access are derived from the [policy clarification of Title II ADA](#) (2014) that requires schools to ensure communication is as effective as it is for peers to afford an equal opportunity to reach the same level of achievement as that provided to others. Additionally, the March 2017 decision by the [US Supreme Court](#) revolved around the question whether schools must provide a meaningful education in which children show significant progress and are given substantially equal opportunities as typical children, or can schools just provide an education that results in some improvement. The Court clarified that the IDEA “requires an educational program reasonably calculated to enable a child to make progress in light of the child’s circumstances.” A student with hearing loss has learning issues secondary to reduced access to communication, and not inherent learning disorder. If the student is appropriately accommodated with specialized instruction to address learning gaps and support learning at the typical pace in the classroom, then it can be expected that students who are deaf/hard of hearing (with no other learning challenges) will be able to make progress at the same expectations as their class peers.
3. Percent audibility of the speech signal is based on the [Speech Audibility Audiogram for Classroom Listening](#), which was derived from the [Count the Dot Audiogram](#). How well a person will perform with the ‘missing pieces’ of audibility is related to their language level, attention, motivation, background knowledge, familiarity with the topic, noise level, etc. Even a student with 45% audibility for conversational speech (35-40 dB) will be likely to comprehend routine instructions or activities (it is lunch time and the teacher says to line up) but will be very compromised when presented with the vocabulary from a new instructional unit.
4. On the Impact of Hearing Loss handouts you will see visual analogies of listening to speech with fragmented hearing. The approximation of the missing fragments of speech have been presented in a light gray color on the handouts. Selecting the sounds to be grayed-out was done by applying the identified missing audibility of speech sounds to a passage of directions as an approximation of fragmented listening caused by the hearing loss when the student is in a quiet setting. Any background noise (lack of use of an FM/DM) will reduce audibility and fragmentation of speech beyond what is shown on the handouts.
5. Typically hearing children will have 95+ percent audibility in all conditions is based on the Speech Audibility Audiogram for Classroom Listening and also reflects the [Speech in Noise Norms for Typical Children](#).
6. Possible listening challenges in school are based on the items of the Listening Inventory For Education – Revised Student Appraisal that are commonly identified by students who are hard of hearing. If the student’s LIFE-R Student Appraisal results are available then the appropriate items can be checked off. If there are no LIFE-R results, the items can be discussed as expected challenging listening situations.
7. There are many sources of lists of accommodations appropriate for students with hearing loss. Those listed are examples only and not all-inclusive. Examples of sources are ([1](#), [2](#), [3](#), [4](#), [5](#)).

Impact of Hearing Loss on Listening, Learning, and Social Interactions

Student's Name: _____ Gr: _____ School: _____

Hearing loss is an access issue that often causes significant learning and/or functional performance issues. Classroom and/or instructional accommodations are required. Educational impacts are not due a learning disorder.

20-25 dB HEARING LOSS (aided or unaided thresholds) (-10 to +15 dB is normal hearing)			
Possible Impact on the Understanding of Language and Speech	Possible Social - Emotional Impact	Potential Educational Accommodations and Services	
<ul style="list-style-type: none"> Hearing decrease when index fingers are placed in ears is approximately 20-25 dB. Majority of students will only hear at 20-30 dB when using their hearing aids Can be "seen to hear" but misses fragments of speech leading to misunderstanding, especially when speaker is 6+ feet away Degree of difficulty experienced in school will depend upon <u>noise level</u> in the classroom, <u>distance</u> from the teacher, and the hearing loss, <u>even with hearing aids</u> Is at high risk to miss unemphasized word endings and consonants, especially when a high pitch hearing loss is present (cast, cap, calf, cat may all sound alike – like 'ca') May have 'Swiss cheese' language causing 'average' language test results but gaps in understanding vocabulary May experience difficulties learning early reading skills (i.e., letter/sound associations) 	<ul style="list-style-type: none"> Barriers begin to build with negative impact on self-esteem as student is accused of "hearing when he/she wants to," or "not paying attention" May believe he/she is less capable due to difficulties understanding in class Student is beginning to lose the ability to pay attention just to the speech signal when listening in any noise; causing the learning environment to be more stressful than peers More fatigued due to effort needed to listen May be viewed as socially awkward due to misheard, fast speaking rate of peers 	<ul style="list-style-type: none"> Hearing aids and personal FM/DM system technology are needed for access in all learning environments Requires seating where other students are visible (i.e. 2nd row or U-shape), away from bright light, with absorptive material within classroom to reduce reverberation (i.e., carpet) Requires training in self-advocacy skills; necessary if the student is to be a full participant in class Level of need for auditory, speech, language, vocabulary development, and support in reading and self-esteem needs to be determined More fatigued due to effort needed to listen Routine monitoring of functional class performance is necessary Need for teacher inservice on the impact of a 20 – 25 dB hearing loss on listening and learning 	
Audibility of Speech Sounds (puzzle pieces available for understanding) NOTE: Typically hearing students have 95%+ audibility in all conditions.			Example of listening with 20-25 dB loss
"Soft speech" 35 dB HL Ex: listening to student respond across class	"Conversational speech" 45 dB HL Ex: listening to someone talking from 3 feet	"Teacher speech" 50 dB HL Ex: Teacher speaking from 10 or more feet away, represents no FM/DM used	Write your name and the date on the top left of your paper. Read the first paragraph, answer the odd questions using a pencil. With a blue marker, underline all of the vocabulary words from your math list. Count all of the underlined words and put the total number on the bottom right corner of your paper. Hand it in to me by 2:00.
40% audible	80% audible	95% audible	
Missing Sounds f, s, th, p, k, v, z, g, t, sh, ch	Missing Sounds f, s, th, p, k, v, z	All speech sounds are detectable, but will not be as loud as for typically hearing	
Possible listening challenges in school* <i>All may be improved with use of FM *LIFE-R Results</i>	<ul style="list-style-type: none"> <input type="checkbox"/> Teacher talking with back turned to student <input type="checkbox"/> Listening to students across room during class discussions 	<ul style="list-style-type: none"> <input type="checkbox"/> Understanding others during small group work <input type="checkbox"/> Teacher talking while moving 	

Accommodations are Mandated by Law. Please Implement the Indicated Items in the Child's Educational Program:

- Seating for optimal auditory/visual access
 Get closer or use FM/DM, do not raise your voice
 Preteach vocabulary
 Frequent visual aids
 Routinely implement a cue to listen
 Slow your speaking rate; pause frequently
 Inservice peers on hearing loss/aids/FM to reduce bullying
 Use open-ended comprehension checks
 Repeat key information using different words
 Support/train use of self-advocacy (clarification requests)
 Daily recording of use and function of hearing devices (monitoring required by IDEA)
 Regular contact with other students with hearing loss
 Periodic educational monitoring such as October and April teacher/student completion of SIFTER, LIFE-R
 Ensure access to computer, video and group learning

NOTE: All children require full access to teacher instruction and educationally relevant peer communication to receive an appropriate education.

Distance, noise in classroom and fragmentation caused by hearing loss prevent full access to spoken instruction. Appropriate acoustics, use of visuals, FM amplification, sign language, notetakers, captioning, etc. increase access to instruction. Students need periodic hearing evaluation, routine amplification checks, and regular monitoring of access to instruction and classroom function.

Impact of Hearing Loss on Listening, Learning, and Social Interactions

Child's Name: _____ Gr: _____ School: _____

Hearing loss is an access issue that often causes significant learning and/or functional performance issues. Classroom and/or instructional accommodations are required. Educational impacts are not due a learning disorder.

25-30 dB HEARING LOSS (aided or unaided thresholds) (-10 to +15 dB is normal hearing)			
Possible Impact on the Understanding of Language and Speech	Possible Social - Emotional Impact	Potential Educational Accommodations and Services	
<ul style="list-style-type: none"> Hearing decrease when index fingers are placed in ears is approximately 20-25 dB. A 25 – 30 dB hearing loss causes greater listening difficulties than this "plugged ear" loss Hearing aids do not restore normal hearing. The majority of students will only hear at 25-30 dB when using their hearing aids Can be 'seen to hear' but misses fragments of speech, especially when speaker is 6+ feet away. Doesn't know what wasn't heard because s/he didn't hear it Degree of difficulty in school will depend upon <u>noise level</u> in the classroom, <u>distance</u> from the speaker, even with hearing aids Is at high risk to miss unemphasized words and consonants (cast, cap, calf, cat may all sound alike – like 'ca'), /s/ and /ed/ endings Missing these sounds can result in difficulties in early reading skills such as letter/sound associations, syntax, vocabulary, speech Level of need strongly related to intervention before age 3 and consistency of amplification 	<ul style="list-style-type: none"> Negative impact on self-esteem builds as student is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention" May believe he/she is less capable due to difficulties understanding in class Ability to pay attention just to the speech signal unlikely to develop, especially when listening in any background noise, causing the school environment to be stressful Fatigued due to effort needed to listen; can take 'listening breaks' that look like inattention Increasing difficulty following fast-paced social interactions, especially in noise without lipreading 	<ul style="list-style-type: none"> Hearing aids and personal FM/DM system technology are needed for access in all learning environments Requires seating where other students are visible (i.e. 2nd row or U-shape), away from bright light, with absorptive material within classroom to reduce reverberation (i.e., carpet) Requires direct training in self-advocacy skills if the student is to be a full participant in all class activities May have 'Swiss cheese' language causing 'average' language test results but narrative language differences requiring special instruction Level of need for auditory, speech, language, vocabulary development, and support in reading and self-esteem needs to be determined Need for teacher inservice on the impact of a 25 – 30 dB hearing loss on listening and learning is necessary 	
Audibility of Speech Sounds (puzzle pieces available for understanding) NOTE: Typically hearing students have 95%+ audibility in all conditions.			Example of listening with 25-30 dB loss
"Soft speech" 35 dB HL Ex: listening to student respond across class	"Conversational speech" 45 dB HL Ex: listening to someone talking from 3 feet	"Teacher speech" 50 dB HL Ex: Teacher speaking from 10 or more feet away, represents no FM/DM used	Write your name and the date on the top left of your paper. Read the first paragraph, answer the odd questions using a pencil. With a blue marker, underline all of the vocabulary words from your math list. Count all of the underlined words and put the total number on the bottom right corner of your paper. Hand it in to me by 2:00.
25% audible	65% audible	81% audible	
Missing Sounds f, s, th, p, k, v, z, g, t, sh, ch, l, a, j, m, d, b	Missing Sounds f, s, th, p, k, v, z, g, t, sh, ch	Missing Sounds f, s, th, t, p, k	
Possible listening challenges in school* <i>All may be improved with use of FM *LIFE-R Results</i>	<input type="checkbox"/> Teacher talking with back turned to student <input type="checkbox"/> Listening to students across room during class discussions	<input type="checkbox"/> Understanding directions <input type="checkbox"/> Understanding others during small group work <input type="checkbox"/> Teacher talking while moving	<input type="checkbox"/> Understanding others during informal social interactions (usually with background noise) <input type="checkbox"/> Teacher talking in background noise <input type="checkbox"/> Understanding announcements/assemblies

Accommodations are Mandated by Law. Please Implement the Indicated Items in the Student's Educational Program:

- Seating for optimal auditory/visual access
 Get closer or use FM/DM, do not raise your voice
 Preteach vocabulary
 Frequent visual aids
 Routinely implement a cue to listen
 Slow your speaking rate; pause frequently
 Inservice peers on hearing loss/aids/FM to reduce bullying
 Use open-ended comprehension checks
 Repeat key information using different words
 Support/train use of self-advocacy (clarification requests)
 Daily recording of use and function of hearing devices (monitoring required by IDEA)
 Regular contact with other students with hearing loss
 Periodic educational monitoring such as October and April teacher/student completion of SIFTER, LIFE-R
 Ensure access to computer, video and group learning

NOTE: Per the ADA Law, all students require full access to instruction and peer-to-peer communication to ensure an equal opportunity to achieve like peers
 Distance, noise in classroom and fragmentation caused by hearing loss prevent full access to spoken instruction. Appropriate acoustics, use of visuals, FM amplification, sign language, notetakers, captioning, etc. increase access to instruction. Students require routine amplification checks, and regular monitoring of access to instruction and classroom function.

Impact of Hearing Loss on Listening, Learning, and Social Interactions

Student's Name: _____

Gr: _____ School: _____

Hearing loss is an access issue that often causes significant learning and/or functional performance issues. Classroom and/or instructional accommodations are required. Educational impacts are not due a learning disorder.

30-35 dB HEARING LOSS (aided or unaided thresholds) (-10 to +15 dB is normal hearing)			
Possible Impact on the Understanding of Language and Speech	Possible Social - Emotional Impact	Potential Educational Accommodations and Services	
<ul style="list-style-type: none"> Hearing decrease when index fingers are placed in ears is approximately 20-25 dB. A 30 – 35 dB hearing loss causes greater listening and learning issues than a "plugged ear" loss Can be 'seen to hear' but misses fragments of speech; doesn't know what s/he doesn't hear because s/he doesn't hear it Degree of difficulty experienced in school will depend upon <u>noise level</u> in the classroom, <u>distance</u> from the teacher (or FM use), even with hearing aids Content of what a speaker says from a distance beyond 3-6 feet will be 'heard' but fragmented, so often only partly understood Will often miss unemphasized words and consonants (cast, cap, calf, cat may all sound alike – like 'ca'), /s/ and /ed/ endings Missing these sounds can result in difficulties in early reading skills such as letter/sound associations, syntax, vocabulary, speech Level of need strongly related to intervention before age 3 and consistency of amplification 	<ul style="list-style-type: none"> Negative impact on self-esteem builds as student is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention" May believe he/she is less capable due to difficulties understanding in class Ability to pay attention just to the speech signal unlikely to develop, especially when listening in any background noise, causing the school environment to be stressful Fatigue often occurs from greater effort needed to listen; takes listening breaks that look like inattention Increasing difficulty following social interactions, especially in noise without lipreading; often perceived as socially awkward 	<ul style="list-style-type: none"> For equal access to classroom communication, use of hearing aids and personal FM/DM system is necessary in all learning environments Requires seating where other students are visible (i.e. 2nd row or U-shape), away from bright light, with absorptive material within classroom to reduce reverberation (i.e., carpet) Likely to have 'Swiss cheese' language causing 'average' language test results but narrative language differences that require direct instruction Requires direct training in self-advocacy skills, if the student is to be a full participant in all class activities Level of need for auditory, speech, language, vocabulary development, and support in reading and self-esteem needs to be determined Teacher inservice on the impact of a 30 – 35 dB hearing loss on listening and learning is necessary 	
Audibility of Speech Sounds (puzzle pieces available for understanding) NOTE: Typically hearing students have 95%+ audibility in all conditions.			Example of listening with 30-35 dB loss
"Soft speech" 35 dB HL Ex: listening to student respond across classroom	"Conversational speech" 45 dB HL Ex: listening to someone talking from 3 feet	"Teacher speech" 50 dB HL Ex: Teacher speaking from 10+ feet away, no FM used	
15% audible	45% audible	60% audible	
Missing Sounds f, s, th, p, k, v, z, g, t, sh, ch, l, a, j, m, d, b, ng, o	Missing Sounds f, s, th, p, k, v, z, g, t, sh, ch, l, a, j, m, d, b	Missing Sounds f, s, th, t, p, k, v, z, g, sh, ch	
Possible listening challenges in school* <i>All may be improved with use of FM/DM *LIFE-R Results</i>	<input type="checkbox"/> Teacher talking with back turned to student <input type="checkbox"/> Teacher talking while moving <input type="checkbox"/> Listening to students across room during class discussion	<input type="checkbox"/> Understanding directions <input type="checkbox"/> Teacher talking in background noise <input type="checkbox"/> Understanding others during small group work	Write your name and the date on the top left of your paper. Read the first paragraph, answer the odd questions using a pencil. With a blue marker, underline all of the vocabulary words from your math list. Count all of the underlined words and put the total number on the bottom right corner of your paper. Hand it in to me by 2:00. <input type="checkbox"/> Understanding school announcements <input type="checkbox"/> Understanding school assemblies <input type="checkbox"/> Understanding others during informal social interactions (usually with background noise) <input type="checkbox"/> Understanding announcements/assemblies

Accommodations are Mandated by Law. Please Implement the Indicated Items in the Student's Educational Program:

- Seating for optimal auditory/visual access
 Get closer or use FM/DM, do not raise your voice
 Preteach vocabulary
 Frequent visual aids
 Routinely implement a cue to listen
 Slow your speaking rate; pause frequently
 Inservice peers on hearing loss/aids/FM to reduce bullying
 Use open-ended comprehension checks
 Repeat key information using different words
 Support/train use of self-advocacy (clarification requests)
 Daily recording of use and function of hearing devices (monitoring required by IDEA)
 Regular contact with other students with hearing loss
 Periodic educational monitoring such as October and April teacher/student completion of SIFTER, LIFE-R
 Ensure access to computer, video and group learning

NOTE: Per the ADA Law, all students require full access to instruction and peer-to-peer communication to ensure an equal opportunity to achieve like peers
 Distance, noise in classroom and fragmentation caused by hearing loss prevent full access to spoken instruction. Appropriate acoustics, use of visuals, FM amplification, sign language, notetakers, captioning, etc. increase access to instruction. Students require routine amplification checks, and regular monitoring of access to instruction and classroom function.

Impact of Hearing Loss on Listening, Learning, and Social Interactions

Child's Name: _____ Gr: _____ School: _____

Hearing loss is an access issue that often causes significant learning and/or functional performance issues. Classroom and/or instructional accommodations are required. Educational impacts are not due a learning disorder.

35-40 dB HEARING LOSS (aided or unaided thresholds) (-10 to +15 dB is normal hearing)			
Possible Impact on the Understanding of Language and Speech	Possible Social - Emotional Impact	Potential Educational Needs for Accommodations and Services	
<ul style="list-style-type: none"> Hearing decrease when index fingers are placed in ears is approximately 20-25 dB. A 35 – 40 dB hearing loss causes much greater listening difficulties than a "plugged ear" loss Can "hear" close speech but misses many fragments leading to misunderstanding Content of what a speaker says from a distance beyond 3 feet will be 'heard' but only partly understood Degree of difficulty in school will depend upon <u>noise level</u> in the classroom, consistency of FM and hearing aid use Will miss all unemphasized words ('a,' 'the,' -ed endings) and most consonants (cast, cap, calf, cat, can't may all sound alike – 'a') Doesn't know what s/he doesn't hear because s/he doesn't hear it Commonly will experience difficulties learning early reading skills such as letter/sound associations due to reduced access to sounds 	<ul style="list-style-type: none"> Negative impact on self-esteem as child is accused of "not paying attention" May believe he/she is less capable due to difficulties understanding in class Understands less than half of speech sounds available through listening. Speech-reading cannot close all gaps in understanding. Learning environment is stressful as child strains to 'fake it' Child is more fatigued due to the significant effort needed to listen Difficulty interacting due to missed speech sounds; often perceived as socially awkward or isolated 	<ul style="list-style-type: none"> For equal access, use of hearing aids and personal FM/DM system in the classroom is necessary Requires seating where other students are visible (i.e. 2nd row or U-shape), away from bright light Will have 'Swiss cheese' language causing narrative language issues. Requires constant preteaching to keep pace with vocabulary learning Gaps in phonological awareness and knowledge of morphology impact reading fluency rate, comprehension Requires direct training in self-advocacy skills; necessary if the child is to be a full participant in class Likely to need attention to auditory skill development, vocabulary, some support in reading and self-esteem Teacher inservice on the impact of a 35 – 40 dB hearing loss on learning 	
Audibility of Speech Sounds (puzzle pieces available for understanding) NOTE: Typically hearing children have 95%+ audibility in all conditions.			Example of listening with 35-40 dB loss
"Soft speech" 35 dB HL Ex: listening to student respond across classroom	"Conversational speech" 45 dB HL Ex: listening to someone talking from 3 feet	"Teacher speech" 50 dB HL Ex: Teacher speaking from 10+ feet away, no FM used	Write your name and the date on the top left of your paper. Read the first paragraph, answer the odd questions using a pencil. With a blue marker, underline all of the vocabulary words from your math list. Count all of the underlined words and put the total number on the bottom right corner of your paper. Hand it in to me by 2:00.
10% audible	30% audible	45% audible	
Sounds perceived u, e, l, ng	Sounds perceived j, m, d, b, ng, l, a	Sounds perceived j, m, d, b, ng, l, a, sh, ch	
Possible listening challenges in school* <i>All may be improved with use of FM/DM</i> *LIFE-R Results	<ul style="list-style-type: none"> <input type="checkbox"/> Teacher talking with back turned to student <input type="checkbox"/> Teacher talking while moving <input type="checkbox"/> Listening to students across room during class discussions 	<ul style="list-style-type: none"> <input type="checkbox"/> Understanding directions <input type="checkbox"/> Teacher talking in background noise <input type="checkbox"/> Understanding others during small group work 	

Accommodations are Mandated by Law. Please Implement the Indicated Items in the Child's Educational Program:

- Seating for optimal auditory/visual access
 Get closer or use FM/DM, do not raise your voice
 Preteach vocabulary
 Frequent visual aids
 Routinely implement a cue to listen
 Slow your speaking rate; pause frequently
 Inservice peers on hearing loss/aids/FM to reduce bullying
 Use open-ended comprehension checks
 Repeat key information using different words
 Support/train use of self-advocacy (clarification requests)
 Daily recording of use and function of hearing devices (monitoring required by IDEA)
 Regular contact with other students with hearing loss
 Periodic educational monitoring such as October and April teacher/student completion of SIFTER, LIFE-R
 Ensure access to computer, video and group learning

NOTE: All children require full access to teacher instruction and educationally relevant peer communication to receive an appropriate education.

Distance, noise in classroom and fragmentation caused by hearing loss prevent full access to spoken instruction. Appropriate acoustics, use of visuals, FM amplification, sign language, notetakers, captioning, etc. increase access to instruction. Students need periodic hearing evaluation, routine amplification checks, and regular monitoring of access to instruction and classroom function (monitoring tools at <http://successforkidswithhearingloss.com>).

Barriers to Listening

Challenges to Understanding in the Classroom – Especially with a Hearing Loss

Visual Analogies to Help Understand the Impact of Hearing Loss

Background Noise – covering up bits and pieces

Glance away from this list of sentences and then quickly look back.

At which sentence is it still immediately easy to read? What is the corresponding S/N?

S/N means how loud one signal is in relation to an unwanted signal. If the teacher's voice is the same loudness as the background noise in the classroom it would be at 0 S/N. If her voice is 10 dB louder than the noise, it would be at +10 S/N

Consider the *effort* and *time* it took to figure out the sentences that had a higher noise level.

- How would this effect the pace of learning?
- What may be the impact on cognitive resources available to comprehend the meaning of what was said, along with just listening and understanding the words that were spoken?
- Fatigue at the end of the school day?
- How might it impact the energy available to learn?

I see some beautiful flowers.	+20
Big dogs can be dangerous.	+15
I like to go to school.	+10
It is lunch time soon.	+5
Walk to the library now.	0
Your brother is not here.	-5

Reverberation – smearing words together

Glance away from this list of sentences and then quickly look back.

Which sentence is it still immediately easy to read? Note the reverberation time number next to that sentence.

Reverberation time in classrooms typically is in a range from very low, with little reflected sound – like 0.3 second – to very reverberant, such as 1.2 seconds. Reverberation time in gymnasiums or large multi-purpose rooms can often be 2.0 seconds or more. Soft surfaces, like carpeting, acoustic tile, draperies all help to reduce reverberation time.

Consider the time lapse and amount of cognitive work it takes to understand the sentences when the words are smeared together.

- What may be the impact on cognitive resources available to comprehend the meaning of what was said, along with just listening and understanding the words that were spoken?
- How would this effect the pace of learning?
- Fatigue at the end of the school day?
- How might it impact the energy available to learn?

The diagram consists of a purple-bordered box containing a list of sentences. To the right of the sentences is a large downward-pointing arrow. To the right of the arrow is a vertical rectangular box containing the text 'Increasing Reverberation Time'. The sentences in the box are: 'I see some beautiful flowers.', 'Big dogs can be dangerous.', 'I like to go to school.', 'It is lunch time soon.', 'Your brother is not here.', 'Walk to the playground.', and 'I went to the store and with'. The text in the sentences becomes increasingly blurred and difficult to read from top to bottom, corresponding to the increasing reverberation time indicated by the arrow.

Distance – preferential seating is NOT enough







Hearing aids and cochlear implants are designed to work best at a distance of 3 – 6 feet.

A child may **DETECT** sound further away but **COMPREHENSION** will be based on attention, knowledge of topic, routineness of communication, etc.

Any new information presented beyond 3-6 is likely to be understood partially, unclearly, or not at all. FM reduces the impact of distance as a student listens to the teacher. Distance is always a concern with peer-peer communication, unless the FM mic is passed before a student answers a question.

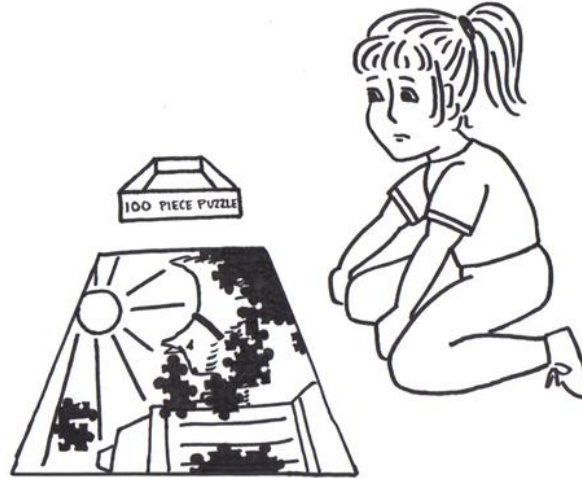
The Listening Bubble in the Classroom

Hearing aids and cochlear implants are most effective at distances of 3-6 feet.
Beyond this distance, the student is likely to not hear all of the speech sounds.
This is especially true for endings, plurals, brief words and all soft or distant speech.
Students may "hear" but struggle with missing pieces of speech that interferes with comprehension.

No FM Used	With FM in Use
	
	
	

Fragmented Hearing Creates Challenges Understanding

Representation of fragmented speech due to hearing loss; puzzle analogy to represent missing 25% of speech audibility.



Representation of fragmented speech due to hearing loss; puzzle analogy to represent missing 40% of speech audibility



- **Above: a visual analogy for Audibility** - Recognizing the subject of a picture puzzle depends on what pieces are missing and the complexity of the picture.
Opportunity - what a child can do with what he hears
- **An analogy for Speech Perception** - Recognizing the content of a puzzle made out of written words depends on knowledge of vocabulary, syntax, the general topic and effort to figure out the missing pieces, especially when there is new vocabulary words and concepts. Consider the student looking at a 100 piece puzzle with the words to the song *Twinkle, Twinkle Little Star*. Even missing some pieces of words, the child is likely to recognize what is said. Contrast that with understanding a new story or information with audibility pieces missing.
Function – what a child can do with what he hears based on what he knows

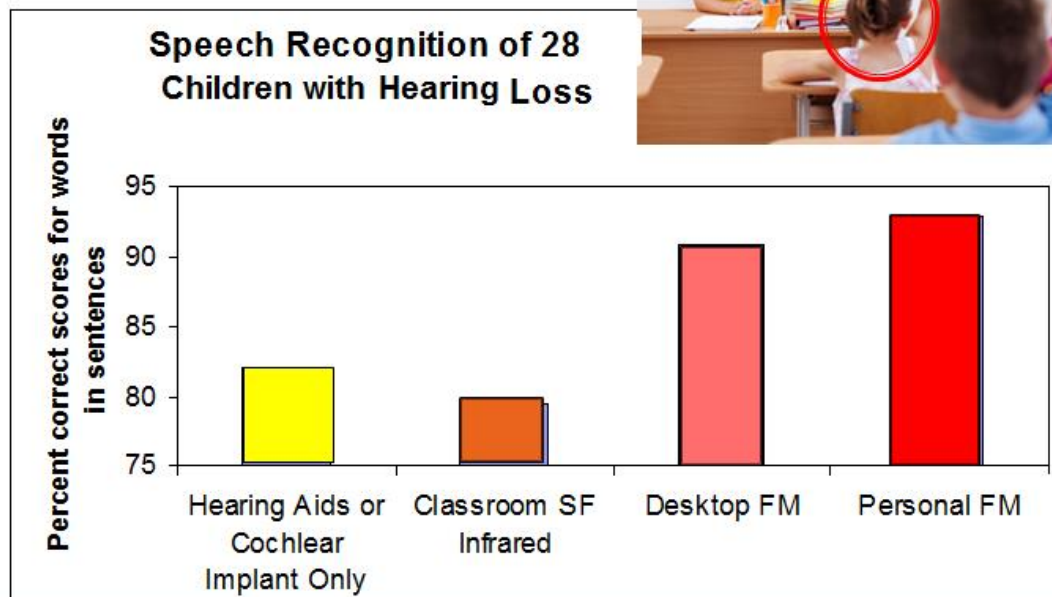
All Hearing Devices are NOT the Same

- Using hearing aids in the classroom improves a child's hearing, but does not make it normal.
- Children with typical hearing are able to perceive speech in noise at an accuracy of about 95% - without having to watch the speaker's face
- Children with hearing aids or a cochlear implant in this study performed about the same with their hearing devices alone when compared to listening with their devices in a room that had a sound field classroom amplification system. Some worked harder and performed more poorly when the sound field amplification was used because of the smearing effect of reverberation in the room.
- Having the teacher's voice presented at the student's ear level provides the greatest access to the teacher's speech. Even with FM technology in use, a student with hearing loss will still not be able to perform as well in noisy situations as their peers with typical hearing.

Sizing up classroom hearing technology



Speech Recognition of 28 Children with Hearing Loss



Distance counts! The closer to the ear the better the performance with the least effort. *Summary of 3 FM Study*

<https://successforkidswithhearingloss.com/resources-for-professionals/impact-on-listening-and-learning>