Appendices

Appendix A

Relationship of Hearing Loss to Listening and Learning Needs

16–25 dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Impact of a hearing loss that is approximately 20 dB can be compared to ability to hear when index fingers are placed in your ears. ■ Child may have difficulty hearing faint or distant speech. At 16 dB, student can miss up to 10% of speech signal when teacher is at a distance greater than 3 feet. ■ A 20 dB or greater hearing loss in the better ear can result in absent, inconsistent, or distorted parts of speech, especially word endings (s, ed) and unemphasized sounds. ■ Percent of speech signal missed will be greater whenever there is background noise in the classroom, especially in the elementary grades when instruction is primarily verbal and younger children have greater difficulty listening in noise. ■ Young children have the tendency to watch and copy the movements of other students rather than attending to auditorily fragmented teacher directions.	■ May be unaware of subtle conversational cues that could cause child to be viewed as inappropriate or awkward. ■ May miss portions of fast-paced peer interactions that could begin to have an impact on socialization and self-concept. ■ Behaviour may be confused for immaturity or inattention. ■ May be more fatigued due to extra effort needed for understanding speech.	■ Noise in typical classroom environments impede child from having full access to teacher instruction. Will benefit from improved acoustic treatment of classroom and soundfield amplification. ■ Favourable seating necessary. ■ May often have difficulty with sound/letter associations and subtle auditory discrimination skills necessary for reading. ■ May need attention to vocabulary or speech, especially when there has been a long history of middle ear fluid. ■ Depending on loss configuration, may benefit from low power hearing aid with personal FM system. ■ Appropriate medical management necessary for conductive losses. ■ In-service on impact of "minimal" 15–25 dB hearing loss on language development, listening in noise, and learning is required for teacher.

26–40 dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Effect of a hearing loss of approximately 20 dB can be compared to ability to hear when index fingers are placed in ears, therefore a 26–40 dB hearing loss causes greater listening difficulties than a "plugged ear" loss. ■ Child can "hear" but misses fragments of speech leading to misunderstanding. ■ Degree of difficulty experienced in school will depend upon noise level in the classroom, distance from the teacher, and configuration of the hearing loss, even with hearing aids. At 30 dB, can miss 25–40% of the speech signal; at 40 dB, may miss 50% of class discussions, especially when voices are faint or speaker is not in line of vision. ■ Will miss unemphasized words and consonants, especially when a high frequency hearing loss is present. ■ Often experiences difficulty learning early reading skills such as letter/sound associations. ■ Child's ability to understand and succeed in the classroom will be substantially diminished by speaker distance and background noise, especially in the elementary grades.	■ Barriers begin to build with negative impact on self-esteem as child 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. ■ Child begins to lose ability for selective listening and has increasing difficulty suppressing background noise causing the learning environment to be more stressful. ■ Child is more fatigued due to effort needed to listen.	■ Noise in typical class will impede child from full access to teacher instruction. ■ Will benefit from hearing aid(s) and use of a desktop or ear level FM system in the classroom. ■ Needs favourable acoustics, seating, and lighting. ■ May need attention to auditory skills, speech, language development, speech reading, and/or support in reading and self-esteem. ■ Amount of attention needed is typically related to the degree of success of intervention prior to 6 months of age to prevent language and early learning delays. ■ Teacher in-service on impact of so-called "mild" hearing loss on listening and learning is needed to convey that it is often greater than expected.

41–55 dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Consistent use of amplification and language intervention prior to age 6 months increases the probability that the child's speech, language, and learning will develop at a normal rate. ■ Without amplification, understands conversation at a distance of 3–5 feet, if sentence structure and vocabulary are known. ■ The amount of speech signal missed can be 50% or more with 40 dB loss and 80% or more with 50 dB loss. ■ Without early amplification, the child is likely to have delayed or disordered syntax, limited vocabulary, imperfect speech production, and flat voice quality. ■ Addition of a visual communication system to supplement audition may be indicated, especially if language delays and/or additional disabilities are present. ■ Even with hearing aids, child can "hear" but may miss much of what is said if classroom is noisy or reverberant. ■ With personal hearing aids alone, ability to perceive speech and learn effectively in the classroom is at high risk. ■ A personal FM system to overcome classroom noise and distance is typically necessary.	■ Barriers build with negative impact on self-esteem as child is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention." ■ Communication will be significantly compromised with this degree of hearing loss if hearing aids are not worn. ■ Socialization with peers can be difficult, especially in noisy settings such as cooperative learning situations, lunch, or recess. ■ May be more fatigued than classmates due to effort needed to listen.	■ Consistent use of amplification (hearing aids + FM) is essential. ■ Needs favourable classroom acoustics, seating, and lighting. ■ Consultation/program supervision by a specialist in childhood hearing impairment to coordinate services is important. ■ Depending on intervention success in preventing language delays, special academic support is necessary if language and academic delays are present. ■ Attention to growth of oral communication, reading, written language skills, auditory skill development, speech therapy, and self-esteem likely. ■ Teacher in-service is required with attention to communication access and peer acceptance.

56–70 dB HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Even with hearing aids, child will typically be aware of people talking around him/her, but will miss parts of words said resulting in difficulty in situations requiring verbal communication (both one-to-one and in groups). ■ Without amplification, conversation must be very loud to be understood; a 55 dB loss can cause a child to miss up to 100% of speech information without functioning amplification. ■ If hearing loss is not identified before age 1 year and appropriately managed, delayed spoken language, syntax, reduced speech intelligibility, and flat voice quality is likely. ■ Age when first amplified, consistency of hearing aid use, and success of early language intervention are strongly tied to speech, language, and learning development. ■ Addition of visual communication system is often indicated if language delays and/or additional disabilities are present. Use of a personal FM system will reduce the effects of noise and distance and allow increased auditory access to verbal instruction. With hearing aids alone, ability to understand in the classroom is greatly reduced by distance and noise.	■ If hearing loss was late-identified and language delay was not prevented, communication interaction with peers will be significantly affected. ■ Children will have greater difficulty socializing, especially in noisy settings such as lunch, cooperative learning situations, or recess. ■ Tendency for poorer self-concept and social immaturity may contribute to a sense of rejection; peer in-service is helpful.	■ Full-time consistent use of amplification (hearing aids + FM system) is essential. ■ May benefit from frequency transposition (frequency compression) hearing aids depending upon loss configuration. ■ May require intense support in development of auditory, language, speech, reading, and writing skills. ■ Consultation/supervision by a specialist in childhood hearing impairment to coordinate services is important. ■ Use of sign language or a visual communication system by children with substantial language delays or additional learning needs may be useful to access linguistically complex instruction. ■ Accommodations (notetaking, captioned films, etc.) are often needed. ■ Teacher in-service required.

71–90 dB and 91+ dB		
Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ The earlier the child wears amplification consistently with concentrated efforts by parents and caregivers to provide rich language opportunities throughout everyday activities and/or provision of intensive language intervention (sign or verbal), the greater the probability that speech, language, and learning will develop at a relatively normal rate. ■ Without amplification, children with 71–90 dB hearing loss may only hear loud noises about 1 foot from ear. ■ When amplified optimally, children with hearing ability of 90 dB or better should detect many sounds of speech if presented from close distance or via FM. ■ Individual ability and intensive intervention prior to 6 months of age will determine the degree that sounds detected will be discriminated and understood by the brain into meaningful input. ■ Even with hearing aids, children with 71–90 dB loss are typically unable to perceive all high-pitch speech sounds sufficiently to discriminate them or benefit from incidental listening, especially without the use of FM. ■ The child with hearing loss greater than 70 dB may be a candidate for cochlear implant(s) and the child with hearing loss greater than 90 dB will not be able to perceive most speech sounds with traditional hearing aids. ■ For full access to language to be available visually through sign language or cued speech, family members must be involved in child's communication mode from a very young age.	■ Depending on success of intervention in infancy to address language development, the child's communication may be minimally or significantly affected. ■ Socialization with hearing peers may be difficult. ■ Children in general education classrooms may develop greater dependence on adults due to difficulty perceiving or comprehending oral communication. ■ Children may be more comfortable interacting with peers who are Deaf and/or hard of hearing due to ease of communication. ■ Relationships with peers and adults who have hearing loss can make positive contributions toward the development of a healthy self-concept and a sense of cultural identity.	■ There is no one communication system that is right for all children who are hard of hearing and/or Deaf and their families. ■ Whether a visual communication approach or auditory/oral approach is used, extensive language intervention, full-time consistent amplification use, and constant integration of the communication practices into the family by 6 months of age will highly increase the probability that the child will become a successful learner. ■ Children with late-identified hearing loss (i.e., after 6 months of age) will have delayed language. ■ This language gap is difficult to overcome, and the educational programming of a child with hearing loss, especially those with language and learning delays secondary to hearing loss, requires the involvement of a consultant or teacher with expertise in teaching children with hearing loss. ■ Depending on the configuration of the hearing loss and individual speech perception ability, frequency transposition (frequency compression) aids or cochlear implantation may be options for better access to speech. ■ If an auditory/oral approach is used, early training is needed on auditory skills, spoken language, concept development, and speech. ■ If culturally Deaf emphasis is selected, frequent exposure to Deaf ASL users is important. ■ Educational placement with other signing Deaf and/or hard of hearing students (special school or classes) may be a more appropriate option to access a language-rich environment and free-flowing communication. ■ Support services and continual appraisal of access to communication and verbal instruction is required. ■ Notetaking, captioning, captioned films, and other visual enhancement strategies are necessary. Training in pragmatic language use and communication repair strategies is helpful. ■ In-service of general education teachers is essential.

UNILATERAL HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Child can "hear" but can have difficulty understanding in certain situations, such as hearing faint or distant speech, especially if poor ear is aimed toward the person speaking. ■ Will typically have difficulty localizing sounds and voices using hearing alone. ■ The unilateral listener will have greater difficulty understanding speech when environment is noisy and/or reverberant, especially when normal ear is toward the overhead projector or other competing sound source and poor hearing ear toward the teacher. ■ Exhibits difficulty detecting or understanding soft speech from the side of the poor hearing ear, especially in a group discussion.	■ Child may be accused of selective hearing due to discrepancies in speech understanding in quiet versus noise. ■ Social problems may arise as child experiences difficulty understanding in noisy cooperative learning or recess situations. ■ May misconstrue peer conversations and feel rejected or ridiculed. ■ Child may be more fatigued in classroom due to greater effort needed to listen if class is noisy or has poor acoustics. ■ May appear inattentive, distractible, or frustrated, with behaviour or social problems sometimes evident.	■ Allow child to change seat locations to direct the normal hearing ear toward the primary speaker. ■ Student is at 10 times the risk for educational difficulties as children with 2 normal hearing ears, and 1/3 to 1/2 of students with unilateral hearing loss experience significant learning problems. ■ Children often have difficulty learning sound/letter associations in typically noisy Kindergarten and Grade 1 settings. ■ Educational and audiological monitoring is warranted. ■ Teacher in-service is beneficial. ■ Typically will benefit from a personal FM system with low gain/power or a soundfield FM system in the classroom, especially in the lower grades. ■ Depending on the hearing loss, may benefit from a hearing aid in the impaired ear.

MID-FREQUENCY HEARING LOSS or REVERSE SLOPE HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Child can "hear" whenever speech is present but will have difficulty understanding in certain situations. ■ May have difficulty understanding faint or distant speech, such as a student with a quiet voice speaking from across the classroom. ■ The "cookie bite" or reverse slope listener will have greater difficulty understanding speech when environment is noisy and/or reverberant, such as a typical classroom setting. ■ A 25–40 dB degree of loss in the low to mid-frequency range may cause the child to miss approximately 30% of speech information if unamplified; some consonant and vowel sounds may be heard inconsistently, especially when background noise is present. ■ Speech production of these sounds may be affected.	■ Child may be accused of selective hearing or "hearing when he wants to" due to discrepancies in speech understanding in quiet versus noise. ■ Social problems may arise as child experiences difficulty understanding in noisy cooperative learning situations, lunch, or recess. ■ May misconstrue peer conversations, believing that other children are talking about him or her. ■ Child may be more fatigued in classroom setting due to greater effort needed to listen. ■ May appear inattentive, distractible, or frustrated.	■ Personal hearing aids important but must be precisely fit to hearing loss. ■ Child likely to benefit from a soundfield FM system, a personal FM system, or an assistive listening device in the classroom. ■ Student is at risk for educational difficulties. ■ Can experience some difficulty learning sound/letter associations in Kindergarten and Grade 1 classes. ■ Depending upon degree and configuration of loss, child may experience delayed language development and articulation problems. ■ Educational monitoring and teacher in-service is warranted. ■ Annual hearing evaluation to monitor for hearing loss progression is important.

HIGH FREQUENCY HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Child can "hear" but can miss important fragments of speech. ■ Even a 26–40 dB loss in high frequency hearing may cause the child to miss 20–30% of vital speech information if unamplified. ■ Consonant sounds /t/, /s/, /f/, /th/, /k/, / sh/, and /ch/ likely heard inconsistently, especially in noise. ■ May have difficulty understanding faint or distant speech, such as a student with a quiet voice speaking from across the classroom; will have much greater difficulty understanding speech when in low background noise and/or when reverberation is present. ■ Many of the critical sounds for understanding speech are high pitched, quiet sounds, making them difficult to perceive; the words cat, cap, calf, and cast could be perceived as "ca"; word endings, possessives, plurals, and unstressed brief words are difficult to perceive and understand. ■ Speech production may be affected. ■ Use of amplification is often indicated to learn language at a typical rate and ease learning.	■ May be accused of selective hearing due to discrepancies in speech understanding in quiet versus noise. ■ Social problems may arise as child experiences difficulty understanding in noisy cooperative learning situations, lunch, or recess. ■ May misinterpret peer conversations. ■ Child may be fatigued in classroom due to greater listening effort. ■ May appear inattentive, distractible, or frustrated. ■ Could affect self-concept.	■ Student is at risk for educational difficulties. ■ Depending upon onset, degree, and configuration of loss, child may experience delayed language and syntax development and articulation problems. ■ Possible difficulty learning some sound/letter associations in Kindergarten and Grade 1 classes. ■ Early evaluation of speech and language skills is suggested. ■ Educational monitoring and teacher in-service are warranted. ■ Will typically benefit from personal hearing aids and use of a soundfield or a personal FM system in the classroom. ■ Use of ear protection in noisy situations is imperative to prevent damage to inner ear structures and resulting progression of the hearing loss.

FLUCTUATING HEARING LOSS

Possible Impact on the Understanding of Language and Speech	Possible Social Impact	Potential Educational Accommodations and Services
■ Of greatest concern are children who have experienced hearing fluctuations over many months in early childhood (multiple episodes with fluid lasting three months or longer). ■ Listening with a hearing loss that is approximately 20 dB can be compared to hearing when index fingers are placed in ears. ■ This loss or worse is typical of listening with fluid or infection behind the eardrums. ■ Child can "hear" but misses fragments of what is said. Degree of difficulty experienced in school will depend upon the classroom noise level, the distance from the teacher, and the current degree of hearing loss. ■ At 30 dB, can miss 25–40% of the speech signal; child with a 40 dB loss associated with "glue ear" may miss 50% of class discussions, especially when voices are faint or speaker is not in line of vision. ■ Child will frequently miss unstressed words, consonants, and word endings.	■ Barriers begin to build with negative impact on self-esteem as the child is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention." ■ Child may believe he/she is less capable due to understanding difficulties in class. ■ Typically poor at identifying changes in own hearing ability. With inconsistent hearing, the child learns to "tune out" the speech signal. ■ Children are judged to have greater attention problems, insecurity, and distractibility and to lack self-esteem. ■ Tend to be non-participative and distract themselves from classroom tasks; often socially immature.	■ Impact is primarily on acquisition of early reading skills and attending in class. ■ Screening for language delays is suggested from a young age. ■ Ongoing monitoring for hearing loss in school, communication between parent and teacher about listening difficulties, and aggressive medical management are needed. ■ Will benefit from soundfield FM or an assistive listening device in class. ■ May need attention to development of speech, reading, self-esteem, or listening skills. ■ Teacher in-service is beneficial.

Appendix B

An Illustration of Hearing Loss

The following demonstrates difficulties a student may have if the higher frequency parts of words are inaudible due to hearing loss and/or poor acoustics.

Figure 22 ***Missing Bits and Pieces of Words***

Won upon a time

a itty mow when to vit a untry mow.

The untry mow live in a feel.

EEE wuz lad to shee hi zittyfren.

A too my ran abowda feel and lay unt noon.

Source: Supporting Success for Children with Hearing Loss. "Classroom Acoustics—Impact on Listening and Learning." *Supporting Success for Children with Hearing Loss*, 2016, https://successforkidswithhearingloss.com/for-professionals/classroom-acoustics-impact-on-listening-and-learning/. Accessed 9 Dec. 2019. Reproduced with permission.

Translation:

Once upon a time
a city mouse went to visit a country mouse.
The country mouse lived in a field.
He was glad to see his city friend.
The two mice ran about the field and played until noon.

Appendix C

FM Wireless Audio Systems

There's an FM System in My Classroom

What is an FM system and why is it used?

- The FM system is a special device that uses radio signals to send a sound from a microphone used by one sound source, across distance to a listener using a receiver that is either connected to their hearing aids or to some type of headphones/earphones.
- This device is helpful in reducing the negative effects of background noise, loss of loudness, and lack of clarity over distance and reverberation.
- It is being used to help students in your class hear so that they can learn—remember that if students cannot hear you clearly, they cannot learn.
- You should be able to find more information about the FM system and why it is required for the student(s) in your classroom in the package of support materials and report that has been sent to your school. If you have not seen this information, then please contact the resource teacher and/or the audiologist.

Do I still need to use the FM system if I have a loud voice?

- Regardless of the loudness of your voice, as you move around, the distance changes between you and the student and thus your voice will change/fluctuate in loudness and clarity with the changing distance if you are not using an FM system.
- The loudness of your voice changes for the listener depending on whether you are facing them or not.
- Constantly changing loudness is very hard for a person with a hearing loss, and hearing aids are not able to keep the loudness of your voice constant or always at a level that is comfortable or even audible.
- The FM system microphone remains a constant distance from your mouth and therefore it maintains the loudness of your voice at a fairly constant level for the hearing aids, thus maintaining your voice at a constant and comfortable loudness for the student with a hearing loss.

What do I need to know about microphones?

- Most microphones (lapel mics and mics integrated into a transmitter) need to be positioned within 6 to 8 inches of your mouth (see the specific instructions provided with your system).
- Boom microphones usually provide better and more consistent sound quality than microphones clipped on your shirt or worn hanging around your neck because they move with your head and stay close to your mouth.
- The microphone will pick up your voice and any other sounds near it, so if your microphone is swinging and banging on something or rubbing on your clothing it will make a lot of distracting and irritating noise.

- Microphones are delicate and if dropped on a hard surface, they usually break.
- If there is wind blowing over the microphone it will usually be heard as "loud static."
- It is important to keep the cord between the microphone and the unit in good shape and to be sure that it is not tangled or knotted.
- Many FM systems have the antenna for the transmitter integrated into either the mic cord or the lavaliere neck cord.
- There are different styles of microphones for different units.
- Sometimes the particular needs of the child will dictate which microphone needs to be used, but sometimes there are choices, so if you would prefer to try a different style, please contact the audiologist to discuss what options are available for the particular unit that you have and for the best performance of the student.

What should I do if there is a problem with the FM system?

- First, you should perform a basic check of the system (time for some logical deduction).
  - Be sure that both the FM transmitter and the receiver are turned on.
  - Be sure that the FM microphone is attached (if it is separate) and turned on if it has a switch (not in mute position).
  - Check that the hearing aids are turned on.
  - Change the hearing aid batteries—they may be too weak to run the aid and FM system.
  - Check to see that the FM direct audio-input boots are correctly attached to the hearing aids and that the contact points are clean and in good condition.
  - Check that the earmold of the hearing aid is not blocked with wax and that there is no condensation/water droplets in the earmold tubing.
  - See the troubleshooting guide in the instructions for the FM system.
- If the system still does not work, put it back on to charge and be sure that you can see the charge lights to indicate that the charger is working.
- Next, you may want to contact your resource teacher or educational assistant to help run through a full troubleshooting step-by-step check of the system. (Troubleshooting instructions can be found in the FM system manual that has been provided with the unit or on the website of the system's manufacturer.)
- If you cannot find the problem or need assistance, please contact the audiologist for telephone assistance. The person making the call needs to be able to describe the problem and what has been tried and needs to be familiar with the FM system—often the problem can be solved without returning the FM system.
- If any of the spare parts are used/broken, you need to let the audiologist know immediately so that new spare parts can be ordered (parts can sometimes take several weeks to arrive).

- Please note, a statement of "not working" does not help—the more details that you can provide, the easier it is for the audiologist to understand the problem that you are encountering and find the problem and a solution.
  - What is not working?
  - What have you tried?
  - When did the problem start?
  - When does it not work? (always/late in the day/etc.)
  - Where does the problem occur? (everywhere or only in some locations)
  - Has anything happened to any part of the FM system—was something dropped?

Website resource:

Many FM equipment manufacturers now have websites with helpful training and troubleshooting information specific to many of their FMs. If you search via the manufacturer you will likely be able to locate resources for schools and teachers and FM users.

Please use the FM System consistently and familiarize yourself with it – your student deserves to hear what you are saying.

Appendix D

Phonological Skills

Phonological skill develops in a predictable progression and provides the basis for sequencing teaching tasks from easy to more difficult.

Prerequisites for phonological awareness are basic listening skill; the acquisition of a several-thousand-word vocabulary; the ability to imitate and produce basic sentence structures; and the use of language to express needs, react to others, comment on experience, and understand what others intend.

Phonological skills, from most basic to advanced, and the ages at which 80 to 90 percent of students have achieved each are outlined in the chart below.

Age	Skill Domain	Sample Task
4	Rote imitation and enjoyment of rhyme and alliteration	**pool, drool, tool** "Seven silly snakes sang songs seriously."
5	Rhyme recognition, odd word out	Which two words rhyme? **stair, steel, chair**
	Recognition of phonemic changes in word	"*Hickory Dickory Clock*. That's not right!"
	Clapping, counting syllables	**truck** (1 syllable) **airplane** (2 syllables) **boat** (1 syllable) **automobile** (4 syllables)
5.5	Distinguishing and remembering separate phonemes in a series	Show sequences of single phonemes with coloured blocks: /s/ /s/ /f/; /z/ /sh/ /z/.
	Blending onset and rime	"What word?" **th-umb** **qu-een** **h-ope**
	Producing a rhyme	Tell me a word that rhymes with *car*. (**star**)
	Matching initial sounds; isolating an initial sound	Say the first sound in *ride* (/r/); *sock* (/s/); *love* (/l/).
6	Compound word deletion	Say *cowboy*. Say it again, but don't say *cow*. (**boy**)
	Syllable deletion	Say *parsnip*. Say it again, but don't say *par*. (**snip**)
	Blending of two and three phonemes	/z/ /ū/ (**zoo**) /sh/ /ŏ/ /p/ (**shop**) /h/ /ou/ /s/ (**house**)
	Phoneme segmentation of words that have simple syllables with two or three phonemes (no blends)	Say the word as you move a chip for each sound. sh-e m-a-n l-e-g
6.5	Phoneme segmentation of words that have up to three or four phonemes (include blends)	Say the word slowly while you tap the sounds. b-a-ck ch-ee-se c-l-ou-d
	Phoneme substitution to build new words that have simple syllables (no blends)	Change the /j/ in *cage* to /n/. Change the /ā/ in *cane* to /ō/.
7	Sound deletion (initial and final positions)	Say *meat*. Say it again, without the /m/. Say *safe*. Say it again, without the /f/.

Age	Skill Domain	Sample Task
8	Sound deletion (initial position, include blends)	Say *prank*. Say it again, without the /p/.
9	Sound deletion (medial and final blend positions)	Say *snail*. Say it again, without the /n/. Say *fork*. Say it again, without the /k/.

Source: Moats, Louisa, and Carol Tolman. Excerpt from *Language Essentials for Teachers of Reading and Spelling (LETRS): The Speech Sounds of English: Phonetics, Phonology, and Phoneme Awareness* (Module 2), 2nd ed., Voyager Sopris Learning, 2009. Adapted with permission.

Appendix E

Question Hierarchy

Question Hierarchy

Level I

Find one like this.

Show me what you heard.

Show me what you touched.

What did you hear?

What did you touch?

What is this?

Say (Sign) this: _____

What did you see?

Show me what you saw.

Level II

Find one that can _____.

What is happening?

What things _____?

Who? What? Where?

Finish this _____.

Tell me its _____.

Find the one that is _____ and _____.

How are these **different**?

Name something that is a _____.

Level III

Find one to use with this.

What will happen next?

What could he say (sign)?

Do this, then this.

Make these into _____.

Tell me how.

What (same thing) happened to all of these?

Tell this story.

How are these the **same**?

What else can you think of that _____?

Find the things that are **not** _____.

Name something that can, but is **not** a _____.

Name something that is **not** a _____.

What is a _____?

Say this: _____.

Level IV

Where will _____?

What will happen if _____?

Why will _____?

Why wouldn't it _____?

Why would it _____?

What made it happen?

What could you do?

What could she do?

What could we use to _____?

Why should we use that?

Why is _____made of that?

How can we tell _____?

Why is this called _____?

Why can't we_____?

Reference: Blank, Marion, Susan A. Rose, and Laura J. Berlin. *The Language of Learning: The Preschool Years*. Grune & Stratton-HBJ, 1978.

Question Hierarchy

Level I: Matching Perception (less perceptual/language distance)*

Reporting and responding to salient information.

Examples:

- What is this?
- What things do you see on the table?
- I'd like to have one.
- Please give me the _____.

Level II: Selective Analysis of Perception

Reporting and responding to delineated and less salient cues.

Examples:

- Now we'll need a bowl to mix these things together.
- What shape is the bowl?
- Oh, look how they are spreading out!
- Let's think of some other things that we can bake in the oven.

Level III: Reordering Perception

Using language to restructure perceptual input and inhibit predisposing responses.

Examples:

- Tell me what we put in the bowl before we added the egg.
- Show me the part of the egg that we don't eat.

Level IV: Reasoning about Perception (most perceptual/language distance)

Using language to predict, reflect on, and integrate ideas and relationships.

Examples:

- Why don't we eat that part?
- What will happen to the cookies when we put them in the oven?
- We'll need to use a pot holder because otherwise we'll burn our hands.

*Perceptual=material available to child; Language=verbal/signed formulations of teacher.

Appendix F

Revised Bloom's Taxonomy

Bloom's Taxonomy was created by Benjamin Bloom and others in the 1950s to show different types of learning, and it has since been used as a course planning tool. In 2000, Lorin Anderson and David Krathwol revised it, reversing the order of the two highest cognitive processes, and adding *metacognitive* to the knowledge dimensions.

Knowledge Dimensions

The following types of knowledge intersect with the cognitive processes in the revised taxonomy:

- **Factual** knowledge refers to what one must know to understand a topic area and to solve problems in that area.
- **Conceptual** knowledge is knowing the interrelationships among elements within a larger structure and how they work together.
- **Procedural** knowledge is knowing how to do, discover, or inquire about something—how to use skills and methods.
- **Metacognitive** knowledge is knowledge and understanding of one's own thinking and thinking in general.

Cognitive Processes

The following table presents the six levels of cognitive processes of the revised taxonomy, together with associated verbs, question starters, and examples of how to demonstrate learning at this level.

Revised Bloom's Taxonomy

Cognitive Process	Verbs	Question Prompts/ Starters	Examples of Demonstrated Learning
Remembering Recognizing or recalling knowledge, ideas, or information from memory.	arrange, bookmark, copy, define, describe, detail, draw, duplicate, find, highlight, identify, indicate, inventory, label, list, locate, match, memorize, name, outline, pick, point, pronounce, quote, recall, recite, recognize, record, relate, repeat, reproduce, restate, retrieve, search, select, state, underline	■ What do you remember about _____? ■ How would you define _____? ■ How would you identify _____? ■ How would you recognize _____? ■ What would you choose _____? ■ Describe what happens when _____. ■ How is/are _____? ■ Where is/are _____? ■ Which one _____? ■ Who was _____? ■ Why did _____? ■ What is/are _____? ■ When did _____? ■ How would you outline _____? ■ List the _____ in order.	■ Label the parts of the brain. ■ Outline the steps in the scientific method. ■ List the steps taken to make a cake. ■ Recite a club's motto.
Understanding Constructing meaning from different types of messages.	annotate, clarify, classify, comment, compare, confirm, contrast, convert, categorize, decipher, defend, designate, differentiate, equate, estimate, express, extend, extrapolate, generalize, give examples, group, illustrate, infer, interpret, liken, order, paraphrase, predict, reorder, rephrase, rewrite, sort, specify, substitute, summarize, tell, translate	■ How would you compare _____? contrast _____? ■ How would you clarify the meaning _____? ■ How would you differentiate between _____? ■ How would you generalize _____? ■ How would you express _____? ■ What can you infer from _____? ■ What did you observe _____? ■ Elaborate on _____. ■ What would happen if _____? ■ What is the main idea of _____? ■ What can you say about _____?	■ Defend a position about representational government. ■ Give an example of an adverb. ■ Specify the role of the chairperson in a working group.

Cognitive Process	Verbs	Question Prompts/ Starters	Examples of Demonstrated Learning
Applying Using knowledge or skills in new situations, to solve problems, answer questions, or perform other tasks.	act out, add, allocate, alter, apply, calculate, change, choose, complete, compute, conduct, coordinate, demonstrate, determine, direct, discover, divide, dramatize, draw, employ, execute, formulate, gather, graph, make, manipulate, model, multiply, operate, organize, perform, present, provide, recount, report, schedule, show, sketch, subtract, use, utilize	■ What actions would you take to perform _____? ■ How would you develop _____ to present _____? ■ What other way could you choose to _____? ■ What would be the result if _____? ■ How would you demonstrate _____? ■ How would you present _____? ■ How would you change/ modify _____? ■ How could you develop _____? ■ Why does _____ work? ■ How would you alter _____ to _____? ■ What examples can you find that _____? ■ How would you solve _____?	■ Demonstrate the proper technique for performing a Ling 6 sound test. ■ Graph the results of a survey. ■ Modify a procedure for someone with a disability.
Analyzing Breaking knowledge down into parts, and showing and explaining the relationships among the parts.	analyze, appraise, associate, attribute, bread down, categorize, classify, correlate, criticize, deconstruct, deduce, discern, diagram, discriminate, dissect, distinguish, elect, establish, experiment, explain, expound, illustrate, inspect, investigate, mind-map, mash, profile, question, refute, scrutinize, separate, simplify, subdivide, summarize, test	■ How can you classify _____ according to _____? ■ How can you compare the different parts _____? ■ What explanation do you have for _____? ■ How is _____ connected to _____? ■ Discuss the pros and cons of _____. ■ What can you deduce from _____? ■ What ideas validate _____? ■ What can you point out about _____? ■ What is the problem with _____? ■ Why do you think _____?	■ Explain the implications of a change in schedule. ■ Determine the needs of classmates when organizing an activity. ■ Distinguish between ethical and unethical behaviour.

Cognitive Process	Verbs	Question Prompts/ Starters	Examples of Demonstrated Learning
Evaluating Judging or assessing the value of ideas, materials, and methods for a given purpose.	argue, assess, attack, champion, compare and contrast, conclude, critique, debate, decide, deduce, defend, diagnose, editorialize, evaluate, forecast, grade, improve, judge, justify, measure, prescribe, prioritize, prove, rank, rate, recommend, resolve, review, revise, score, select, solve, support, validate, value, verify, weigh	■ What criteria would you use to assess _____? ■ What data was used to evaluate _____? ■ What choice would you have made regarding _____? ■ What is the most important _____? ■ What would you suggest _____? ■ How would you grade _____? ■ What is your opinion of _____? ■ How could you verify _____? ■ What information would you use to prioritize _____? ■ Rank the importance of _____. ■ Determine the value of _____.	■ Support the value of diversity in a project team. ■ Recommend a course of action. ■ Rank the value of various expenditures.
Creating Pulling together parts of knowledge to form a new whole and build relationships for new situations.	animate, assemble, assimilate, build, collect, compose, condense, construct, create, curate, derive, design, develop, devise, elaborate, expand, formulate, generate, guide, hypothesize, integrate, invent, manage, mix, modify, originate, organize, plan, prepare, produce, program, propose, rearrange, reconstruct, reorganize, revise, rework, set up, simulate, synthesize, theorize, transform, write	■ What alternative would you suggest for _____? ■ What changes would you make to revise _____? ■ How would you explain the reason _____? ■ How would you generate a plan to _____? ■ What could you invent to _____? ■ What facts can you gather _____? ■ How would you portray _____? ■ Devise a way to _____. ■ Elaborate on the reason _____. ■ How would you improve _____? ■ Generate ideas for _____.	■ Devise a plan to help food-insecure members of your community. ■ Design a blueprint for an ideal laboratory. ■ Write a short story or poem. ■ Build a website.

Appendix G

Problem-Solving Framework

Identify the problem: _____

Develop possible solutions (brainstorming component):

1. _____

2. _____

3. _____

Identify the pros and cons of each solution. Pick one solution and try it.

Did it work?

_____ Yes? Good! You chose an effective solution.

_____ No? Can you determine why it didn't work? Pick another solution to try, knowing what didn't work the first time.

Appendix H

Literacy Strategies for Students Who Are Deaf or Hard of Hearing

Top Five Strategies under Each Area	Specific Examples
Vocabulary	
Word Play	Sentence completion activities (cloze); glossary lists; multiple meanings; synonyms; antonyms; root words; analogies; metaphors; build categories; use of dictionary/reference books; matching; lots of practice and usage of new words; use of adjectives and adverbs (descriptive writing); thesaurus; highlight/bold new words/phrases; words in context; vocabulary notebook
Pre-teaching	Discuss vocabulary before, during, and after reading; direct teaching; relate to things students already know (prior knowledge); rehearsal of words in a variety of sentences; review; focus on commonly used words for a topic covered in class or of interest to the student
Games	Balderdash-style games; Bananagrams; Scrabble; Apples to Apples; direction activities using vocabulary; flashcards; word family bingo
Graphic Organizers	Word maps; brainstorm and web vocabulary; semantic/concept maps; comparing and contrasting/Venn diagram
Visuals/Pictures	Vocabulary redefined in the students' own words with picture or symbol for greater retention; exemplars; facial grammar in ASL and what it means in English
Conversation Skills	
Role-Playing	Informal conversation; repair strategies; context of a good communicator; turn taking; active listening
Modelling	Direct instruction techniques; cueing to the topic; reflecting on the statement of the speaker; social stories; asking and answering questions with a pragmatic checklist; videotape conversation with peers
Questioning and Conversation Techniques	Watch videos and discuss; KWL; students must use three question words to continue the conversation; photo to keep a conversation going/to ask questions/ to learn a particular piece of information; conversation groups; video pal messages
Games	Barrier games; News Time; manipulatives
Flashcards	Super Duper fun decks; using new vocabulary in sentences; situational cards with speech bubbles; social skills cards; wh-question cards; picture cards to prompt topics of conversation
Alphabetic Principle	
Text Strategies	Repeated/daily reading at school and home; direct instruction; target sounds and practice through reading; guided reading; paper/pencil tasks; picture books
Phonemic Awareness Activities	Letter-word associations; alphabet jingles; phonics worksheets; initial/medial/ final sounds; practise LING-6 sounds; AV techniques; practise sound-letter correspondence; flashcards; vowel/consonant recognition
Letter Play	Manipulation of letters within words; syllables; root words; alphabetize; spelling real and nonsense words; Scrabble/magnetic tiles to invent words and focus on sounds; alphabet books; matching phonemes to print symbols; flashcards
Word Families	Dolch list matching; Scrabble tiles with word families; build crossword puzzles; flashcards
Rhyming	Songs/music; games; matching; flashcards; hands-on activities
Fluency	
Text Strategies	Reading aloud/through the air; reading and answering comprehension questions; book club conversation; reader's theatre; sight words; choral reading; tracking text while reading; view finder strategy; focus on punctuation during reading; add facial expression to indicate question/statement
Phonological Awareness Activities	Modelling; audio/video record students reading and have them critique themselves; role play; decoding multisyllabic words; prefixes/suffixes; consonant/vowel patterns; relate word families; rhyming words; word attack skills

Top Five Strategies under Each Area	Specific Examples
Repetitive Reading	Highlight words not decoded accurately and go back and discuss in context; timed reading; guided reading
Pre-teaching Vocabulary	Word lists from the text; transfer word lists to flashcards for review
Chunking of Phrases	Scan/skim; practise fluency of phrases
Comprehension	
Questioning Techniques	Five Wh ?s; generate questions by looking at pictures in text; visualizing framework of the five Wh ?s as they read; re-reading; take turns reading passage with listener asking two Wh ?s; SQ4R (survey/question/read/recite/revise/reflect); comprehension questions for reference while reading; question wheel; establish connections to personal experiences; text-to-self/text-to-text/text-to-world—Making Connections; OWL strategy (Observe or notice/What do you wonder/Link to your life)
Prediction	Cause and effect; visualizing exercises; looking at headings; compare/contrast; pre-reading predictions of characters/problem/setting, etc.
Main Ideas	Graphic organizers; explicit instruction; highlight text for evidence/author's purpose for passage; clarification
Summarizing	Sequencing charts; games; cloze activities; journal writing; role play; opinions of passage; context clues; re-telling; use pictures for clues; paper/pencil tasks
Pre-teaching	Pre-reading strategies; relate information to prior knowledge; highlight key words; pre-teach unknown vocabulary; flashcards
Writing	
Journal Writing	Picture prompts; list of vocabulary that can be used for a writing task so that word retrieval does not stall creativity; dialogue journals; email older students daily, same format as a dialogue journal
Visual Strategies	Graphic organizers to compare/contrast; draw pictures with text; look at photos to generate text; words on paper strips/tiles/blocks to play with word order; webs; visual of sandwich/hamburger for a sentence; story maps
Modelling	Brainstorming; model questions and answers; correct the morning message; writing centre; write notes to the office/classroom door/parents, etc.; audition with visual support to model
Writing for Variety of Purposes	Sequence stories; create books about themselves; story structure; difference between fictional and informational writing; taking turns writing sentences for an imaginative story; writing in form of interest for them (e.g., comics); home news book
Editing Techniques	Editing writing samples together; re-reading aloud to hear mistakes; thesaurus; focus on two to three grammatical features for editing; editing checklist/rubric; review their writing/revise/self-editing; transition word list; one-to-one conferencing; student identify missing parts of speech or grammar for correction

Source: Cannon, Joanna E. "Literacy Strategies for Deaf and Hard of Hearing Students—A Survey Study of Current Practices in British Columbia." *The Canadian Journal of Educators of the Deaf and Hard of Hearing,* vol. 4, no. 1, 2013, pp. 12–16. Reproduced with permission.

Appendix I

Reading

Reading = Decoding **and** Comprehending

Can You Read?

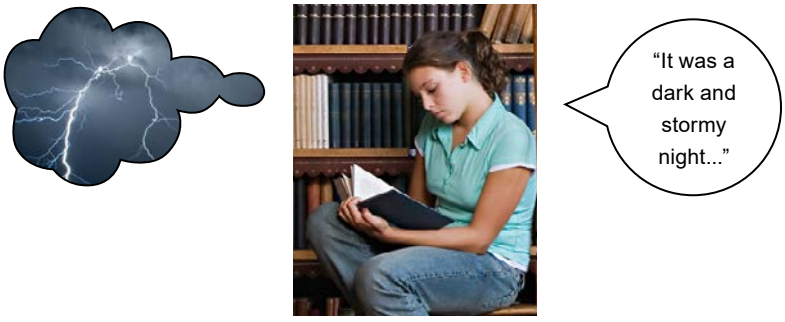
dactylion

1. Can you speak/sign this word?
2. Can you comprehend this word?
   Show me your understanding by
   a. using the word in a sentence
   b. drawing a picture
   c. acting the word out
   d. bringing one to me

If you do only 1, you are *only decoding.*
If you can do 2, you *are comprehending.*

If a student *only decodes* text out loud, you only know half the picture.

Checking for understanding about what the student decoded will give you the entire picture.



Appendix J

Hiring an ASL-English Interpreter

Interviewing and Screening Interpreters

The Manitoba Education Consultant Outreach Team, in collaboration with the school-based team and the TDHH, can assist school divisions in hiring signers and interpreters by offering a screening tool that evaluates the level of interpretation skills. These screenings can also assist administrators in completing school-based evaluations regarding interpretation skills.

The department is aware that it can be difficult to recruit interpreters for Manitoba schools, particularly in rural and isolated parts of the province. Screening assists in choosing the best option in difficult situations.

For more information, please visit the Manitoba Deaf and Hard of Hearing Services Unit website at www.edu.gov.mb.ca/k12/specedu/dhh/index.html.

Qualifications of Interpreters

Qualifications of ASL-English interpreters include the following:

- graduation from an ASL-English Interpreting Program (AEIP)
- active dual membership in the Manitoba Association of Visual Language Interpreters (MAVLI) and the Association of Visual Language Interpreters of Canada (AVLIC)
- experience working with students who are Deaf or hard of hearing
- basic understanding of hearing loss and its effect on the social, physical, and psychological development of individuals who are Deaf or hard of hearing
- basic knowledge of language acquisition and development
- an awareness of Deaf culture specifically and cultural diversity generally, and their relationship to students' development and self-perception
- knowledge of community resources available to students and their families
- ability to establish and maintain effective working relationships and to work collaboratively as a member of an educational team
- strong interpersonal, organizational, and communication skills
- commitment to professional learning specific to interpreting
- knowledge of the basic aspects of students' educational, physical, social, and emotional development
- understanding of the basic principles of educational practices, the function of support services, and the role of interpreters as part of an educational team

- AEIP programs from two to four years in length are offered on a full-time basis. ASL classes are offered in 40-hour blocks several times a year—these are the stepping stones to entry into the AEIP.
- The skill level of signers and ASL-English interpreters has a great impact on the amount of curriculum that the student who is DHH is able to access. To hire the most qualified candidate, administrators look for completion of an AEIP program.
- When trained interpreters are unavailable, individuals who are fluent in ASL may be considered as temporary candidates if they have successfully completed a recognized screening, such as the one that Manitoba Education provides.
- Job titles or job classifications for qualified interpreters tend to vary between school divisions. Professional standards support the accurate title of "ASL-English interpreter."

Interpreters follow a code of ethics that binds them to professional behav*iour and conduct. To view this code, see the Code of Ethics and Guidelines for Professional Conduct* at www.avlic.ca/sites/default/files/docs/2000-AVLIC_CoEGPC.pdf.