TOOLS for SCHOOLS™
program

Helping Children with Cochlear Implants **Succeed in School**

rehAB
AB's global rehabilitation & educational programs

AdvancedBionics.com

Advanced Bionics AG
Laubisrütistrasse 28, 8712 Stäfa, Switzerland
T: +41.58.928.78.00
F: +41.58.928.78.90
info.switzerland@AdvancedBionics.com

Advanced Bionics LLC
28515 Westinghouse Place
Valencia, CA 91355, United States
T: +1.877.829.0026
T: +1.661.362.1400
F: +1.661.362.1500
info.us@AdvancedBionics.com

For information on additional AB locations, please visit
AdvancedBionics.com/contact

028-M308-02 RevC

TOOLS for SCHOOLS™
program

Helping Children with Cochlear Implants **Succeed in School**

Advanced Bionics

rehAB
AB's global rehabilitation & educational programs

welcome!

Dear Parents, Educators, and Therapists,

The Tools for Schools™ (TFS™) program is designed to help children succeed in school. Within this folder you will find key educational and support pieces to help you better manage a child with an AB cochlear implant in the classroom.

Additional free resources and services can be found here: ***AdvancedBionics/rehAB***. These uniquely designed resources have been created so that you can provide children with cochlear implants with a successful and rewarding educational experience.

If you have any questions about the Tools for Schools program or any other AB products or services, please contact an AB representative (go to ***AdvancedBionics.com/Contact*** to find the AB representative office nearest to you) .

We look forward to partnering with you!

Sincerely,
Advanced Bionics

028-M308-02 RevC

Supporting a child with a cochlear implant involves a team approach! Take a moment to discover the Tools for Schools program by visiting ***AdvancedBionics.com/rehAB***. These resources will ease your workload, save you time, and offer you the assurance you need that a child's cochlear implant(s) is functioning properly at school.

Resources available for free on the rehAB website include:

Educational Management: Download a variety of resources to help with the educational management of a child with a cochlear implant, including the Audiology Referral Form, Parent and School Communication Log, School Input Form, articles, and much more.

Rehabilitation Materials and Support: Find materials you need to support the successful development of a child's listening and language skills by downloading PowerPoint presentations and brochures, or accessing online courses.

Assessment Tools: Monitor a child's progress and verify that equipment is working properly by downloading easy-to-access assessment tools and reference cards, including The Ling Six Sound Check & Cards, The Bilingual Family Interview Scale (BIFI), The Infant and Toddler Meaningful Auditory Integration Scale (IT-MAIS), Sounds of Speech, Stages of Normal Communication, and more.

Product Information and Troubleshooting: Uniquely developed product guides and apps provide parents and educators with information on the product functions and diagnosing an issue with the child's sound processor or the accessories.

Tools for Toddlers: Discover helpful information and resources on early intervention for children under three years old who are not yet ready for school, including communication options, family support, developing pre-literacy skills, and more.

028-M308-02 RevC

The SOUNDS OF SPEECH

English Consonants • Adapted from Ling, Daniel (1976) Speech and the Hearing Impaired Child: Theory and Practice

Consonant	1st Formant	2nd Formant	3rd Formant	4th Formant
/p/			1,500–2,000	
/t/			2,500–3,000	
/k/	300–400		2,000–2,500	
/d/	300–400		2,500–3,000	
/b/	300–400		2,000–2,500	
/g/	200–300		1,500–2,500	
/m/	250–350	1,000–1,500	2,500–3,500	
/n/	250–350	1,000–1,500	2,000–3,000	
/ng/ (wing)	250–350			4,500–6,000
/f/				4000–5,000
/s/				5,000–6,000
/sh/			1,500–2,000	4,500–5,500
/th/ (thin)				6,000
/h/			1,500–2,000	
/v/	300–400			3,500–4,500
/z/	200–300			4,000–5,000
/TH/ (that)	250–400	1,000–1,500	2,000–3,000	
/ch/	200–300		1,500–2,000	4,000–5,000
/dg/ (jot)	200–300		2,000–3,000	
/l/	250–400		2,000–3,000	
/r/ (err)	600–800	1,000–1,500	1,800–2,400	

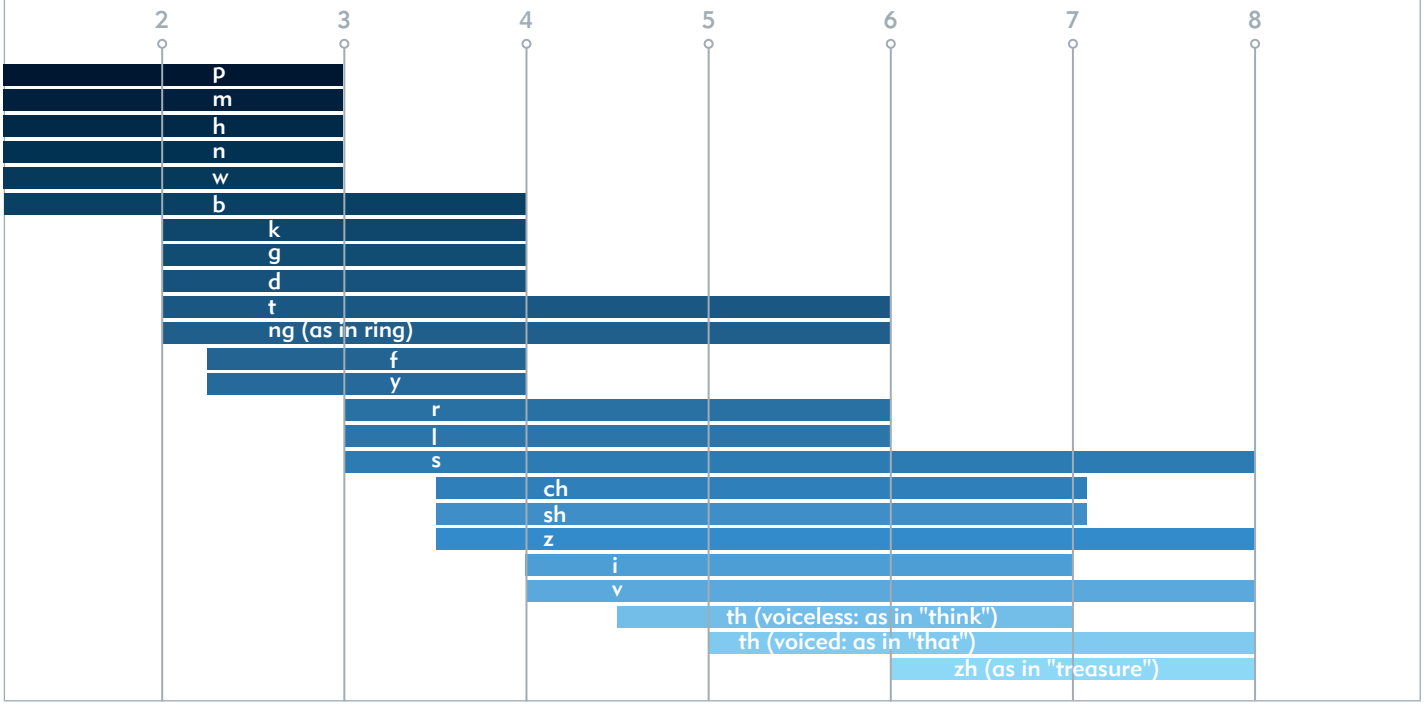
Vowels • Adapted from Ling, Daniel (1976) Speech and the Hearing Impaired Child: Theory and Practice

Vowel	Example	1st Formant	2nd Formant
/i/	bee	370	3,200
/I/	bit	530	2,730
/Ɛ/	bet	690	2,610
/æ/	bat	1,010	2,320
/a/	box	1,020	1,750
/ə/	bail	600	1,680
/U/	book	540	1,410
/u/	boot	430	1,170
/^/	but	850	1,590
/ɜ/	bird	560	1,820

TOOLS for SCHOOLS™ program

The SOUNDS OF SPEECH

English Consonants — Age of Acquisition • Adapted from Sanders (1972) and Templin (1957)



Tips for using The Sounds of Speech charts and tables:

1. These charts and tables with vowel and consonant formant information are designed to assist you during therapy.
2. If the child doesn't have access to the sound(s), they cannot be expected to produce and/or imitate them. Review the child's audiogram to determine what sounds they are able to detect.
3. Remember to review the English Consonants—Age of Acquisition table before planning therapy goals for a young child.
4. It is important to note not only the first formant of the target sounds during therapy, but also the subsequent formants as well.

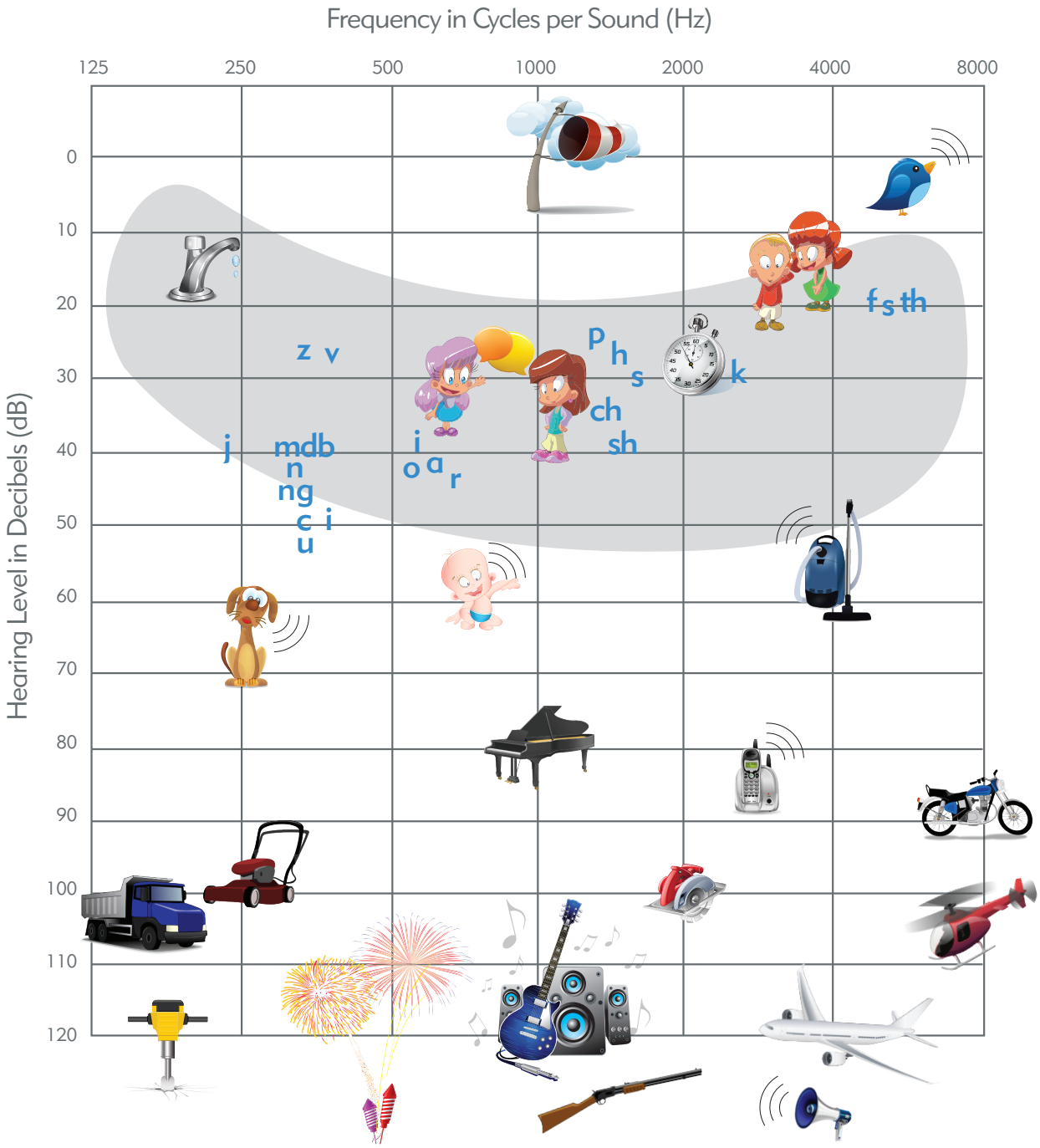
028-M308-02 RevC

Stages of NORMAL COMMUNICATION DEVELOPMENT

Age	Communication Milestone
0–6 months	Startled by loud sounds; soothed by mother's voice
6–8 months	Begins to babble *(babababaha)*
9 months	Responds to own name
12 months	First spoken word; understands simple words and sounds
15 months	Sounds as though "talking" when jabbering, with some real words interspersed
18 months	50-word spoken vocabulary; beginning of word combinations; can identify body parts
24 months	Spoken vocabulary of 200+ words; uses many beginning sentences; follows simple directions
2–3 years	Enjoys being read to; points to pictures when asked; refers to self by name
3 years	Understands and uses simple verbs, pronouns, prepositions, and adjectives, such as *go, me, in,* and *big;* uses complete sentences much of the time
4 years	Able to give a connected account of some recent experiences; able to carry out a sequence of two directions
5 years	Can carry on a conversation with adults; sentence structure mostly matches the patterns of child's family; speech is intelligble, with a few mispronounced sounds

TOOLS for SCHOOLS™
program

AUDIOGRAM OF FAMILIAR SOUNDS



TOOLS for SCHOOLS™ program

TIPS FOR TEACHING A CHILD with a Cochlear Implant

Tips for the Teacher

- Maintain a communication notebook between school and home with regular entries.
- Talk naturally, not too fast or too slow.
- Project your voice, but do not shout.
- Do not talk with your back turned to the class.
- Try not to move around too much while talking.
- Make sure the child can see your face clearly when you are speaking.
- Make sure your classroom has adequate lighting.
- Be aware that the sunlight coming in through the windows can make lipreading and watching visual cues more difficult.
- Do not block your face with your hands, books, or other items while talking.
- Keep in mind that children hear best on their implant side.
- Come up with a fun, secret way the child can let you know they do not understand, such as putting a certain item on the desk or using a certain hand position.

Tips to Help Student Comprehension

- Clearly introduce a new topic when the subject of conversation is changing.
- Summarise key points given by classmates.
- Write words, dates, assignments, and other important information on the board.
- Provide a list of vocabulary or other assignments for the child to learn at home prior to class discussions.
- Point or say the name of each child who contributes to a discussion so the child can identify whom to focus on.
- Repeat or rephrase comments or questions to the entire class before responding or calling on another child.
- Use visual cues, such as body language and props, to allow the child a second opportunity to receive the message you are communicating.

Tips for Seating

- If possible, allow the child to have flexible seating so they can move to the optimal hearing location for different activities.
- Sit the child in front during assemblies.
- If the child uses an FM system, give the microphone to the person speaking.
- Seat children in a horseshoe or circle during group activities.
- Seat the child away from peers who are especially noisy.
- Seat the child away from windows.

028-M308-02 RevC

TOOLS for SCHOOLS™ program

TIPS FOR TEACHING A CHILD with a Cochlear Implant

Tips for a Quieter Classroom

- Keep in mind that hard, smooth surfaces reflect sound and make listening more difficult.
- Use a carpeted classroom, if possible.
- Cover hard, reflective surfaces with sound absorption materials such as cork boards and cloth hangings.
- Put tennis balls on chair legs that sit on hard surfaces.
- Put drapes on windows.
- Keep the classroom door shut to eliminate noise from the hallway.

Tips for Equipment Maintenance

- Identify one staff member who is responsible for doing a sound check of the cochlear implant as well as checking the FM system *(if applicable)* each morning.
  - Verify that the child's sound processor is set appropriately, check the program number, volume, sensitivity, and battery charge status.
  - After the equipment function has been verified, perform a daily listening check using the Ling Six Sound test.
- Annual in-service training is recommended for all educators who work with the child regarding proper use and care of the child's speech processor.
- If the child uses an FM system, remember to turn off your FM transmitter during classroom activities.

Additional Classroom Tips

- Teach the child to indicate if they do not understand and provide them with compensatory strategies to use, such as *I didn't hear that* and *I don't understand*.
- Teach ancillary staff members to notice indications of misunderstanding or confusion.
- Know that the child will appreciate every effort you make to help them in the classroom.
- Remember that a child with a cochlear implant typically has hearing thresholds between 20 and 45 dB HL across the speech frequencies, which does not mean they have normal hearing.

028-M308-02 RevC

TRACKING AUDITORY PROGRESS in Children with CIs

By Amy McConkey Robbins, MS, CCC-SLP

What are the auditory benchmarks for average progress in CI children during the first year of implant use?

Auditory benchmarks have been established independently for three groups of children, based upon research findings and clinical experience.[1-5] These groups are:

Group 1: Children implanted in the preschool years (age four or earlier).

Group 2: Children implanted at age five or later who have some residual hearing/speech perception skills, have consistently worn hearing aids, and communicate primarily through speech.

Group 3: Children implanted at age five or later who have little or no residual hearing/speech perception skills and are highly dependent on sign language and other visual cues for language learning.

The benchmarks shown for each of the three groups in Tables 1, 2, and 3 are based on data collected and reported by the investigators cited above.

Tracking Auditory Progress in CI Kids

Note: Child is credited only for skills in listening-alone conditions. "Spontaneous" means without prompting or modeling and when not in a listening set.

■ Time post-implant child should demonstrate the skill

Table 1 — Group 1 • Children implanted at **age four years or earlier**

Skill	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.
1. Full-time use of CI	■				
2. Changes in spontaneous vocalisations with CI use		■			
3. Spontaneously responds to name 25% of time		■			
4. Spontaneously responds to name 50% of time			■		
5. Spontaneously alerts to a few environmental sounds			■		
6. Performance in audio booth consistent with what is reported at home				■	
7. Evidence of deriving meaning from many speech and environmental sounds					■
8. Major improvement in language					■

Table 2 — Group 2 • Children implanted at age five years or older. (Some residual hearing, consistent HA use prior to CI, primarily oral)

Skill	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.
1. Full-time use of CI					
2. Understands some words or phrases, closed-set					
3. Understands many words or phrases, closed-set					
4. Spontaneously responds to name 50% of time					
5. Understands familiar phrases in everyday situations when listening, auditory alone					
6. Spontaneous recognition of own name versus names of others					
7. Knows meaning of some environmental or speech signals when heard, auditory only					
8. Major improvement in language					

Table 3 — Group 3 • Children implanted at age five years or older. (Limited or no residual hearing, limited or no HA use, heavily reliant on visual cues or signs)

Skill	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.
1. Full-time use of CI					
2. Begins to discriminate patterns of speech (syllable number, stress, length, etc.)					
3. Understands some words in closed-set					
4. Begins to spontaneously respond to name					
5. Reports when device is not working (e.g., dead battery)					
6. Understands many words or phrases in closed set					
7. Understands a few things, open-set					
8. Major improvement in language					

Note: Full-time implant use is an unconditional prerequisite to auditory development. If a child is not wearing the implant during all waking hours—at home, school, and other activities—these benchmarks are not applicable. *Children who fail to bond to their device and wear it full-time within a few weeks of initial stimulation may exhibit insufficient progress and are at high risk of becoming nonusers of their implants.*

References

1. Robbins, A.M. (2003) Communication Intervention for Infants and Toddlers with Cochlear Implants. Topics in Language Disorders, Vol. 23, no. 1; 16-28.

2. Osberger MJ, Zimmerman-Phillips S, Barker MJ, Geier L. (1999) Clinical trial of the Clarion cochlear implant in children. Annals of ORL. Suppl 177;108(4):88–92.

3. Waltzman SB, Cohen N. (1999) Implantation of patients with prelingual long-term deafness. Annals of ORL. Suppl 177;108(4):84–87.

4. Robbins AM, Koch DB, Osberger MJ, Phillips SZ, Kishon-Rabin L. (2004) Effect of age at implantation on auditory skill development in infants and toddlers. Archives of Otolaryngol HeadNeck Surg.;130:570–574.

5. McClatchie A, Therres MK (2003) AUditory SPeech & LANguage (AuSpLan). Washington, DC:AG Bell.

THE LING SIX Sounds

THE LING SIX Sound Check

What is the Ling Six Sound Check?

It's a behavioural listening check to determine a cochlear implant's effectiveness. The sounds ***ah, ee, oo, sh, s, and mm*** indicate a child's ability to detect all aspects of speech, as these six sounds encompass the frequency range of all phonemes. This check can be used to determine what sounds the student is able to detect, discriminate, and identify.

Task	Description
Detection	Recognising the presence or absence of sound
Discrimination	Discerning if two or more sounds are the same or different
Identification	Reproducing a sound or pointing to a picture of the sound heard

If the child has the ability to hear to:

- **1,000 Hz**—they should hear the three vowel sounds ***ah, ee, and oo,*** spoken in a quiet voice at a distance of at least five yards
- **2,000 Hz**—they should also hear the sound ***sh***
- **4,000 Hz**—they should detect ***s*** from a distance of at least one to two yards

Six-Sound Speech Test Instructions

For School Children	For a Very Young Child
1. Position the child one to two yards from you and ask them to "listen."	1. For a child under the age of four you will need to teach detection through a behavioral response.
2. If this is the first time the child has to complete the task, demonstrate what is expected.	2. Use of real objects to represent each of the Ling Sounds is recommended, using the images on the sheet as recommendations (e.g., ghost, airplane).
3. Using a normal conversational level, present each of the sounds through listening alone.	3. While giving the child a quiet distraction, provide a long baseline of silence and then make one of the Ling sounds (through audition alone and without any toys).
4. Occasionally say nothing while doing the test. This way, the child learns that it is okay to say that they do not hear anything. Remember to present the Ling Sounds in a random order so the child doesn't learn the pattern of presentation.	4. If the child looks, repeat the sound without showing the object. When you have the child's attention, first through listening, reinforce their attention by showing the corresponding toy and then repeating the sound again; provide waiting time so the child can process the sound.
5. If the child is able to detect the sounds, progress to a discrimination task and then an identification task by asking the child to point to the correct picture. The goal is to have the child naturally repeat the Ling Sound.	5. After a few minutes, say another sound and present the corresponding toy in the same way. Present all the Ling Sounds as long as you can maintain the child's attention. If attention is poor, change tasks and try again.

BEHAVIOURAL LISTENING CHECK

Form for recording a child's responses to the Ling Six sounds

Child's Name: _____ Age: _____ Date: _____

Cochlear Implant (CI): ☐ Right Ear ☐ Left Ear ☐ Both Ears

CI Settings: _____

Technique Used: ☐ Detection ☐ Discrimination ☐ Identification

Response Used: ☐ Behavioural ☐ Conditioned Play ☐ Pointing ☐ Repeating

Presentation Level: ☐ Whisper ☐ Normal Voice ☐ Loud Voice

Distance: ☐ 3 feet ☐ 6 feet ☐ 12 feet

Reliability: ☐ Good ☐ Fair ☐ Poor

Ling Sound	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
AH							
EE							
OO							
SH							
S							
M							
Silence							

Note: Remember to present the Ling Six sounds in random order and to vary your length of presentation so that the child does not provide false positives.

TOOLS for SCHOOLS™ program

HEAR YOUR WORLD with Naída CI

What is a Cochlear Implant?

A cochlear implant is an electronic device that allows many people who have experienced hearing loss to hear better. Those who have never heard before experience hearing for the very first time.

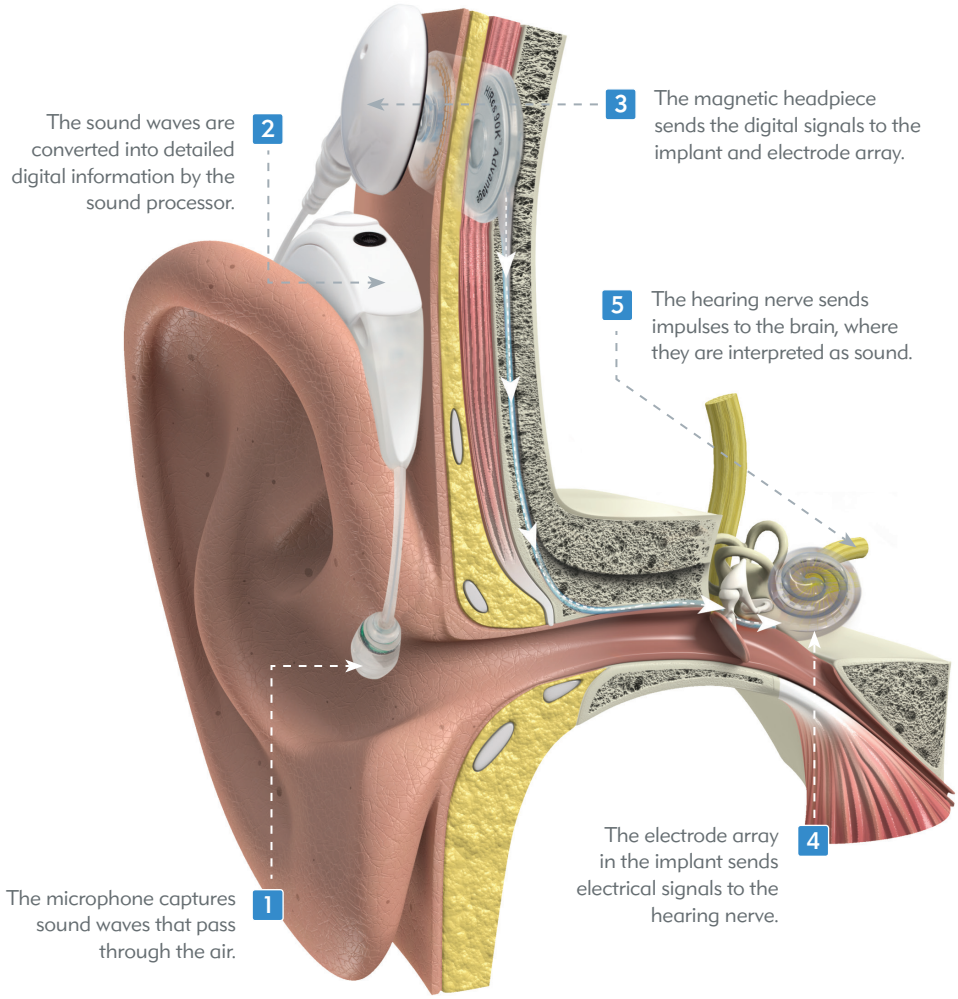
Using state-of-the-art technology, a cochlear implant provides a new pathway for hearing and bypasses the damaged portion of the inner ear. Cochlear implants are currently the only medical technology able to functionally restore one of the five senses, which is why many physicians refer to them as **"technological miracles."**

HiResolution™ Bionic Ear System
by Advanced Bionics

HiRes 90K™ ADVANTAGE
Implant

Naída CI
Sound Processor

Neptune™ Swimmable
Sound Processor



TOOLS for SCHOOLS™ program

Choosing **COCHLEAR IMPLANTS**

For many people with mild-to-moderate hearing loss, hearing aids are a viable solution for improved hearing. When hearing health professionals determine that hearing aids are not an effective solution, the time has arrived to consider cochlear implantation. That is because, if the inner ear is not functioning correctly or has suffered damage, it does not matter how much a hearing aid amplifies sound—*it simply cannot be heard*.

Many recipients of **AB's HiResolution™ Bionic Ear System** demonstrate improvement in their ability to understand speech, even in noisy environments, compared to hearing-aid wearers who have significant hearing loss.

Children have Special Hearing Needs

Children begin learning to speak from the day they are born. By age three, they need to hear approximately 30,000 words a day to develop the language skills necessary to succeed in school. This need to hear language strongly reinforces the importance of early implantation in children with hearing loss who would benefit from cochlear implants.[1]

Is a Child You Teach a Candidate for Cochlear Implants?	Yes	No
• Does the child have delayed speech and language development as a result of their hearing loss?	☐	☐
• Does the child rarely respond to their name?	☐	☐
• Does the child avoid social interaction or lack the appropriate skills to interact with other children or adults?	☐	☐
• Do you have concerns about the child's ability to hear speech in noisy environments?	☐	☐
• Do you have concerns about the child's ability to participate and succeed in school with normal-hearing peers?	☐	☐

If you answered **"Yes"** to any of these statements, a child in your class may benefit from cochlear implants. To learn more, reach out to a hearing healthcare professional.

1. Hart B, Risley TR. (1995) Meaningful Differences in the Everyday Experience of Young American Children. Brooks Publishing Co, Inc., Baltimore, MD.

028-M308-02 RevC