

# ***Mainstreaming the Student who is Deaf or Hard-of-Hearing***

**A Guide for Professionals,  
Teachers, and  
Parents**



*The following individuals were instrumental in creating this guidebook:*

**Melanie Doyle**, M.Ed, Parent of hard-of-hearing child  
**Linda Dye**, M.A., CCC-A, Director of CCHAT Center, San Diego

January 2002

# MAINSTREAMING THE STUDENT WHO IS DEAF OR HARD-OF-HEARING

## *Table of Contents*

<b>INTRODUCTION</b> .....	1-2
Purpose of the Guide	
Deaf or hard-of-Hearing?	
<b>THE EAR AND HEARING LOSS</b> .....	3-6
How We Hear	
General Classifications of Hearing Loss	
<b>THE IMPACT OF HEARING LOSS ON CHILDREN</b> .....	7-14
Intelligible vs. Audible Speech	
Auditory Skills and Incidental Learning	
Spoken Language	
Academic Performance	
Self-Image and Social Adjustment	
<b>CLASSROOM TIPS FOR WORKING WITH DEAF AND HARD-OF-HEARING STUDENTS</b> .....	15-20
Fostering a Positive Mainstream Experience	
Preferential Seating	
Improving Communication	
Vocabulary, Word Comprehension and Reading	
Classroom Support and Accommodations	
<b>LISTENING DEVICES AND ASSISTIVE TECHNOLOGY</b> .....	21-30
Hearing Aids	
Cochlear Implants	
FM and Infrared Systems	
Managing Auditory Devices	
Additional Assitive Technology	
<b>ACOUSTICS</b> .....	31-36
The Need for Good Acoustics	
Classroom (Background) Noise and Reverberation	
Improving Classroom Listening	
<b>LAWS, REGULATIONS AND GUIDLINES</b> .....	37-40
Individuals with Disabilities Education Act	
Americans with Disabilities Act	
Section 504 of the Rehabilitation Act of 1973	
Family Educaitional Rights and Privacy Act	
<b>GLOSSARY OF TERMS</b> .....	41-48
<b>RESOURCES</b> .....	49-62
<b>BIBLIOGRAPHY</b> .....	63-64
<b>APPENDIX</b> .....	65-67

# INTRODUCTION

## *Purpose of This Guide*

**D**eveloping a successful program of support for students who have a hearing loss requires a team approach. Teachers play an important role in a deaf and hard-of-hearing (D/HH) child's life and have a tremendous impact on their learning, self-image and social adjustment. Parents too, play an integral role in their child's educational process and must be informed in order to fully participate in all aspects of their child's learning . . . from the Individualized Education Plan (IEP) to the classroom.

Seventy-five percent of the D/HH student population is either partially or totally mainstreamed. Regardless of the statistics, most teachers have had little or no exposure to educating children with any degree of hearing loss and may feel ill-prepared to meet the needs of a D/HH child.

This guide is intended to provide teachers, professional staff and parents basic information about: 1) the critical role that hearing plays in both the developmental and educational processes; and 2) how the learning environment can be optimized in order to help the D/HH child develop the confidence, skills and ability to be successfully mainstreamed into a regular education setting and reach his/her fullest potential.



## *Deaf or Hard-of-Hearing?*

**N**o satisfactory definition has been drawn between deaf and hard-of-hearing, other than a behavioral one, because hearing loss exists on a continuum and is influenced by many other external factors. It is even difficult to separate "deaf" from "hard-of-hearing" by degree of hearing loss. There are many severe-to-profoundly deaf individuals who have developed excellent speech and speechreading skills and function well orally. They may or may not utilize sign language interpreters and may even consider themselves hard-of-hearing.

A formal definition of functional deafness might include any person having a hearing loss in the severe to profound range who communicates mainly through sign. Functionally hard-of-hearing individuals have a wide range of losses which may vary from mild to severe/profound, may be unilateral (affecting only one ear), or may be high frequency, low frequency, or mid-frequency only losses. For the most part, however, these individuals access information aurally (through listening) often with the use of assistive listening devices and have intelligible speech.



# THE EAR AND HEARING LOSS

## *How We Hear*

**A**lthough most teachers and professionals who work with children are familiar with how the ear functions, it may be helpful to review some of the basics. Each part of the ear has a special role in the hearing process.

**Outer Ear:** the pinna (the part of the ear on the outside of the head) and the ear canal.

**Middle Ear:** located between the outer ear and inner ear, separated from the ear canal by the eardrum (tympanic membrane). The middle ear contains three ossicles (tiny bones) called the malleus, incus and stapes or commonly referred to as the hammer, anvil and stirrup.

**Inner Ear:** the innermost part of the ear which is composed of the hearing organ (the cochlea or snail-like organ), the balance mechanism (the semi-circular canal), and the auditory nerve (acoustic nerve).

Sound waves enter the outer ear and pass down the ear canal to the ear drum. As sound waves move the eardrum, the three ossicles vibrate back and forth. These vibrations are amplified and passed on to the inner ear and the cochlea. When the sound waves move the inner ear fluid they stimulate hair cells (cilia) which convert the vibrations to nerve impulses that travel along the auditory nerve to the brain. The brain then makes sense of these electrical signals and you “hear.”



*Photo courtesy of Clarke Jacksonville Auditory Oral Center*

## General Classifications of Hearing Loss

A hearing loss occurs when there is poor development, injury, infection or degeneration in any part of the hearing system. A hearing loss can be partial or total, temporary or permanent, in one ear (unilateral/monaural) or both (bilateral/binaural). A unilateral loss often goes unnoticed but may still have significant educational ramifications.

### Types/Causes of Hearing Loss

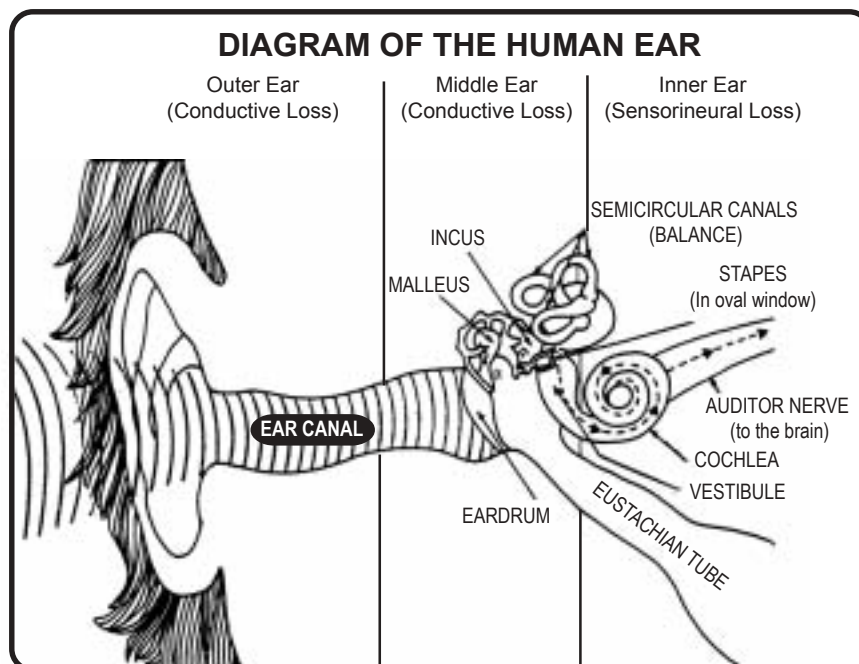
Regardless of the cause, hearing loss falls into the following categories depending on the part of the ear that's affected:

**Conductive Hearing Loss.** When the structures in the outer or middle ear do not work properly, their ability to conduct sound vibrations to the inner ear is affected. A build-up of wax in the ear canal, a punctured eardrum, or an ear infection often causes conductive hearing loss. The tiny bones can also become immobilized and lose their ability to vibrate. Conductive hearing loss can often be surgically or medically corrected.

**Sensorineural Hearing Loss.** When the inner ear does not properly process the sound vibrations, messages cannot be passed on normally to the brain. This is called sensorineural hearing loss. It can result from genetic defects, a severe infection such as mumps or meningitis, a head injury, certain medicines, an abnormal growth in the ear, aging or even from a very loud noise that damages the cochlea. This type of hearing loss usually cannot be reversed by medical or surgical means and is therefore permanent.

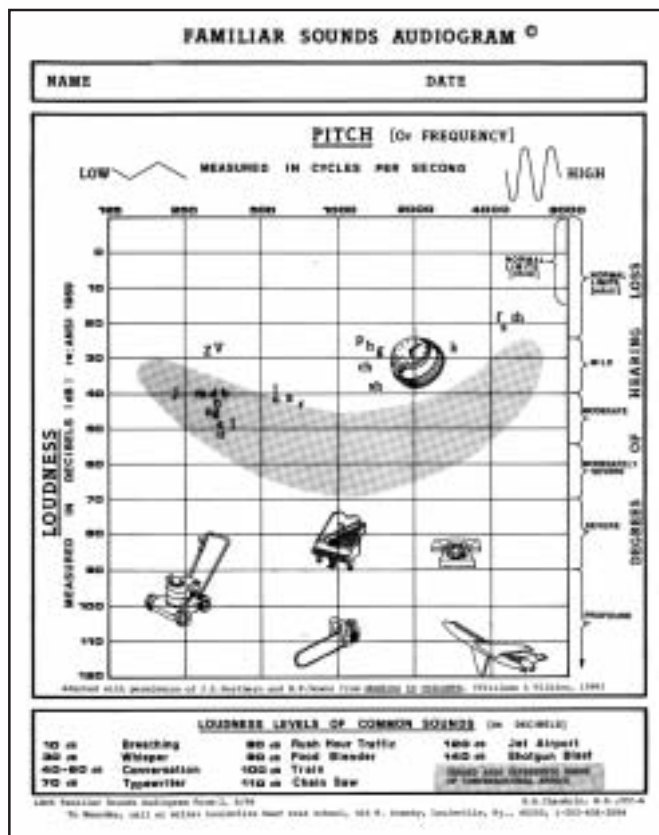
**Mixed Hearing Loss.** When a combination of conductive and sensorineural hearing losses occur it is called mixed hearing loss.

**Central Auditory Processing Disorder.** CAPD is not a hearing impairment in terms of reduced hearing sensitivity, but is instead a difficulty understanding the meaning of incoming sounds. A child can “hear” but is not able to efficiently interpret sounds or structure his or her auditory world. This can be compared to the “visual” problem of dyslexia. It is mentioned in this guide because a child with CAPD can benefit from many of the same interventions afforded a D/HH child.



### Time of Onset of Hearing Loss

Hearing impairments in children can be classified into congenital and acquired hearing losses, depending on when the impairment first occurs in a child's life. Congenital refers to being present at birth, or a condition which develops in the first few days of life. An acquired hearing impairment occurs after speech and language have developed (often defined as postlingually). The negative effects of an acquired hearing impairment tend to be less severe than those of a congenital loss because the auditory system has already been "programmed" for language and spoken communication. When a child cannot hear in first six months of life, s/he is at significant risk for language learning problems.



### Degrees of Hearing Loss

In addition to the above classifications, hearing impairments also can be categorized by severity or degree. The following numerical values are based on the average of the hearing loss at three frequencies (500 Hz, 1,000 Hz and 2,000 Hz), although numeric values can vary from author to author. It is important to note that these tests are conducted in a soundproof audiological test booth, and a child may not hear equally well in a relatively noisy school setting.

An audiologist is a professional who specializes in evaluating hearing loss and conducting hearing tests. The results from the tests are recorded on an audiogram which is a graph showing hearing sensitivity (see picture or full-sized example in the appendix).

The degree of hearing loss is determined by measuring hearing threshold which is the level in decibels (dB) at which a signal is just barely heard. The louder a sound must be made to be heard, the greater the degree of hearing loss. Thresholds are measured at several frequencies (itches) and graphed on the audiogram. Frequency is noted in Hertz (Hz).

See Appendix A for a full-sized Familiar Sounds Audiogram.

Normal Hearing Sensitivity	0 to 15 dB
Minimal or Slight Hearing Loss	16 to 25 dB
Mild Hearing Loss	26 to 40 dB
Moderate Hearing Loss	41 to 55 dB
Moderately Severe Hearing Loss	56 to 70 dB
Severe Hearing Loss	71 to 90 dB
Profound Hearing Loss	91 dB or greater





# THE IMPACT OF HEARING LOSS ON CHILDREN

The importance of hearing is often underestimated largely because, for the most part, it is an invisible disability. The lack of understanding of hearing loss is further compounded by the tendency to classify the ability to hear into two categories: hearing and deaf. It is important to note that many D/HH individuals have at least some residual (remaining) hearing.

Even though deafness and hard-of-hearing are considered “low-incidence” disabilities (less than 1% of the population), studies have shown that some level of hearing loss will affect 14.9 percent of school-aged children. When middle ear infections are included in this equation, one in three children will have some type of loss on any given day. Unfortunately, the average age of detection of a severe-to-profound hearing loss in the United States is

two-and-a-half years. Children with mild-to-moderate losses tend to be diagnosed at age four. This means that many children are not identified as having a hearing loss until they are well into the critical period for significant language acquisition.

A hearing loss of any type and degree is problematic. A minimal or slight hearing loss (15 dB HL) may not be a problem for an adult who has attending skills and is able to share meaning with the speaker, but a minimal hearing impairment can seriously affect the overall development of a child who is in the process of learning language, developing communication skills and acquiring knowledge. This chapter describes possible effects of long-term hearing loss. The more significant the loss, the greater the likelihood that a child will display the difficulties discussed.



## ***Intelligible Versus Audible Speech***

**T**he ability to discriminate speech sounds is defined as *intelligibility*. The ability to detect the presence of speech is defined as *audibility*. Speech might be audible to a child with a hearing impairment, but the words may not be intelligible without technological intervention, especially in less than ideal acoustic environments (like noisy classrooms).

When a child is asked if s/he can hear, the child's likely response will be "yes," however, understanding what was said is a different story! For instance "walk", "walked", "walking" and "walks" may all sound the same, and words like "vacation" and "invitation" may be confused. So a child may behave as if s/he heard and understood what was said, but s/he would not know if critical sounds were missed.

High-frequency sounds ("s," "th," "f," "sh") are very important for understanding speech because they involve consonant production and carry the meaning in many words. In fact, higher frequency speech sounds use only 10% of the energy of speech, but carry 90% of the meaning. Since a high frequency loss is the most common type of hearing loss, this difficulty is pervasive among D/HH children. This is why recognizing verb tense ("bounces" vs. "bounced"), pluralization ("book" vs. "books"), possession ("yours," "John's"), and contractions ("it's," "he's," "what's") is a difficult task for D/HH children.

## ***Auditory Skills and Incidental Learning***

**N**ormally-hearing children learn to listen naturally, however D/HH children who utilize the auditory-oral approach have to be taught to listen and discern important sounds from inference. This task is even more difficult for students who wear hearing aids which tend to amplify background noise. Although technology has made great strides in this area, a hearing aid does not make an ear function as "normal."

Children with normal hearing often seem to passively absorb information from the environment and constantly pick up tidbits of information. This is referred to as incidental learning.

A child with a hearing loss cannot casually overhear what people say and since a great amount of information that a child learns is not directed at him/her, it stands to reason that s/he misses out on essential daily information. As much as 90% percent of what a normally hearing individual learns is from overhearing conversations, with only ten percent from direct instruction. Because of this, D/HH children miss out on practical knowledge needed to make



progress in both the school environment and the community. Children who have a hearing loss will need to be taught directly many of the skills that other children learn incidentally. Please keep in mind that informal class discussions will often not be heard by D/HH children.

## Spoken Language

A primary and obvious effect that hearing loss has on a child is its impact on spoken communication. As mentioned previously, many hearing losses are not identified until age two or older, and for auditory/oral children these months of missed listening must be recouped. The greater the impairment the greater the difficulties with delayed language, syntax, speech intelligibility and voice quality. It is not uncommon for D/HH individuals to speak with a nasal or atonal quality. An experienced speech language therapist is needed to provide intensive therapy to address these deficiencies.



*Photos courtesy of  
Clarke Jacksonville Auditory Oral Center*

## Academic Performance

Another consequence of a hearing loss is its negative impact on vocabulary development, reading, and writing. Inadequate knowledge of vocabulary can result in D/HH students understanding only one meaning of multi-meaning words or can prevent them from deciphering subtle inferences or deductions. When language skills are deficient and vocabulary is limited, reading skills also are likely to be poor. Often these students are not even aware that they have limited comprehension. Given the complex nature of reading and writing, it is not surprising that these skills are a constant struggle for D/HH students whose performance may be below that of their hearing peers. Mainstreamed D/HH students have relatively grade-level reading abilities, however, when a child does have a reading problem academic success can be limited.



## ***Self-image and Social Adjustment***

**H**earing loss can have a major effect on a D/HH child's behavior and self-esteem. Students may perceive themselves as different if they have hearing problems or difficulty communicating with others, especially if they wear cochlear implants/hearing aids and/or utilize an FM system (wireless communication). A reduced ability to communicate may interfere with development of age appropriate social skills (they may appear "out of it," be socially immature, and miss important social cues). This negative self-image can further be compounded if an uninformed teacher faults a D/HH child for "daydreaming," or "hearing when s/he wants to," or "not trying."

In addition to the impacts mentioned above, many children who have a hearing loss may be less attentive, easily frustrated and appear less confident in the classroom than their normal-hearing peers. Often these

children are more fatigued than their hearing peers due to the level of effort needed to listen during the day. Increased fatigue levels put these students at risk for irritable behavior in the classroom. These factors can have a further impact on their academic performance.

With appropriate information, teachers and professionals can play an active and supportive role in

the life of a D/HH child. The section on "Classroom Tips for Working with Deaf and Hard-of-Hearing Students" provides practical ideas that will enable the teacher to proactively address some of the difficulties that D/HH children frequently face.

The handout titled, "Relationship of the Degree of Longterm Hearing Loss to Psychosocial Impact and

Educational Needs" summarizes many of the above issues in an easy to read matrix.



## RELATIONSHIP OF DEGREE OF LONGTERM HEARING LOSS TO PSYCHOSOCIAL IMPACT AND EDUCATIONAL NEEDS

Degree of Hearing Loss	Possible Effect on the Understanding of Language & Speech	Possible Psychosocial Impact	Potential Educational Accommodations and Services
<b>Minimal 16 - 25 dB</b>	<p>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 of 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 where instruction is primarily verbal.</p>	<p>May be unaware of subtle conversational cues which could cause child to be viewed as inappropriate or awkward. May miss portions of fast-paced peer interactions which could begin to have an impact on socialization and self-concept. May have immature behavior. May be more fatigued due to extra effort needed for understanding speech.</p>	<p>Due to noise in typical classroom environments which impede child from having clear access to teacher instruction, will benefit from improved acoustic treatment of classroom and sound-field amplification. Favorable seating necessary. May need attention to vocabulary or speech, especially when there has been a history of ear problems. Depending on loss configuration, may benefit from low power hearing aid with personal FM system. Inservice on impact of so called "minimal hearing loss" on language development, listening in noise and learning, required for teacher.</p>
<b>Mild 26 - 40 dB</b>	<p>Child can "hear" but misses fragments 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. At 30 dB can miss 25% - 40% of the speech signal; at 35-40 dB may miss 50% or more of class discussions, especially when voices are faint or speaker is not in line of vision. Will miss brief or unemphasized words and consonants, especially when high frequency hearing loss is present. Often experiences difficulty learning early reading skills such as letter/sound associations.</p>	<p>Barriers 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 understanding difficulties 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 more fatigued due to effort needed to listen.</p>	<p>Noise in typical class will impede child from clear access to teacher instruction. Will benefit from hearing aids(s) and use of a personal FM or sound-field FM system in the classroom. Needs favorable acoustics, seating and lighting. Refer to special education for language development, auditory skills, articulation, speechreading and/or support in reading and self-esteem. Inservice teacher on impact of so called "mild hearing loss" on listening and learning.</p>
<b>Moderate 41 - 55 dB</b>	<p>Even with hearing aids, child can "hear" but typically misses fragments of what is said. The amount of speech signal missed can be 50+% with 40 dB loss and 80+% with 50 dB loss. Child is likely to have delayed or disordered syntax, limited vocabulary, imperfect speech production and flat voice quality. Early consistent use of amplification and language intervention increases the probability that the child's speech, language and learning will develop more normally. Child will not have clear access to verbal instruction due to typical noise in class. A personal FM system to overcome noise in the classroom and distance from the teacher is usually necessary.</p>	<p>Barriers build with negative impact on self-esteem as child is accused of "hearing when he/she wants to," "daydreaming," or "not paying attention." Often with this degree of hearing loss, communication can be significantly affected, and socialization with peers can be difficult, especially in noisy settings such as lunch or recess. May be more fatigued than classmates due to effort needed to listen.</p>	<p>Consistent use of amplification (hearing aids/FM) is essential. Needs favorable classroom acoustics, seating and lighting. Program supervision by hearing impairment specialist to coordinate services is essential. Special academic support may be necessary, especially for elementary grades; attention to growth of oral communication, reading, written language skills, auditory skill development, speech therapy, self-esteem likely. Teacher inservice required with attention to peer acceptance.</p>

<p>Moderate to Severe 56 - 70 dB</p>	<p>With hearing aids, child can usually "hear" people talking around him/her, but will miss fragments of what is said resulting in difficulty in situations requiring verbal communication in both one-to-one and groups. A 55 dB loss can cause a child to miss up to 100% of speech information without working amplification. Delayed spoken language, syntax, reduced speech intelligibility and flat voice quality likely. Use of a personal FM system will reduce noise and distance and to allow increased auditory access to verbal instruction.</p>	<p>Often with this degree of hearing loss, communication is significantly affected, and socialization with peers can be difficult, especially in noisy settings such as lunch or recess. Tendency of poorer self-concept and social immaturity will contribute to a sense of rejection; peer inservice helpful.</p>	<p>Full time, consistent use of amplification (hearing aids/FM system) is essential. Depending upon loss configuration, frequency transposition aid may be of benefit. Program supervision by specialist in hearing impairment necessary. May require intense support in language skills, speech, aural habilitation, reading and writing. Note-taking, captioned films and visual aids are needed accommodations. Teacher inservice required.</p>
<p>Severe 71 - 90 dB</p>	<p>Without amplification, may hear loud noises about one foot distant from ear. When amplified optimally, children with hearing ability of 90 dB or better should be able to detect many sounds of speech if presented from close distance or via FM. Individual ability and early intensive intervention will determine the degree that sounds detected will be discriminated and processed into meaningful input. Often unable to perceive higher pitch speech sounds sufficiently loud enough to discriminate them, especially without the use of FM. If loss is present at birth, oral speech and language will likely be severely delayed or not develop spontaneously. The younger the child wears amplification consistently and intensive language intervention is provided, the greater the probability that speech, language and learning will develop at a more normal rate.</p>	<p>Communication is significantly affected, and socialization with hearing peers is often difficult. Child often more comfortable interacting with deaf or hard of hearing peers due to ease of communication. Relationships with peers and adults who have hearing loss can make positive contributions toward the development of healthy self-concept and a sense of cultural identity. Poorer self-concept and greater social immaturity is typical unless child is in a deaf school or with a peer group. Child in mainstream classroom may have greater dependence on adults due to difficulties comprehending oral communication.</p>	<p>Whether a visual communication approach or auditory/oral approach is used, early and extensive language intervention, full-time consistent amplification use and constant integration of the communication practices into the family will highly increase the probability that the child will become a successful learner. Specialized supervision, support services and continual appraisal of access to communication is required. Depending on hearing loss, a frequency transposition aid or cochlear implant may be remotely possible options. Oral or sign interpreter likely necessary in mainstream settings, especially as instruction becomes more linguistically complex. Note-taking, captioned films, and visual aids necessary; training in communication repairs strategies helpful. Inservice of mainstream teachers is essential.</p>
<p>Profound 91 dB or more</p>	<p>Detection of speech sounds is dependent upon the hearing loss configuration and the optimal use of amplification. Degree and configuration of hearing loss, use and appropriateness of amplification, quality of early intervention and individual ability, all combine to influence the degree to which a profoundly deaf child can detect, discriminate, process and understand the sounds of spoken language. If loss is present at birth, speech and language will not develop spontaneously. If loss is recent onset, speech and language is likely to deteriorate rapidly.</p>	<p>Child often more comfortable interacting with deaf or hard of hearing peers due to ease of communication. Often in the mainstream, child will have greater dependence on adults due to difficulties understanding oral communication. Inservice to hearing peers and teachers is essential to foster acceptance.</p>	<p>If an auditory/oral approach is used, full time, consistent use of amplification (hearing aids/FM) is essential if hearing is to be maximized. Frequency transposition aid or cochlear implant may be an option. If culturally deaf emphasis is used, exposure to deaf, ASL users is vital. Self-contained educational placement with other deaf and hard of hearing students often a less restrictive option. Inclusion into regular classes as much as is beneficial to student (with oral or sign interpreter). Note-taking, captioned films and visual aids are necessary accommodations. Training in communication repair strategies helpful. Inservice of mainstream teachers is essential.</p>

<p>Unilateral (One normal ear and one ear with permanent loss).</p>	<p>Child can "hear" but will have difficulty understanding in certain situations, such as hearing faint or distant speech, especially if poor hearing ear is closest to the person speaking. Will usually have difficulty localizing sounds and voices using hearing alone. The unilateral listener will have greater difficulty understanding when environment is noisy and/or reverberant, especially with normal ear towards the overhead projector or other sound source and poor hearing ear towards the teacher. Exhibits difficulty detecting or understanding soft speech from the side of the poor hearing ear, especially in a group discussion.</p>	<p>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, lunch or recess situations. May misconstrue peer conversations and feel rejected or ridiculed. Child may be more fatigued in classroom setting due to greater effort needed to listen, especially if class is active or has relatively poor acoustics. May appear inattentive, distractable or frustrated, with behavior or social problems sometimes evident.</p>	<p>Allow child to change seat locations to direct the better ear toward the most effective listening position. Student is at risk for educational difficulties as half of students with unilateral hearing loss experience significant learning problems. Often have difficulty learning sound/letter associations in typically noisy Kindergarten and grade 1 settings. Educational monitoring is warranted. Teacher inservice is beneficial. May benefit from a hearing aid on the poorer hearing ear if there is residual hearing or occasionally a CROS aid can be successful. Will benefit from a sound-field FM system in the classroom, especially in lower grades, or a personal FM system with low gain/power.</p>
---	--	--	---

**Note:** All children with hearing loss require periodic audiologic evaluation, rigorous amplification checks, regular monitoring of their access to instruction and the effectiveness of their communication skills. Children with hearing loss (especially conductive) need appropriate medical attention along with educational accommodations and services.

**Teacher Inservice:** All children require access to verbal instruction if they are to succeed in school. A child without effective access to teacher instruction will not receive an appropriate education. Distance, noise in classroom and fragmentation caused by hearing loss prevent access. Use of visuals, FM classroom amplifications, visual communication systems, notetakers, communication partners, etc. provide access to instruction. Components of good classroom management for a child with hearing loss include: 1) keep in close proximity to the child during instruction, 2) call on students by name during discussions and summarize important points, 3) reduce noise sources, 4) check student comprehension following directions, 5) adapt/modify curriculum for student to experience success, 6) utilize classroom amplification daily for all large group instruction, 7) be aware of potential changes in hearing ability and report if suspected, 8) facilitate socialization between the child and peers, 9) keep lighting from windows on teacher's face.

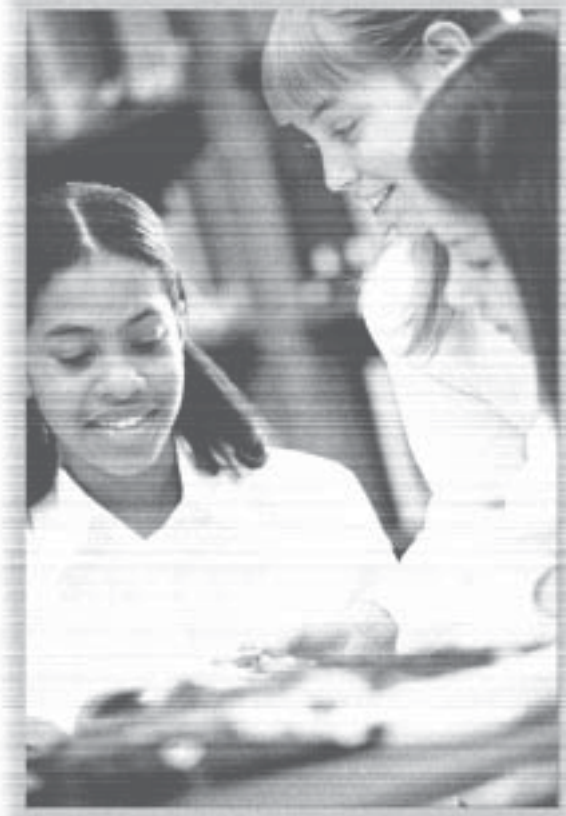
*Developed by Karen L. Anderson, EdS & Noel D. Matkin, PhD 1998. Used by permission of author.*



# CLASSROOM TIPS FOR WORKING WITH DEAF AND HARD-OF-HEARING STUDENTS

Every child is an individual with his/her own strengths and limitations. This means it's important to not have a preconceived notion of a D/HH child's ability to function based on the degree of his/her hearing loss. Regardless of the type or severity of the hearing loss, a teacher can greatly improve a D/HH child's ability to function in the classroom by making minor changes in his/her teaching style.

This section is devoted to providing insights as well as discussing strategies for managing the classroom for mainstreamed students who have a hearing loss. Not every consideration highlighted below will apply to all D/HH students.



## *Fostering a Positive Mainstream Experience*

It was discussed previously how many D/HH children perceive themselves as different because they wear hearing aids, cochlear implants and/or an FM system and may have difficulty communicating with others. Ultimately this impacts their self-esteem. Listed below are ways the teacher can address this issue and help foster a supportive classroom environment:

- Reinforce positive coping strategies (e.g. how to respond to teasing on the playground, what to say to an individual when they ask why the child wears hearing aids, etc.).
- Promote self-advocacy and activities that foster inclusion. A mainstreamed pupil may need more formal instruction on how to interact socially with his/her normally hearing peers.
- Support daily use of personal hearing aids, cochlear implants and other assistive listening devices prescribed for the student.
- Help the pupil understand his/her own hearing loss and provide an opportunity for the student to share information with the class about hearing loss, and how his/her hearing aids, cochlear implant and/or FM system works.
- Provide opportunities to meet other D/HH students on a regular basis (pen pals, internet, family field trips).
- Make sure to review safety and emergency procedures directly with the D/HH student. In the event of a fire or emergency situation, check all restrooms since many D/HH children may not be able to hear the alarms.

The D/HH itinerant teacher can provide additional information or assist the mainstream teacher with many of these activities.

## ***Preferential Seating***

**B**oth noise and lighting impact a D/HH student's ability to hear and receive information visually. Please consider the following when assigning student seating:

- Seat the student with his/her back towards the light source (typically a window or open door) since it is difficult to speechread or see other visual clues when looking into the light.
- If a child has a "better" ear seat him/her with his/her better ear towards the teacher.
- During group activities, encourage the student to watch the faces of the other children when they speak. Semi-circle seating is especially helpful to a D/HH student.
- Try not to seat D/HH students near air conditioners, heaters, open doors or windows, computers, overhead projectors, or near other high noise areas of the room.
- Seat the student near the front of the classroom with good visual access to the teacher. Sitting off to one side also allows greater access to the majority of students in the room during class discussions.
- Seat the child near a peer "buddy" to assist in keeping the student on track. By watching his/her buddy, the D/HH student will also gain clues to missed information.



## ***Improving Communication***

**M**any D/HH students rely on speechreading to obtain information from a speaker's facial expressions to supplement their auditory input. Here are some ideas for a number of common-sense accommodations the teacher can do to improve both auditory and visual communication:

- Speak naturally at normal volume. Exaggeration and over emphasis of speech will hinder the student's ability to speechread and auditorily process language.
  - Get the attention of the student before addressing him/her (call the child's name or tap his/her shoulder).
  - Make sure the speaker's face is visible to the student . . . trim large mustaches, avoid covering the mouth or chewing on pencils, etc.
  - Do not talk while walking around the room or turn towards the white board while giving instructions. (An overhead projector can be effective teaching tool if the fan noise doesn't overwhelm the D/HH student).
  - Since D/HH students have difficulty following conversations that move around the room, identify who is speaking and repeat peer comments during class discussions.
  - Repeat any announcements given over the PA system.
  - Restate rather than simply repeat information when the student is having difficulty understanding after one repetition.
  - On the white board, write instructions and information such as new vocabulary words, assignments, announcements, simple outlines for the lesson, and key words or phrases as the lesson progresses.
- Check for understanding. Ask the student questions that require him/her to repeat content rather than respond with yes or no answers.
  - Provide the student with a written copy of the daily bulletin.
  - When homework is corrected within the classroom, give the student the answer sheet to correct his/her work.
  - When doing a Read Aloud activity, have the student read first, or have them read the passage silently.
  - During video tape presentations, try to use a captioned version (the itinerant teacher may have a catalog . . . ask in advance!). If one is not available, give the student a script of the video or assign an alternate activity.
  - Reduce visual distractions by reducing excessive artwork, limiting the number of mobiles hanging from the ceiling and removing general clutter. However, providing additional visual support such as pictures, charts, diagrams, and objects, to reinforce concepts being taught is helpful.
  - Transitioning into new content is difficult for D/HH students. Using phrases such as, "Does anyone have any more questions?," "To summarize what's been discussed . . .," and "Let's move on" will help the student follow changes in activities.

## ***Vocabulary, Word Comprehension & Reading***

**D**eaf and hard-of-hearing students have limited exposure to a given word and as a result they tend to have literal or inflexible understanding of a word's meaning. Use some of these strategies to help D/HH students increase their reading comprehension and stay on par with their hearing peers:

- Explain the meaning of new words introduced in class.
- Provide them with opportunities to read a variety of materials on the subject and encourage them to check out similar-subject information from the library.
- Send home books the student has read in class so parents can review them with their child.
- Role play and act out the story.
- Conduct hands-on activities involving objects depicted in the story.
- Engage students in a discussion about vocabulary and concepts contained in a story prior to the reading experience (the itinerant teacher can assist with this).
- Teach them cognitive or language strategies that will help them understand the text (prediction, compare and contrast, recall, sequencing, inferencing, etc.).
- Create an outline of the major points of the story with the class.

## ***Classroom Support and Accommodations***

### **Team Approach**

It was mentioned previously that it takes a team to successfully mainstream a D/HH child. Members of the team may include the parents, classroom teacher, itinerant resource teacher, speech/language therapist, educational audiologist and the principal. The two most common problem areas in team management occur when the role of each team member is not clearly defined and when there is poor coordination and communication between the members.

Coordinating the exchange of information between the classroom, support personnel and the home can be challenging. This may be accomplished through a combination of a diary system (often a notebook that travels back and forth), frequent "5-minute" meetings, or longer debriefing meetings. Developing a clear delineation of staff responsibilities, communicating among team members, and continually monitoring progress is essential for determining the individual needs of each pupil and to develop an appropriate individualized education plan.

### **Resource and Itinerant Teachers**

In addition to previously mentioned suggestions, the resource teacher and/or the D/HH itinerant teacher can help with vocabulary and language development, auditory training, practicing appropriate social skills and pre-/post-testing. Pre-teaching activities will help D/HH students establish the knowledge base needed to understand new information as well as expose them to new terms and concepts (e.g. advanced copies of vocabulary words). Post-teaching can be used to review key concepts, clarify misconceptions, organize information and expand the D/HH child's knowledge of content or skills emphasized in the lesson.

### **Assistive Technology and Personnel**

- Transcribers may be assigned to the classroom (especially at the middle or high school level). They will provide the student with a backup copy of class notes to compare with their own.
- Peer notetakers that have been trained in proper notetaking techniques may be assigned to a student in middle or high school to make sure that the D/HH student has complete notes.
- Sign language interpreters may be assigned to a D/HH student if s/he needs more than aural input to fully access the curriculum.
- FM systems are usually provided for hard-of-hearing students and should be used for all classroom activities, including music and physical education. In addition, these systems should be used for assemblies and field trips to provide equal access to information.

### **Standardized Assessments (SAT-9)**

The IEP team determines what, if any, accommodations or modifications are needed for a child with a disability to participate in an assessment. These can include flexible scheduling, flexible seating, large-print or braille, out-of-level testing, revised test format, aids and/or aides (e.g. using FM systems, having directions read or signed). When selecting individual accommodations and modifications, parents, students, and other IEP team members must understand how their decisions will affect the use of the scores (some modifications may affect the student's chances for such things as moving to the next grade or graduating with a regular diploma). If this has not been addressed, contact the student's advocate teacher or D/HH Itinerant teacher. A sample list of instruction and test accommodations is included in Appendix B.

### **Closing Thoughts**

A number of strategies have been suggested to help improve the D/HH student's success in the classroom. In general, academic expectations should not be lowered for D/HH students and expecting less work or achievement from them will only result in a "dummying down" effect. Deaf and hard-of-hearing students need to be held to the same standards as their peers and should not use their hearing loss an "easy out" excuse (e.g. incomplete homework).

By far, the most important factor that contributes to the success of a mainstreamed D/HH child is a teacher who is aware of the child's challenges, shows a sensitivity to their special communication needs, and is willing to be flexible by continually adapting and modifying teaching strategies. The teacher's reward is knowing that s/he has been the key link in contributing to the D/HH child's success and ability to reach his/her fullest potential.



*Photo courtesy of Clarke Jacksonville Auditory Oral Center*



# LISTENING DEVICES AND ASSISTIVE TECHNOLOGY

Assistive technology and devices for sound access are providing more hearing options to choose from. As mentioned earlier, intelligibility of speech (the ability to hear word-sound distinctions clearly) is compromised in noisy situations even though the sounds might still be audible. Distance from a speaker, background noise, room reverberation, and attention all influence how audible and intelligible speech is for a child with a hearing loss.

The focus of all hearing technology is to enhance the reception of a clear acoustic (mostly speech) signal and for this to occur, consistent use with appropriate forms of amplification are a must. Hearing aids and assistive listening devices help a child access his/her residual (remaining) hearing.

This section of the guide provides the teacher, professional and parent with a general understanding of the amplification devices that are currently available. When the teacher plays a role in trouble shooting problems, an in-service training is needed so the individual fully understands the technology being used specific to the child in his/her classroom.

## *Hearing Aids*

Hearing aids are not used in the same manner as glasses are to correct vision. Hearing aids do not distinguish between speech and noise as a normal ear does, and cannot “tune out” much of what a child does not want to hear. Although hearing aids are good in one-on-one and small group situations, they also amplify all sounds, including background noise.

Amplification cannot correct damage to the inner ear. Even the most advanced hearing instruments of today cannot return a person’s hearing to normal. Rather, hearing aids amplify and shape incoming sounds to make them audible to an ear that could not otherwise detect them. There have been major improvements in the flexibility and sound quality of modern hearing instru-

ments, such as the digital hearing aid, but this has no effect on a damaged hearing nerve’s ability to interpret what it hears.



## **How a Hearing Aid Works**

All parts of the hearing aid work together to amplify sound. Regardless of the style, all hearing aids have the following components:

*Microphone:* receives the acoustic signal (sounds from the environment) and changes the sounds into an electric signal. Some hearing aids have multiple and/or directional microphones to assist in controlling sound input.

*Amplifying Circuit:* shapes the sound, now in the form of electric current, and makes it louder. The amount of amplification provided by a hearing aid is called “gain.”

*Receiver:* changes the amplified and shaped electrical signal back into an acoustic signal (sound) that can be heard. A receiver is a microphone in reverse.

*Earmold:* custom made ear pieces that direct the sound from the hearing aid into the ear and keep the hearing aid in place.

Hearing aids are powered by batteries and feature:

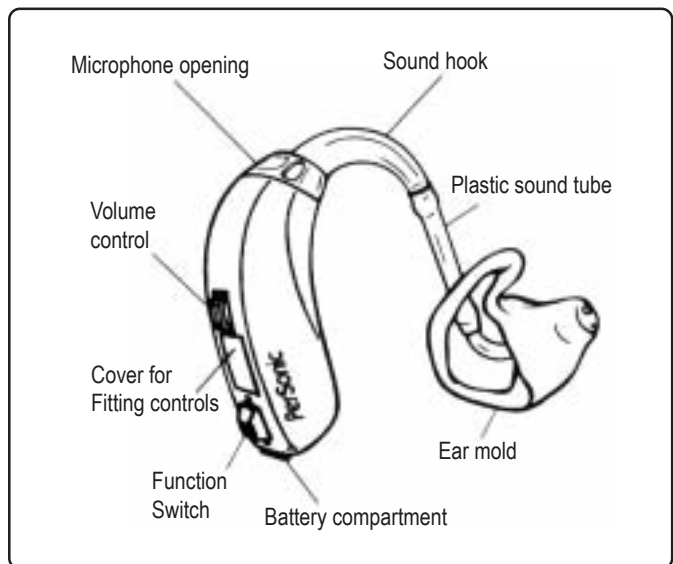
- Internal controls which are set by an audiologist. These controls determine which frequencies are amplified (frequency response) and the loudest sound the hearing aid can make (saturation response).
- External controls which are set by the hearing aid user. They may include a switch that can be set on M (microphone), M-T (microphone + telecoil), T (telecoil), or O (off).
- A Telecoil switch which allows the hearing aid to be used with a telephone and some assistive listening devices. Not all hearing aids contain a telecoil.
- A volume control wheel which can be adjusted to increase or decrease the loudness of sound. On some hearing aids the volume control adjusts automatically and there is no control wheel, while others may use a remote control to change the settings.

## **Behind-The-Ear (BTE) Hearing Aid**

A BTE hearing aid is the most common type of aid used with children. It is the most flexible (suitable for any degree of hearing loss) and can attach to assistive listening devices such as an FM system. As the name suggests, this type of hearing aid fits behind the ear and is connected to a soft plastic earmold which fits inside the ear. As shown, the sound hook or ear hook curves around the top of the ear and attaches to a small piece of plastic tubing extending from the earmold.

Sound is routed through the earmold into the ear. The microphone is located at the top of the hearing aid near the ear hook. The battery, amplifier and receiver are all inside the case that fits behind the ear.

Many teachers wonder why they can hear “squealing” from an aid. A hearing aid is like a mini public address system, so due to the closeness of the microphone to the receiver there is acoustic feedback when the earmold is loose and feedback “escapes.” If there is frequent squealing, it may be a sign that the earmold needs to be replaced.





### **Other Hearing Aid Styles**

The body-style hearing aid (worn on a harness on the chest) was once a common style of aid for children. Since the microphone is not at ear level it does not provide natural sound reception at the ear. Advancements in hearing technology have enabled more powerful aids to be worn BTE, eliminating the need for body-style aids.

In-the-ear (ITE) and in-the-canal (ITC) hearing aids are popular with adults due to their cosmetic appeal. These aids are seldom recommended for children due to the fact that children's ears are still growing, there are safety concerns, and they have limited ability to utilize assistive listening devices.

Finally, some children who have difficulty wearing a hearing aid (due to malformation of the external ear or persistent middle ear problems) may utilize a bone-conduction aid. The bone conduction receiver is fastened to a headband which holds it to the head.



## ***Cochlear Implants***

The cochlear implant is an exciting piece of technology that offers severe-to-profoundly deaf children the opportunity to access sound which otherwise would not be available to them with traditional hearing aids. Cochlear implants are not like a hearing aid. In fact, the implant bypasses the damaged parts of the inner ear and stimulates the nerve to send information to the brain.

### **Components of the Implant**

A cochlear implant consists of three parts: receiver, headpiece, and speech processor.

*Receiver.* The receiver is the part that is implanted. It looks like a magnetic disk about the size of a quarter. It is placed under the skin behind one ear, and a wire that leads from the receiver to an electrode is placed in the fluid of the cochlea in the inner ear.

*Transmitter/Headpiece.* A small headpiece is worn just behind the ear and contains the microphone that picks up sound in the environment and the transmitter that sends sound through the system. The microphone and the transmitter, placed on the head behind the ear, are held in place over the implanted receiver by small magnets in both the transmitter and the implanted receiver.

*Speech processor.* The speech processor, which shapes and amplifies the sounds picked up by the microphone, is worn on the body, either behind the ear or on a belt. It is attached to the transmitter by a special cord.

### **How the Cochlear Implant Works**

Sound waves enter the microphone located in the headpiece. Sound is sent through the transmitter and along a wire to the speech processor. The speech processor converts the sound into a special signal that is sent to the implanted receiver. The receiver sends the signal to the brain, where it is interpreted as sound.



Above: Electrodes, receiver and behind-the-ear implant speech processor and magnet.

Left: Speech processor, head piece containing microphone, transmitter, and magnet.

Photos courtesy of Cochlear Corporation.



## ***FM and Infrared Systems***

**H**earing aids and cochlear implants are not designed to deal with all listening needs. Their biggest limitation is their inability to enhance the signal-to-noise ratio (defined below) in situations where the listener cannot be physically close to the speaker.

Assistive listening devices (ALDs) encompass a range of products designed to solve the problems of noise, distance from the speaker, and room reverberations. The most common type of ALD utilized in the educational setting are FM or infrared system (others used more commonly in the home include telephone and alarm devices which will not be described here). There are both personal and sound-field systems.

### ***Distance Hearing and Speech-to-Noise Ratio***

In order to understand how an FM (frequency-modulated) system helps a D/HH child, the concepts of distance hearing and speech-to-noise ratio (S/N) must be explained. A child with a hearing impairment of any degree, even when wearing hearing aids, cannot hear well over distances. Distance hearing is a problem because the speech signal (usually the teacher's voice) loses both intensity and critical speech elements as the signal travels away from the sound source. The greater the hearing impairment, the greater the reduction in earshot or distance hearing.



The S/N ratio (also called signal-to-noise ratio) is the relationship between the loudness of the message (signal) and the background sound (noise) it must overcome to be heard and understood. Background noise is anything that interferes with the signal: air conditioning, traffic, pencil sharpeners, etc. The more favorable the S/N ratio (the louder the desired auditory signal relative to background sounds), the more intelligible speech is for the child.

Individuals with normal hearing typically require a S/N ratio of +6 dB for the reception of intelligible speech. This means that the teacher's voice needs to be 6 dB louder than the background noise. Children who are D/HH require a +15 to +20 dB S/N ratio. Due to noise and changes in teacher position, the average classroom S/N ratio is only +4 or +5 dB, which is less than ideal for even normal hearing students.

Many teachers feel that if they raise their voice, this will be sufficient for a child to hear what they are saying. However, yelling from across the room only promotes audibility (hearing the presence of speech) not intelligibility (hearing differences among speech sounds). If the D/HH child is not receiving a complete speech signal, s/he is being denied access to spoken communication. Yelling is also frequently equated with anger which may cause the student to have increased stress.

The ideal distance for a child to hear speech sounds is 6 inches from his ear. Since it is not practical for a teacher to sit next to one child in a classroom situation, the FM system is a great solution to address both of these problems.

### **Personal FM System**

An FM unit is an assistive listening device that improves the speech-to-noise ratio by use of a remote microphone that can be placed close to the sound source (usually the teacher's mouth, but it can also be a tape recorder, TV monitor, etc.). A personal FM unit is like having a tiny private radio station that transmits and receives on a single frequency. There are no wires connecting the speaker and listener which allows the teacher to freely move about the classroom.

The teacher's microphone is usually clipped to their clothing and worn about six inches below the mouth. The pupil can sit anywhere in the classroom and hear the teacher's voice as if it were only six inches away. The FM system improves the S/N ratio by reducing the distance the teacher's voice has to travel and the effects of background noise. The FM receiver is worn by the child and must be set to the same radio frequency as the microphone/transmitter for the child to receive the desired radio signal.

There are a number of ways that the FM signal can be transmitted to the hearing aid: Walkman-type head phones, button-type earmolds, wire or loop worn around a child's neck, or direct audio input. Some systems do not involve the use of hearing aids, while others require the students to have special features on their hearing aids. Because there are various settings and numerous options, all teachers should receive an in-service training from the audiologist on how the system works along with trouble-shooting techniques.

### **Sound-field or Classroom Systems**

Sound-field technology is a tool that allows control of the acoustic environment in a classroom, thereby facilitating speech accessibility of the teacher to all the children in the room. Sound-field systems are like high fidelity, wireless public address systems and transmit via radio waves (FM) or infrared light.

As with the personal FM system, the speaker wears a microphone transmitter and the signal is sent to a receiver/amplifier that is connected to loudspeakers. The sound-field increases the loudness of speech relative to background noise.

The major difference between a sound-field unit and a personal FM system is that the personal FM can provide the most favorable S/N ratio: +20 to +30 dB. Sound-field FM systems typically improve the classroom S/N ratio by about +10 to +20 dB. Therefore, children with more severe hearing losses typically require personal FM units. In some cases, a sound-field unit may be the only amplification needed for children who have a mild hearing loss.



Photos courtesy of Phonic Ear®

## **Benefits of Sound-Field Systems**

There have been numerous studies documenting the benefits of sound-field technology. Based on current information, the following children appear to benefit the most from sound-field amplification (due to the increased speech-to-noise ratio):

- Those with conductive hearing loss (including those with histories of middle ear infections)
- Children with minimal degree of sensorineural hearing loss (unilateral and bilateral)
- Children with central auditory processing disorders (CAPD)
- Students with attention disorders (ADD, ADHD) and developmental delays
- Preschoolers, kindergartners, and first graders with normal hearing sensitivity who are in the crucial stages of developing academic competencies
- Those with articulation and language disorders
- English as a second language students
- Students with dyslexia



These studies have further concluded that classrooms with amplified systems have students who tend to listen longer, have better on-task behaviors and improved test scores. Additionally, students who have a hearing loss are not singled out when a sound-field system is used (as opposed to a personal FM system). Older D/HH students, who may not consistently wear their hearing aids due to cosmetic reasons, will also benefit from a sound-field amplification system. Teachers who use sound-field technology report they need to use less energy projecting their voices and are less tired at the end of the day. FM systems also increase teacher efficiency by requiring fewer repetitions which allows for more actual teaching time. Overall, classrooms are quieter and both children and teachers are less fatigued.

A great deal of this guide has been dedicated to explaining FM systems, however, in order for them to be effective they must be used appropriately. This includes:

- Making sure a lapel microphone is not clipped to the side of a garment (it must be in the middle so speech doesn't fade in and out). It is preferable for teachers to wear a headset microphone.
- Keeping jewelry or other items such as books and paper from rubbing against the microphone.
- Being sensitive to minimizing noises such as crumpling paper, tapping pencils or chewing.
- Turning the system off while assisting other students individually or talking with other adults.
- Repeating comments or questions made by peers so the D/HH student can hear them.

### ***Limitations of FM Systems***

FM systems require the speaker to use a microphone which 1) may not be used properly, and 2) may not always be feasible in every situation. Input from other speakers — aides, peers, or audio equipment, for instance — will generally not be amplified and these remarks may be missed by the D/HH student.

Instructional methods also need to be taken into consideration. As interactive, small-group, and computer-assisted learning increases, the utilization of amplification technologies becomes more problematic. At times it may become a burden for the teacher to ensure that D/HH students clearly hear their peers during discussions and cooperative learning activities.

Amplification technologies also cannot completely compensate for (or overcome) a poor acoustical environment. In fact, amplified background noise can be painful and disruptive for children with a variety of auditory disabilities. Parents and education professionals need to understand that FM systems should not be used as the solution for correcting classrooms with inappropriate acoustics. Please refer to the next chapter on Acoustics and the Classroom Environment for more information on this subject.



## ***Managing Auditory Devices***

### ***Aide or Teacher's Role***

Sadly, over 50% of amplification devices are not working on any given day. A dead hearing aid is worse than nothing at all because the earmold then acts like an earplug. The only way to know if the hearing aid is working is to listen to it at least once a day at the beginning of each school day.

This is also true for personal FM systems which must also be tested in the environment in which it is being used. The FM system may be free from interference in one room, but pick up noise from lighting ballasts, radio frequency sources, HVAC controls, and other electrical, electronic, microwave and even infrared sources in another part of the school. These interferences compromise the effectiveness of assistive technologies and often young children who have a hearing loss are not be able to identify and call attention to malfunctioning devices.

The teacher or aide will need a hearing aid stethoscope (called a stethoset) to listen to a hearing aid and an FM unit which utilizes an earmold. A quick and simple test, called the Ling 6 sounds, can be performed to determine if a system is functioning properly. The Ling 6 sounds are ah, ee, oo, sh, s and m; these sounds were selected because they contain speech energy that is representative of all English speech sounds. The school district audiologist can provide the stethoset and demonstrate the sound test at the in-service training.

If any type of malfunction occurs with the FM system the teacher should contact the audiologist and request a back-up system while the current one is being repaired. If the student is experiencing problems with his hearing aid call the parent or send home a note describing the problem.

### ***Student's Role***

The level of responsibility for managing auditory devices is determined by the child's age and ability. Some primary goals for a kindergarten-age child might be able to insert and remove the hearing aid, test and change batteries, and notify the teacher that the hearing aid or FM system is malfunctioning. As the child gets older, s/he should be taught basic maintenance and trouble-shooting techniques. The audiologist should work with the teacher to design a program that enables the child to take control and responsibility to the fullest extent possible.

Please remember that amplification that is not functioning properly, even for part of the day, can significantly impact a child's learning and self-esteem.



## ***Additional Assistive Technology***

### **Captioning**

Closed captioning is a process where the dialogue portion of a program (TV, film, video) is translated to captions (subtitles) and viewed on the monitor. D/HH students are unlikely to be able to speechread or fully hear during a film or video presentation, so the use of captioning will help them understand the content of the film. Since notetaking while viewing a film is difficult at best, study guides (which often come with the video) should be distributed to the D/HH student prior to watching the film. Students should not be held accountable for the material covered in a film if it was not captioned or a study guide was not provided in advance.

In addition to captioning, placing the microphone of the FM system in front of the speaker, or using an attachment that allows the FM to be directly plugged into the audio output of the projector or TV monitor, will greatly help the D/HH student. This allows the student to receive the message directly rather than hearing external noise which may mask the message.

### **Overhead Projectors**

The overhead projector is an ideal tool for teachers because it allows them to face the class while writing down information. The D/HH student should not be seated too close to the projector since it is also a source of background noise.

### **Educational Transcription Systems**

Educational Transcription Services, Computer-Assisted Notetaking or Captioning Services all refer to a system for translating speech into print within a few seconds of the spoken word. Through the use of computer equipment (laptop, word-processing program and in some cases a stenotype machine) and a notetaker/typist, the student can read notes

as the class progresses. As the notetaker types text it is displayed on a monitor (TV monitor in the room or laptop in front of the student). A hard copy of the lecture can be given to the student after class.

There are verbatim programs and summary or abbreviated programs. CART (known as Communication Access Realtime Translation, Communication Access Realtime Technology, Computer-Aided Realtime Translation, Computer-Assisted RealTime, or Computer-Assisted Realtime Translation) and C-Print are verbatim options. TypeWell trained typists use an abbreviation-based typing system. The use of remote captioners (notetakers who are located off-site but still provide typed text in “real time”) is an option that is developing. This support service is typically used for middle and highschool students.

### **Automatic Speech Recognition**

The technology for Automatic Speech Recognition (ASR) programs is developing rapidly. For voice input, the teacher wears a headset microphone that is connected to a computer. As the teacher speaks to the class, the ASR program “recognizes” his/her voice and translates the spoken message into text that is displayed on a monitor. Some programs require a considerable amount of time to “train” the speaker’s voice so the program can accurately read it. Examples include Dragon Naturally Speaking (by L&H Dragon System’s, Inc.) and IBM’s Via Voice. There is a program on the market called the iCommunicator by Interactive Solutions, which converts speech to text, speech to sign language, speech to computer-generated voice, or text to computer-generated voice. Refer to the Resources chapter for further information on these products.



# ACOUSTICS AND THE CLASSROOM ENVIRONMENT

## *The Need for Good Acoustics*

**A**coustics refers to the total effect of sound, especially when produced in an enclosed space. The need for good acoustics in classrooms is simple. . . students must be able to hear in order to understand the teacher and each other. Most individuals don't realize that poor acoustics affect not only the transfer of information, but the learning process itself. It has been well documented that inappropriate acoustics in a classroom can compromise speech perception, on-task behavior, reading and spelling ability, behavior, attention, concentration and academic achievement in children with a hearing loss.

Because children are inefficient listeners (due to being neurologically immature and lacking the experience necessary to predict from context), they require better acoustical environments than adults. The ability to focus on speech while there is competing noise present is a developmental skill that is not mastered until approximately 13-15 years of age. The younger the child, the greater their difficulty in comprehending and attending to speech when noise is present. Stu-

dents may not be aware that poor acoustics are contributing to their learning difficulties and even if they are, most don't want to bring attention to their disability by stating that they're having problems hearing.

Modifications to learning environments which include classrooms, speech therapy rooms, multi-purpose rooms and cafeterias are essential so D/HH students can have total access to learning. Appropriate acoustic modifications can provide a D/HH child the opportunity to fully participate in class and can mean the difference between a successful and unsuccessful mainstream placement.

Three factors influence how well students are able to hear in the classroom: distance, reverberation and background noise. The issue of distance (how far the listener is from the speaker) is discussed in the section on FM systems in the Assistive Technology chapter. FM technology is a must, but so are improved classroom acoustics. To be effective, amplification requires control of reverberation and background noise.



## ***Classroom (Background) Noise and Reverberation***

### **Internal and External Noise**

The term background noise refers to any auditory disturbance that interferes with what a listener wants to hear. Classrooms are noisy . . . the average primary grade classroom noise level is 51 dB unoccupied and 69 dB occupied.

Noise generated within the classroom (internal noise) contributes to background noise levels. Sources of internal noise include:

- Heating, ventilating and air conditioning system (HVAC)
- Students talking
- Desks and chairs sliding on hard surfaced floors
- Shuffling books and papers
- Pencil sharpeners
- Audio-visual equipment (overhead projectors, etc.)
- Computers
- Aquarium pumps
- Lighting (ballasts in fluorescent lights)
- Soft background music
- Fans

Research has shown that internal sources of noise present in the typical classroom are the most detrimental to children because this form of noise is also similar in loudness and frequency to the teacher's voice.

External noise is exactly that, noise from outside the classroom. This can include:

- Interference from adjacent classrooms (especially in "loft" or open classroom schools)
- Corridor and hallway traffic
- Sounds emanating from cafeterias, playgrounds and gymnasiums
- Aircraft
- Highway traffic
- Construction equipment
- Lawn mowers, blowers and other landscape maintenance noise

Whether internally or externally generated, the presence of high noise levels leads to relatively poor signal-to-noise ratios (which was discussed in the previous chapter).

## **Reverberation**

Reverberation is sound, including both the spoken message and background noise, reflecting off the surface within the environment and persisting in the space. In other words reverberation is the remainder of the sound that exists in a room after the source has stopped (often referred to as an echo). This echoing effect occurs in classrooms that do not have enough sound-absorbing surfaces. The amount of reverberation is determined by the size of the room and how much acoustically absorbent material such as carpeting, draperies, and treated ceiling tile, covers the surfaces. The lower the reverberation time the better (between .4 and .6 seconds is desirable).

This echoing effect also contributes to background noise levels which in turn covers up or “masks” the spoken word (typically from the teacher). The net effect is a reduction in the student’s ability to understand speech. Recall the discussion on how “walk,” “walked,” “walking,” and “walks” may all sound the same to a hearing-D/HH child (see the chapter on the Impact of Hearing Loss). Word-final consonants such “ed,” “s,” and “ing” are particularly vulnerable to being masked by background noise.



## ***Improving Classroom Listening***

**M**any schools were designed before there was scientific knowledge connecting background noise and reverberation to children's speech perception and its link to learning difficulties. There is no doubt however, that acoustics is playing a greater role in a child's learning environment. To date there are recommendations but no laws or national standards which address classroom noise and reverberation. Even in the absence of standards (which are expected to be established in 2002), the IEP team should consider acoustic modifications in a D/HH child's Individualized Education Plan. The IEP process is designed to address the individual needs of each child which do not require standards to be in place.



## ***Reducing Internal and Reverberant Noise***

The first step in making changes to the acoustical environment of the classroom is for the teacher to become aware of the many internal sources of noise. Fortunately internal noise and reverberation are relatively easy to control by adding absorbent materials to certain room surfaces.

Sound absorbing surfaces include such items as:

- Acoustically treated low ceilings. This is by far the best sound absorbing material.
- Wall panels. Panels should cover at least half of the wall surfaces and must be Class A fire rated and sufficiently porous and dense to absorb sound.
- Carpeting. Although not the best sound absorbing alternative, it is effective in reducing chair noise and feet scuffing. Recent advances in carpet technology have led to the availability of bacteria-resistant floor coverings. Where carpeting is not feasible or practical, putting "tips" (or tennis balls) on chair legs is an easy solution which significantly reduces noise.
- Thick curtains or draperies.

Teachers can play an important role by evaluating and monitoring internal classroom noises on an ongoing basis. It is important to have equipment (HVAC, computers, projectors, light fixtures) serviced regularly to eliminate noise created by malfunction.

## ***Reducing External Noise***

Exterior noise, which is frequently intermittent, may be more difficult to control than internal noise. Some strategies for reducing external noise include:

- Seating children with hearing loss away from such noise sources.
- Insulating vents and other openings.
- Closing windows and doors during instruction.
- Utilizing landscaping, such as the placement of trees, shrubs, and earthen banks as a barrier.
- Utilizing rooms that are away from busy hallways and other large group areas.
- Installing multi-pane glass (louvered windows, which are found in many schools, offer little protection from outside noise).
- Ensuring doors are well sealed.
- Ensuring that landscape services be provided during non-instructional time.

Many of the above suggestions for reducing noise may appear to be out of the parent's or teacher's ability to implement, but parents and professional staff are key members of the IEP team and can act as an advocate for change. If the learning environment does not allow instruction to be heard clearly, any teaching, testing or intervention that uses speech as the vehicle for interaction is likely to fall far short of its projected goals. Keep in mind that it is often the sum of many simple solutions that, when combined, create the biggest impact in reducing noise.

Additional information on this subject can be found in both the Laws and Resources chapters of this guide.





# LAWS, REGULATIONS AND GUIDELINES

This section contains information on laws, regulations and guidelines as they relate to the needs of deaf and hard-of-hearing students.

## ***Individuals With Disabilities Education Act or IDEA***

20 United States Code Secs. 1400 and following  
34 Code of Federal Regulations, Part 300  
(1997 Amendments)

IDEA is the principal law which determines the special educational services children will receive from a school system. This federal law requires school districts to provide each student who has a disability with a free appropriate public education (FAPE). FAPE authorizes special education and related services, which are provided at public expense and without charge to student's families, meet appropriate standards and conform with an IEP. Assistive technology is specifically mentioned in IDEA as a service which school districts may have to provide in order for a student with disabilities to benefit from special education. The U.S. Department of Education has created regulations under the authority of the IDEA.

### ***How the Individuals with Disabilities Education Act (IDEA) Applies to Deaf and Hard of Hearing Students.***

<http://clerccenter2.gallaudet.edu/KidsWorldDeafNet/e-docs/index.html> (located in the virtual library/e-documents section of the Kids World Deaf Net Website). This resource contains a vast amount of information regarding the law, its implementing regulations, and its particular implications for families with children who are deaf or hard of hearing. Highly recommended!

### ***IDEA related websites:***

[www.ideapractices.org/idearegsmain.htm](http://www.ideapractices.org/idearegsmain.htm)

[www.ed.gov/offices/OSERS/IDEA/index.html](http://www.ed.gov/offices/OSERS/IDEA/index.html)

[www.ideapractices.org/regs/AppendxA.htm](http://www.ideapractices.org/regs/AppendxA.htm)

[www.ideapractices.org/docs/ideadepot/userguide.htm](http://www.ideapractices.org/docs/ideadepot/userguide.htm)

### ***California Education Code, Secs. 56000 and following California Code of Regulations, Secs. 3000 and following***

These are state statutes and regulations which parallel the IDEA. The State Department of Education established the enabling regulations.

[www.leginfo.ca.gov/](http://www.leginfo.ca.gov/) (click on California Law, then Education Code and search)

[www.calregs.com/](http://www.calregs.com/)

## ***Americans With Disabilities Act***

42 United States Code Chapter 126  
28 Code of Federal Regulations, Part 35

This wide-ranging legislation passed in 1990 intending to make society more accessible to people with disabilities. It is divided into five titles: Title I (Employment), Title II (Public Services), Title III (Accommodations), Title IV (Telecommunications), and Title V (Miscellaneous). The Departments of Justice (DOJ) and Transportation (DOT) are responsible for issuing and enforcing regulations to implement Titles II and III of the ADA. The Department of Justice is responsible for Title II, which applies to activities of public entities such as school systems (28 C.F.R. Part 35), however, the U.S. Department of Education is designated by the DOJ to resolve complaints alleging noncompliance with this part against public elementary and secondary education systems and institutions.

### **Acoustics**

Achieving appropriate classroom acoustics is particularly important considering the emphasis of the ADA on removing barriers and improving accessibility of educational facilities. Under Title III all new construction and modifications must be accessible to individuals with disabilities. For existing facilities, barriers to services must be removed if readily achievable (poor acoustics is an architectural barrier to many people with a variety of communication disabilities). The Architectural and Transportation Barriers Compliance Board (Access Board) is an independent Federal agency that is responsible for developing/updating the ADA Accessibility Guidelines (ADAAG) to include acoustic accessibility. It is anticipated that a standard will be adopted in 2002. Acoustic performance criteria for maximum background noise levels in unoccupied learning spaces are expected to be 35db. A-weighted and maximum reverberation time 0.6 seconds.

### **Auxiliary Aids and Services**

The Department of Justice oversees the portions of Title II of the ADA implementing regulations that specifically addresses the obligation of a school board or other public entity to remove communication barriers for deaf individuals. This includes furnishing, at no cost, auxiliary aids and services where necessary to afford an individual with a disability an equal opportunity to participate in a service or program conducted by a public entity. This can include interpreters, notetakers, transcription services, assistive listening devices and other methods of making aurally delivered materials available to persons with hearing impairments.

### **ADA related websites:**

[www.usdoj.gov/crt/ada/adahom1.htm](http://www.usdoj.gov/crt/ada/adahom1.htm)  
(US Dept. of Justice, ADA Home Page)

[www.ed.gov/ocr/regs/28cfr35.html](http://www.ed.gov/ocr/regs/28cfr35.html)  
(28 C.F.R. Part 35)

[www.usdoj.gov/crt/ada/qandaeng.htm](http://www.usdoj.gov/crt/ada/qandaeng.htm)  
(ADA Questions & Answers)

[www.access-board.gov/](http://www.access-board.gov/)  
(Access Board)

[www.access-board.gov/adaag/html/adaag.ht](http://www.access-board.gov/adaag/html/adaag.ht)  
(ADA Accessibility Guidelines)



## ***Section 504 of the Rehabilitation Act of 1973***

29 United State Code Sec. 794  
34 Code of Federal Regulations Sections 104 and following

Section 504 is another important piece of legislation, especially if a child does not have an Individualized Education Plan. Subpart D applies to preschool, elementary and secondary education and guarantees that students with disabilities may not be discriminated against because of their disability. This is a federal anti-discrimination law designed to reasonably accommodate a student's condition so that his/her needs are met as adequately as the needs of students without disabilities. Section 504 defines "handicapped person" as any person who has a physical or mental impairment which substantially limits one or more major life activities, who has a record of such an impairment or who is regarded as having such an impairment. "Major life activities" include functions such as hearing. The U.S. Department of Education Office, Office for Civil Rights is responsible for regulatory oversight.

In terms of the child with hearing loss, this law can be interpreted to mean that related aids and services, such as FM equipment and educational audiology related services, be provided to allow the child to listen as adequately in the classroom as his/her nonhandicapped peers. Section 504 also requires programs which receive federal financial assistance to provide interpreters or other auxiliary aids to individuals with disabilities when necessary to give them equal access to the program. Acoustic modifications to all learning environments (the classroom, auditorium, therapy rooms, etc.) could also be covered under Section 504. In other words, the listening needs caused by the hearing impairment need to be accommodated within the classroom.

### **540 Related Websites:**

[www.ed.gov/ocr/regs/34cfr104.html](http://www.ed.gov/ocr/regs/34cfr104.html)

[www.dol.gov/dol/oasam/public/regs/statues/sec504.htm](http://www.dol.gov/dol/oasam/public/regs/statues/sec504.htm)

[www.os.dhhs.gov/ocr/504.html](http://www.os.dhhs.gov/ocr/504.html)

[home.webmonster.net/sped.oh/article3.htm](http://home.webmonster.net/sped.oh/article3.htm)

## ***Family Educational Rights and Privacy Act (FERPA)***

20 United States Code Section 1232 (g) - (i)  
34 Code of Federal Regulation, Part 99

FERPA provides parents with the right to inspect and review any and all education records directly related to their children. Education records are defined as “those records, files, documents, and other materials which contain information directly related to a student; and are maintained by an educational agency or institution or by a person acting for such agency or institution.” This law also defines when information can be released from a child’s educational records. It is sometimes referred to as the “Buckley Amendment.”

### **FERPA Related Websites:**

[www.ed.gov/offices/OM/fpco/ferpa1.html](http://www.ed.gov/offices/OM/fpco/ferpa1.html)

[www.tourettesyndrome.net/documentLibrary/ferpareg.htm](http://www.tourettesyndrome.net/documentLibrary/ferpareg.htm)

## ***Programs for Deaf and Hard of Hearing Students***

Guidelines for Quality Standards  
California Department of Education, 2000

This document contains recommended guidelines for parents, teachers, administrators, governing boards, support personnel, other inter-agency personnel and interested representatives to use in identifying, assessing, planning, and providing appropriate educational services to all children who are deaf or hard-of-hearing. It is also intended to assist in monitoring programs for these students. The guidelines reference legal mandates where available. Chapters include: Identification and Referral, Assessment of Unique Needs, Organization for Student Learning, Curriculum and Instruction, and Support for Student Learning. Call 1-800-995-4099 for ordering information (nominal cost) or refer to the order sheet in Appendix C. This 200 page document can also be downloaded from: [www.cde.ca.gov/deafhh/](http://www.cde.ca.gov/deafhh/) (Click on laws and regulations)

### ***Other Legal Websites:***

Comparison of Section 504 and IDEA:  
[www.ldonline.org/ld\\_indepth/legal\\_legislative/edlaw504.html](http://www.ldonline.org/ld_indepth/legal_legislative/edlaw504.html)

[www.edlaw.net/frames.html](http://www.edlaw.net/frames.html)  
(Type 504 Statute in the search function)

Comparison of IDEA, ADA and Section 504:  
[at-advocacy.phillynews.com/misc/cohen2.html](http://at-advocacy.phillynews.com/misc/cohen2.html)

Regulations Enforced by the Office For Civil Rights  
(Includes Section 504)  
[www.ed.gov/ocr/regs/](http://www.ed.gov/ocr/regs/)

United States Code:  
[www.access.gpo.gov/congress/cong013.html](http://www.access.gpo.gov/congress/cong013.html)

Code of Federal Regulations:  
[www.access.gpo.gov/nara/cfr/index.html](http://www.access.gpo.gov/nara/cfr/index.html)

# GLOSSARY OF TERMS

**ACOUSTICS:** Pertaining to sound, the sense of hearing, or the science of sound. As used in this guide the term refers to the qualities of an auditorium, classroom, or other space that determine how well sounds can be heard. (American Heritage Dictionary)

**ACOUSTIC ROOM TREATMENT:** The use of sound-absorbing materials (such as carpets and acoustical tile) to reduce room noise and increase the signal-to-noise ratio, thus enhancing the usefulness of hearing aids and other listening devices.

**ACQUIRED HEARING LOSS:** Hearing loss which is not present at birth. Sometimes referred to as adventitious loss.

**ADA:** Americans with Disabilities Act. Federal legislation which impacts accessibility for disabled persons in education, the workplace, and public places.

**AIR CONDUCTION:** Sound from the air is delivered through the ear canal, the eardrum, and middle ear to the inner ear.

**AMBIENT NOISE:** Background noise which competes with the main speech signal.

**AMERICAN SIGN LANGUAGE (ASL):** A visual/gestural language used by deaf people in the United States and Canada, with semantic, syntactic, morphological, and phonological rules which are distinct from English.

**AMPLIFICATION:** The use of hearing aids and other electronic devices to increase the loudness of sound so that it may be more easily received and understood.

**ASSISTIVE LISTENING DEVICES:** Any and all types of electronic hearing aids including personal aids, FM systems, infrared, special inputs for telephone or television, and amplified alarms and signals.

**AUDIOGRAM:** A graph on which a person's ability to hear different pitches (frequencies) at different volumes (intensities) of sound is recorded.

**AUDIOLOGICAL ASSESSMENT:** A hearing test, comprised of identifying pure-tone thresholds, impedance testing, speech recognition, and speech discrimination measurements, which shows the type and degree of hearing loss.

**AUDIOLOGIST:** A person who holds a degree in audiology and is a specialist in testing hearing and providing rehabilitation services to persons with hearing loss. The American Speech-Language-Hearing Association is the only organization which certifies audiologists.

**AUDITORY/ORAL EDUCATION:** The habilitation of listening skills, spoken language, and speechreading skills through early and consistent training, with emphasis on the use of high-quality amplification.

**AUDITORY TRAINER:** See FM system.

**AUDITORY TRAINING:** The process of training a person's residual hearing in the recognition, identification, and interpretation of sound.

**AUDITORY/VERBAL EDUCATION:** The development of speech and language through the maximized use of residual hearing.

**AURAL HABILITATION:** Training designed to help a person with hearing loss to make productive use of residual hearing. Sometimes includes training in speechreading.

**BICULTURAL:** Membership in two cultures, such as deaf culture and hearing culture.

**BILATERAL:** Affecting two sides, such as a mild to profound loss of hearing in both ears.

**BILINGUAL:** Being fluent in two languages. For some deaf children this will include the use of ASL and English.

**BILINGUAL-BICULTURAL:** Being fluent in two languages (ASL and English) and having membership in both deaf and hearing cultures.

**BINAURAL HEARING AIDS:** Hearing aids worn in both ears.

**BONE CONDUCTION:** Sound received through the bones of the skull.

**COCHLEAR IMPLANT:** An electronic device surgically implanted to stimulate nerve endings in the inner ear (cochlea) in order to receive and process sound and speech.

**COMPUTER ASSISTED NOTETAKING (CAN) or COMMUNICATION ACCESS REALTIME TECHNOLOGY (CART):** See Educational Transcription Systems.

**CONDUCTIVE HEARING LOSS:** Impairment of hearing due to the failure of sound waves to reach the inner ear through the normal air conduction channels of the outer and middle ear. In children, conductive loss is typically medically correctable.

**CONGENITAL HEARING LOSS:** Hearing loss present at birth or associated with the birth process, or which develops in the first few days of life.

**CUED SPEECH:** A visual representation of the phonemes of spoken language, which uses eight handshapes in four different locations in combination with the natural mouth movements of speech to make all the sounds of spoken language look different.

**DEAF:** A hearing impairment which is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, which adversely affects educational performance (34 CFR 300.5). A prelingual, primarily sensorineural, bilateral hearing loss of 91dB or more (Quigley and Kretschmer 1982). A person's communication development and current primary communication mode are visually based (either sign language or speechreading). Residual hearing (if any) is a secondary and supplemental sensory avenue; vision is the major channel for receiving information (Ross 1990).

**DEAF-BLIND:** Educationally significant loss of vision and hearing.

**DEAF COMMUNITY:** The community of people whose primary mode of communication is signed language and who share a common identity, a common culture, and a common way of interacting with each other and the hearing community.

**DECIBEL (dB):** The unit of measurement for the loudness of sound. The higher the dB, the louder the sound.

**DECODER:** An electronic device or computer chip that can display closed captions enclosed in television programs, cable television programs, and videocassettes. Also called a telecaption adapter.

**EAR MOLD:** A custom made plastic or vinyl piece which fits into the outer ear to interface with a hearing aid.

**EDUCATIONAL INTERPRETER:** A person who is able to perform conventional interpreting together with special skills for working in the education setting (National Task Force on Education Interpreting 1989).

**EDUCATIONAL TRANSCRIPTION SYSTEMS:** A system which translates speech into print in “real time” through the use of computer equipment and a notetaker/typist. There are a number of programs which translate speech either verbatim or in summary format.

**ENGLISH SIGN SYSTEM:** Sign systems designed for educational purposes, which use manual signs in English word order; sometimes with added affixes which are not present in American Sign Language. Some of the signs are borrowed from American Sign Language and others have been invented to represent elements of English visually. Signing Exact English and Seeing Essential English are two examples of invented systems.

**FINGER SPELLING:** Representation of the alphabet by finger positions in order to spell out words or longer strings of language.

**FM SYSTEM:** An assistive listening device that transmits the speaker’s voice to an electronic receiver in which the sound is amplified and transmitted to the student’s ears via small earphones or the student’s personal hearing aids. The device reduces the problem of background noise interference and the problem of distance from the speaker.

**FREQUENCY:** The number of vibrations per second of a sound. Frequency, expressed in Hertz (Hz), determines the pitch of sound.

**HARD-of-HEARING:** A hearing impairment, whether permanent or fluctuating, which adversely affects a child’s educational performance, but which is not included under the definition of “deaf” in this section (34 CFR 300.5). The person’s linguistic development is primarily auditorily based, with vision serving as a secondary and supplemental channel (Ross 1990).

**HEARING AID:** An electronic device that conducts and amplifies sound to the ear.

**HEARING-IMPAIRED:** Refers to persons with any degree of hearing loss, from mild to profound, including deaf and hard-of-hearing persons. This term is losing acceptance by deaf persons because of the implication of the term “impaired.”

**HL:** Hearing level.

**HEARING LOSS:** Hearing loss was originally defined in medical terms before the development of modern audiology. Today, professionals tend to use the consistent, research-based terminology of audiology as well as the less-defined educational and cultural descriptions:

**Audiometric:** The following numerical values are based on the average of the hearing loss at three frequencies (500 Hz, 1,000 Hz, and 2,000 Hz) in the better ear without amplification. The numerical values for the seven categories vary from author to author.

Normal hearing (-10 dB to 15 dB)

Slight loss (16 dB to 25 dB)

Mild loss (26 dB to 30 dB)

Moderate loss (31 dB to 50 dB)

Moderate/severe loss (51 dB to 70 dB)

Severe loss (71 dB to 90 dB)

Profound loss (91 dB or more)

**Educational:** Any degree of hearing loss may limit full communicative access to educational opportunities in most schools without appropriate support.

**HEARING SCREENING:** Audiometric testing of the ability to hear selected frequencies at intensities above the threshold of normal hearing. The purpose is to identify individuals with hearing loss, with minimal time expenditure, and to refer them for further testing.

**HERTZ:** This is the generally used term for measuring pitch, expressing the vibrations or cycles per second. Most speech sounds fall within the so-called “speech range” of about 300 to 3000 Hz.

**IDEA:** Individuals with Disabilities in Education Act - PL94-142 revised. A federal law requiring school districts to provide each student who has a disability with a free appropriate public education (FAPE).

**INDIVIDUALIZED EDUCATION PROGRAM (IEP):** A team-developed and written program which identifies therapeutic and educational goals and objectives needed to appropriately address the educational needs of a student with a disability. An IEP for a hard-of-hearing child should take into consideration such factors as:

1. Communication needs and the child’s and family’s preferred mode of communication
2. Linguistic needs
3. Severity of hearing loss and potential for using residual hearing
4. Academic level
5. Social, emotional needs, including opportunities for peer interactions and communication.

**INDIVIDUAL FAMILY SERVICES PLAN (IFSP):** A team-developed, written plan for infants and toddlers which address:

1. Assessment of strengths and needs and identification of services to meet such needs
2. Assessment of family resources and priorities and the identification of supports and services necessary to enhance the capacity of the family to meet the developmental needs of the infant or toddler with a disability
3. A written, individualized family service plan developed by a multi-disciplinary team, including the parent or guardian (IDEA)

**INFLECTION:** A change in the pitch of the speaking voice to add meaning or emphasis to a word or phrase.

**INTENSITY:** The loudness of a sound, measured in decibels (dB).

**INTERPRETER OR TRANSLITERATOR FOR THE DEAF:** A person who facilitates communication between hearing and deaf or hard-of-hearing persons through interpretation into a signed language or American Sign Language, or transliteration of a language into visual/phonemic code by an oral interpreter or Cued Speech Interpreter. The educational interpreter specializes in classroom interpreting.

**INTONATION:** The aspect of speech made up of changes in pitch and stress in the voice. The voice may go higher or lower during speech to emphasize certain words or parts of words than others.

**INVENTED ENGLISH SIGN SYSTEMS:** Sign systems developed for educational purposes, which use manual signs in English word order with added prefixes and suffixes not present in traditional sign language. Some of the signs are borrowed from American Sign Language and others have been invented to represent elements of English visually. Signed English and Signing Exact English (SEE) are two examples of invented systems.

**ITINERANT:** deaf and hard-of-hearing teacher who travels to the attending school or home of the D/HH student who is not enrolled in a special day class. Provides a wide-range of services from consultation to direct instruction.

**LEAST RESTRICTED ENVIRONMENT:** A basic principle of IDEA which requires public agencies to establish procedures to ensure that to the maximum extent appropriate, children with disabilities, including children in public or private institution or other care facilities, are educated with children who are not disabled and that special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only when the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.

**MAINSTREAM:** The concept that students with disabilities should be integrated with their non-disabled peers to the maximum extent possible, when appropriate to the needs of the student with a disability. Mainstreaming is one point on the continuum of educational options.

**MANUALLY CODED ENGLISH:** A term applied to a variety of systems that use signs, finger spelling, or gestures separately or in combination to represent English manually.

**MIXED HEARING LOSS:** A hearing loss with combined sensorineural and conductive elements.

**MONAURAL.** Involving only one ear (e.g. monaural amplification is the use of one hearing aid).

**MORPHEME:** A linguistic unit of relatively stable meaning that cannot be divided into smaller meaningful parts (American Heritage Dictionary 1976).

**NATIVE/NATURAL LANGUAGE:** Language acquired primarily through the least impaired sensory channel.

**ORAL EDUCATION:** A philosophy of teaching deaf and hard-of-hearing individuals to make efficient use of residual hearing through early use of amplification, to develop speech, and to use speechreading skills.

**ORAL INTERPRETER:** Communicates the words of a speaker or group of speakers to an individual who is deaf by inaudibly mouthing what is said so that it can be read on the lips.

**OTITIS MEDIA:** Infection of the middle ear. Children with hearing loss have a higher incidence of otitis media than the rest of the population. Children with recurrent attacks may have fluctuating hearing loss and be somewhat at risk for acquiring permanent hearing loss.

**OTOLOGIST:** A physician who specializes in medical problems of the ear.

**PARENT-INFANT PROGRAM:** A program of parent education and infant intervention which stresses early exposure to language and attention to developmental processes which enhance the learning of language. Some programs include early exposure to amplification and the use of hearing aids to stimulate the auditory channel.

**PIDGIN SIGN ENGLISH (PSE):** A variety of sign language which combines some features of American Sign Language and English. It is sometimes called Contact Signing.

**POSTLINGUAL DEAFNESS:** Hearing loss acquired after first learning a language.

**PRAGMATICS:** The appropriateness of language use to the situation, the speaker, and the audience in regard to logic and validity.

**PRELINGUAL DEAFNESS:** Refers to hearing loss which is present at birth or shortly thereafter and occurs prior to the acquisition of language.

**REAL-TIME CAPTIONING:** On-line captioning for television screens and monitors displaying the printed speech of live speakers.

**RESIDUAL HEARING:** The amount of usable hearing which a deaf or hard-of-hearing person has.

**RESOURCE SPECIALIST (RSP):** A teacher who works with small groups of children at a school site who have learning deficits.

**REVERBERATION:** Prolongation of a sound after the sound-source has ceased. The amount of reverberant energy in a room depends on the absorption coefficient of the surface of the walls, floor and ceiling.

**ROCHESTER METHOD:** A mode of communication in which spoken English is supplemented with simultaneous finger spelling of each spoken word.

**SECTION 504:** The Vocational Rehabilitation Act of 1973 guarantees that students with disabilities cannot be discriminated against because of their disability.

**SEE-1:** Seeing Essential English was designed to use ASL signs plus signs invented to represent both root words and the inflectional system of English.

**SEMANTICS:** The use in language of meaningful referents in both word and sentence structures.

**SENSORINEURAL HEARING LOSS:** A permanent hearing loss caused by failure or damage of auditory fibers in the inner ear (cochlea) and/or damage to the neural system.

**SIGNAL-TO-NOISE-RATIO:** The difference in the intensities of the speech signal (such as the teacher's voice) and the ambient (background) noise.

**SIGNED ENGLISH:** The Signed English system was devised as a semantic representation of English for children between that ages of 1 and 6 years. ASL signs are used in English word order, with 14 sign markers being added to represent a portion of the inflectional system of English. See Invented English Sign Systems.

**SIGNING EXACT ENGLISH:** See Invented English Sign Systems.

**SPECIAL DAY CLASS:** A class designed to meet the needs of children requiring more intensive educational services, typically for more than 50% of the day.

**SPEECHREADING.** The interpretation of lip and mouth movements, facial expressions, gestures, prosodic and melodic aspects of speech, structural characteristics of language, and topical and contextual clues. Sometimes referred to as lip-reading.

**SPEECH PERCEPTION.** The ability to recognize speech stimuli presented at suprathreshold levels (levels loud enough to be heard).

**SPEECH INTELLIGIBILITY:** The ability to be understood when using speech.

**SPEECH AND LANGUAGE IMPAIRMENT:** One or more of the following communication impairments which adversely affects educational performance: **articulation impairment**, including omissions, substitutions or distortions of sound, persisting beyond the age at which maturation alone might be expected to correct the deviation; **voice impairment**, including abnormal rate of speaking, speech interruptions, and repetition of sounds, words, phrases, or sentences, which interferes with effective communication; one or more **language impairments** (phonological, morphological syntactic, semantic, or pragmatic use of aural/oral language as evidenced by both a spontaneous language sample demonstrating inadequate language functioning, and test results, on not less than two standardized assessment instruments or two subtests designed to determine language functioning, which indicate Inappropriate language functioning for the child's age).

**SPEECH LANGUAGE SPECIALIST:** A professional who works with individuals who have specific needs in the area of speech and language. Sometimes referred to as a speech and language pathologist.

**SYNTAX:** Defines the word classes of language (nouns, verbs, etc.) and the rules for their combination (which words can be combined, and in what order to convey meaning).

**TELECOMMUNICATION DEVICES FOR DEAF PEOPLE (TDDs):** Originally and often still called TTYs. These electronic devices allow deaf and hard-of-hearing people to communicate by telephone. Also referred to as TTs, text telephones; this term appears in ADA legislation and regulations.



**TOTAL COMMUNICATION:** A philosophy of communication that employs a combination of components of oral and manual teaching modes using sign, lipreading, finger spelling, use of residual hearing, speech, and sometimes Cued Speech.

**TRANSLITERATING:** The process of facilitating communication between persons who are hearing and persons who are deaf or hard-of-hearing. In this form of interpretation, the language base remains the same; e.g. the transliteration of spoken English to a signed English system or to a form which can be read on the lips.

**TRANSCRIPTIONIST:** A person trained in computer assisted notetaking.

**UNILATERAL HEARING LOSS:** A mild to profound loss of hearing in one ear. Unilateral loss is now thought to adversely affect the educational process in a significant percentage of students who have it.

*Definitions are from the Oral Deaf Education Website (Oberkotter Foundation) and California Department of Education's Programs for Deaf and Hard of Hearing Students, Guidelines for Quality Standards, 2000.*



# RESOURCES

## ORGANIZATIONS

### ***Alexander Graham Bell Association for the Deaf and Hard-of-Hearing***

3417 Volta Place, N.W.  
Washington, DC 20007  
(202) 337-5220 (voice/TTY)  
www.agbell.org

The Alexander Graham Bell Association for the Deaf and Hard-of-Hearing (AG Bell) is an international membership organization comprised of parents of children who are deaf and hard of hearing, adults with hearing loss, and professionals who serve children with hearing loss. AG Bell is the largest organization in the US focused on the needs of hearing impaired children who use auditory approaches to communicate. AG Bell offers a wide variety of member-oriented programs, publications, and financial aid programs. AG Bell also sponsors a large convention every other year.

### ***AG Bell, California Chapter***

4340 Stevens Creek Blvd, Suite 107,  
San Jose, CA 95129  
E-mail: califagbell@earthlink.net  
home.earthlink.net/~califagbell

The local chapter meets in LA and sponsors a yearly conference and picnic. They also have a newsletter titled California Waves. A membership application can be printed out from their website.

### ***American Society for Deaf Children***

P.O. Box 1510  
Olney, MD 20830  
(800-942-ASDC (voice/TTY)  
www.deafchildren.org

A nonprofit parent-helping-parent organization promoting a positive attitude toward sign language and Deaf culture. Provides information, encouragement, and support to families with Deaf and Hard-of-Hearing children.

### ***American Speech-Language-Hearing Association***

10801 Rockville Pike  
Rockville, Maryland 20852  
(310) 897-0457 (voice)  
www.asha.org

The mission of the American Speech-Language-Hearing Association is to promote the interests of, and provide the highest quality services for, professionals in audiology, speech-language pathology, and speech and hearing science, and to advocate for people with communication disabilities.

## ***Auditory-Verbal International, Inc.***

2121 Eisenhower Ave., Suite 401  
Alexandria, VA 22314  
(703) 739-1049 (voice)  
(703) 739-0874 (TTY)  
[www.auditory-verbal.org](http://www.auditory-verbal.org)

Dedicated to helping children who have hearing losses learn to listen and speak. Promotes the auditory-verbal therapy approach, which is based on the belief that the overwhelming majority of these children can hear and talk by using their residual hearing, hearing aids, and cochlear implants.

## ***Beginnings for Parents of Children who are Deaf or Hard-of-Hearing, Inc.***

3900 Barrett Dr.  
Raleigh, NC 27609  
800-541-HEAR  
[www.beginningsvcs.com](http://www.beginningsvcs.com)

A non-profit agency providing an objective approach to meeting the diverse needs of families with children who are Deaf or Hard-of-Hearing and the professionals who serve them.

## ***Deaf Community Services, San Diego***

7851 Mission Center Ct., Suite 310  
San Diego, CA 92108  
(619) 682-5001(voice)  
(619) 682-5000 (TTY)  
[www.dcsosd.org](http://www.dcsosd.org)

A resource center providing social services to empower and encourage independence for any Deaf or Hard-of-Hearing individual, as well as educate their families and employers, and promote unity between the Hearing, Deaf and Hard-of-Hearing communities.

## ***IMPACT (Independently Merging Parent Association of California)***

14181 Chagall Ave  
Irvine, CA 92606  
John Allmann, President (949) 653-5770  
(voice/TDD)  
[www.deafkids.org](http://www.deafkids.org)

IMPACT is a California statewide all-volunteer, non-profit organization of parents, teachers and professionals serving Deaf and Hard-of-Hearing children. IMPACT publishes a newsletter three times per year (Fall, Winter, Spring), and holds a Cal-Ed/IMPACT conference annually.

## ***John Tracy Clinic***

806 West Adams Boulevard  
Los Angeles, CA 90007  
800-522-4582 (voice)  
(213) 747-2942 (TTY)  
[www.johntracyclinic.org](http://www.johntracyclinic.org)

John Tracy Clinic provides, worldwide and without charge, parent-centered services to young children with a hearing loss offering families hope, guidance and encouragement to help the children learn to communicate. The Clinic also offers services to aid the professional community in understanding how to work with deaf children. Out-of-town parents may be particularly interested in the correspondence course/parent distance education and/or the pre-school family summer program (contact Maura Martindale).

## ***League for the Hard of Hearing***

71 West 23rd Street  
New York, NY 10010  
(917) 305-7700 (voice)  
(917) 305-7999 (TTY)  
www.lhh.org

The League offers people who are Hard-of-Hearing or Deaf access to diagnostic, rehabilitation, counseling, and education programs. Their services range from audiological testing to advocacy for children and adults who are Hard-of-Hearing or deaf. The League also provides support services for mainstream education.

## ***National Association of the Deaf***

814 Thayer Ave.  
Silver Spring, MD 20910  
(301) 587-1788 (voice)  
(301) 587-1789 (TTY)  
www.nad.org

The oldest and one of the largest consumer organizations advocating equal access by people who are Deaf or Hard-of-Hearing in the areas of employment, education, telecommunications, and rehabilitation. Also maintains the NAD Publications Department, Deaf awareness programs, a legal defense fund, a public information center, youth programs, and certification programs for interpreters and for sign language instructors.

## ***National Cued Speech Association (NCSA)***

23970 Hermitage Road  
Shaker Heights, OH 44122  
800-459-3529 (voice/TTY)  
www.cuedspeech.org

The NCSA provides awareness and education, through instructional programs, publications, exhibits and conferences, regarding the use of cued speech.

## ***National Information Center for Children and Youth with Disabilities***

P.O. Box 1492  
Washington, DC 20013  
800-695-0285 (voice)  
www.nichcy.org

NICHCY is the national information and referral center that provides information on disabilities and disability-related issues for families, educators, and other professionals. They have a number of publications worth checking out.

## ***Project NEEDS***

www.abilitiesnetworks.org/Pages/dhabil.html

The San Diego Deaf and Hard-of-Hearing (D/HH) ABILITIES Web Site is a state-of-the-art technical resource specializing in local community issues, needs, and current events, with links to state and national Deaf and Hard-of-Hearing resources.

## ***Self Help For Hard of Hearing People (SHHH)***

7910 Woodmont Ave, Suite 1200  
Bethesda, MD 20814  
(301) 657-2248 (voice)  
www.shhh.org

SHHH's mission is to "open the world of communication to people with hearing loss by providing information, education, support and advocacy."

## **EDUCATION RESOURCES AND INSTITUTIONS**

### **California Department of Education: Deaf and Hard-of-Hearing Unit**

State Special Schools  
515 L St., Suite 270  
Sacramento, CA 95814  
(916) 327-3850 (voice)  
(916) 445-4556 (TTY)  
[www.cde.ca.gov/deafhh/](http://www.cde.ca.gov/deafhh/)  
Nancy Grosz Sager (916) 327-3868  
(voice/TTY) [nsager@cde.ca.gov](mailto:nsager@cde.ca.gov)

Provides guidance and technical assistance to programs and service providers for Deaf and Hard-of-Hearing students in California.

### **California State University, Northridge**

8111 Nordhoff Street  
Northridge, California 91330  
(818) 677-1200  
[www.csun.edu/](http://www.csun.edu/)  
Department of Deaf Studies  
[www.csun.edu/~sch\\_educ/dfst/dfst.html](http://www.csun.edu/~sch_educ/dfst/dfst.html)  
Offers Bachelor of Arts degree in Deaf Studies.

### **Gallaudet University**

800 Florida Avenue, NE  
Washington, DC 20002  
(202) 651-5000 (voice/TTY)  
[www2.gallaudet.edu/](http://www2.gallaudet.edu/)

The world's only four-year liberal arts college for students who are Deaf or Hard-of-Hearing.

### **National Technical Institute for the Deaf (NTID)**

Rochester Institute of Technology  
One Lomb Memorial Drive  
P.O. Box 9887  
Rochester, NY 14623  
(716) 475-600 (voice/TTY)  
[www.rit.edu](http://www.rit.edu)

Provides technological postsecondary education for Deaf and Hard-of-Hearing students. Disseminates informational materials and instructional videotapes on issues related to Deaf people and Deaf culture.

### **Oral Deaf Education**

<http://www.oralDeafed.org>

This website includes information for parents who are interested in the oral approach for their children who are Deaf and Hard-of-Hearing. Includes links to oral Deaf education schools.

## ***US Department of Education: Office of Special Education Program (OSEP)***

330 C Street, S.W. Mary E. Switzer  
Building Washington, DC 20202  
(202) 205-5507 (voice) Office of the Director  
[www.ed.gov/offices/OSERS/OSEP](http://www.ed.gov/offices/OSERS/OSEP)

The Office of Special Education Programs (OSEP) is a component of the Office of Special Education and Rehabilitative Services (OSERS), which is one of the principal components of the U.S. Department of Education (ED). OSEP's mission and organization focus on the free appropriate public education of children and youth with disabilities from birth through age 21.

## **MEDICAL & RESEARCH**

### ***Better Hearing Institute***

5021-B Backlick Rd.  
Annandale, VA 22003  
(703) 642-0580 (voice/TTY)  
[www.betterhearing.org](http://www.betterhearing.org)

Nonprofit educational organization that implements national public information programs on hearing loss and available medical, surgical, hearing aid, and rehabilitation assistance for millions with uncorrected hearing problems.

### ***Girls and Boys Town National Research Hospital***

555 North 30th St.  
Omaha, NE 68131  
(402) 498-6511 (voice)  
(402) 498-6543 (TTY)  
[www.girlsandboystown.org](http://www.girlsandboystown.org)

A hospital whose mission is to help and heal America's children and operate the nation's leading clinical and research center for childhood hearing loss and related disorders.

### ***National Institute on Deafness and Other Communication Disorders (NIDCD)***

National Institutes of Health  
31 Center Drive, MSC 2320  
Bethesda, MD USA 20892-2320  
(301) 496-7243 (voice)  
(301) 402-0252 (TTY)  
[www.nidcd.nih.gov](http://www.nidcd.nih.gov)

The National Institute on Deafness and Other Communication Disorders (NIDCD) is one of the Institutes that comprise the National Institutes of Health (NIH). NIDCD is mandated to conduct and support biomedical and behavioral research and research training in the normal and disordered processes of hearing, balance, smell, taste, voice, speech, and language. There is a special website designated for parents of hearing impaired children.

### ***House Ear Institute (HEI)***

2100 West Third Street, Fifth Floor  
Los Angeles, CA 90057  
(213) 483-4431 (voice)  
(213) 484-2642 (TTY)  
[www.hei.org](http://www.hei.org)

Through research and education, the HEI aims to improve the quality of life of those with an ear disease or hearing or balance disorder. The Children's Auditory Research and Evaluation (CARE) Center offers a full range of pediatric hearing tests, otologic and audiologic evaluation and treatment, hearing aid dispensing, and cochlear implant services.



## LEGAL

### ***California Center for the Law and the Deaf (CACLAD)***

14895 E. 14th St., Suite 220  
San Leandro, CA 94578  
(510) 483-0941 (voice/TTY)  
[www.deaflaw.org](http://www.deaflaw.org)

The mission of the California Center for Law and the Deaf is to protect and advance the legal rights of Deaf and Hard-of-Hearing people to enable them to live independent, productive lives, with full access to the rights, privileges, entitlements, services, educational and employment opportunities available to others.

### ***The Council of Parent Attorneys and Advocates, Inc. (COPAA)***

P.O. Box 81-7327  
Hollywood, FL 33081-0327  
(954) 966-4489 (voice)  
[www.copaa.net](http://www.copaa.net)

An independent, nonprofit, tax-exempt organization of attorneys, advocates and parents established to improve the quality and quantity of legal assistance for parents of children with disabilities. A listserv is available where parents, advocates and attorneys post legal information and requests for help.

### ***The EDLAW Center***

[www.edlaw.net](http://www.edlaw.net)

Jim Rosenfeld, J.D. On-line counseling services and resources.

### ***Protection and Advocacy, Inc.***

3580 Wilshire Boulevard, Suite 902  
Los Angeles, CA 90010  
800-776-5746 (voice)  
[www.pai-ca.org](http://www.pai-ca.org)

PAI works in partnership with persons with disabilities to protect, advocate for, and advance their human, legal, and service rights. There is a newsletter and a number of great publications (including IDEA documents) available through this site.

### ***SpecialEdLaw.net Website***

[specialedlaw.net/index.mv?ads=main](http://specialedlaw.net/index.mv?ads=main)

This site is a multidisciplinary internet resource for parents of special needs children, as well as attorneys, special education administrators, teachers, psychologists, and others with a need for information relating to Special Education law. Includes information on IDEA, ADA, Section 504 and FERPA.

### ***Wrightslaw***

[www.wrightslaw.com](http://www.wrightslaw.com)

Pete Wright, J.D. This site contains hundreds of articles, cases, newsletters, and other information about special education law and advocacy. Parents, advocates, educators, and attorneys use Wrightslaw for accurate, up-to-date information about advocacy for children with disabilities. On-line newsletter is available.

## **CATALOGS & PUBLICATIONS**

### **AG Bell**

(See contact information under Organizations)

AG Bell has a number of publications that parents can use as resources:

- *Publications Catalog* (lists books available for advocacy, audiological management, cochlear implants, children's books, communication approaches, education, language and speech development, etc.)
- *Volta Voices Magazine* (recommend subscribing to this)
- *Volta Review* (a more technical, research-oriented publication)

### **Dawn Sign Press**

6130 Nancy Ridge Dr.  
San Diego, CA 92121  
(619) 625-0600 (voice/TTY)  
[www.dawnsign.com](http://www.dawnsign.com)

Offers books, videos and workshops for Deaf Culture (includes children, educational fingerspelling, instructional and Deaf Studies).

### **Harris Communications**

15159 Technology Drive,  
Eden Prairie MN 55344  
800-825-6758 (voice)  
800-825-9187 (TTY)  
[www.harriscomm.com/](http://www.harriscomm.com/)

Harris Communications, Inc. is a mail order catalog company which features products for Deaf and Hard-of-Hearing individuals. Products include TTYs, books, videos, telephone, hearing aid accessories, assistive listening devices, warning detectors and novelties. Call for free brochure

### **HiP MAGAZINE for Deaf & Hard-of-Hearing kids and their pals**

P.O. Box 519  
Berkeley, CA 94701  
(510) 848-9650 (voice)  
[www.hipmag.org/](http://www.hipmag.org/)

This magazine, published 5 times per year, is an award-winning non-profit publication for today's Deaf and Hard-of-Hearing kids (grades K-4, 5-8, 9-12).

### **SHHH (See contact information under Organizations)**

SHHH publishes a journal titled *Hearing Loss*. It is a great publication that features current information regarding legislation, medical information, and developments in hearing technology.

### **Sign Media, Inc.**

4020 Blackburn Lane  
Burtonsville, MD 20866-1167  
800-475-4756  
[www.signmedia.com](http://www.signmedia.com)

This catalog features information on ASL, Deaf Culture, Education and Interpretation.

## ***Soundbytes***

11 East 44th Street, 2nd Floor  
New York, NY 10017  
800-667-1777 (voice/TTY)  
[www.soundbytes.com](http://www.soundbytes.com)

This “hearing enhancement resource catalog” provides communication devices, educational products, amplification devices, books & videos, hearing aid accessories and an assortment of home convenience devices.

## ***The Special Edge***

Resources in Special Education  
429 J Street  
Sacramento, CA 95814  
800-869-4337 (voice)  
E-mail: [rise@wested.org](mailto:rise@wested.org)

A free newsletter published bi-monthly through the California Department of Education.

## **HEARING AIDS & SUPPLIES**

### ***Dry & Store***

800-327-8547  
[www.eartech.com](http://www.eartech.com)

Dry and store is an “hearing aid conditioning system” which reduces moisture and sanitizes hearing aids. New models work with Cochlear implants.

### ***GN Resound Corporation***

220 Saginaw Dr.  
Seaport Centre  
Redwood City, California, 94063,  
(650) 780-7800 (voice)  
800-248-4327 Customer Service (voice)  
[www.gnresound.com](http://www.gnresound.com)

### ***Oticon, Inc.***

29 Schoolhouse Rd., P.O. Box 6724  
Somerset, NJ 08875  
800-526-3921 (voice)  
[www.oticonus.com/](http://www.oticonus.com/)

### ***Phonak***

4520 Weaver Parkway  
Warrenville, IL 60555  
800-777-7333  
[www.phonak-us.com](http://www.phonak-us.com)

### ***Siemens Hearing Instruments Inc.***

13043 East 166th Street  
Cerritos, CA 90701  
800-98-9787 (voice)  
[www.siemens-hearing.com](http://www.siemens-hearing.com)

### ***Widex Hearing Aid Company***

3553 24th Street  
Long Island City, NY 11106  
800-221-0188 (voice)  
[www.widexusa.com](http://www.widexusa.com)

## **COCHLEAR IMPLANTS**

### ***Advanced Bionics Corporation (Clarion Implant)***

12740 San Fernando Road  
Sylmar, CA 91342  
800-678-2575 (voice)  
800-678-3575 (TTY)  
[www.cochlearimplant.com](http://www.cochlearimplant.com)

### ***Cochlear Corporation (Nucleus Implant)***

61 Inverness Dr. East, Suite 200  
Englewood, CO 80112  
800-523-2798 (voice/TTY)  
[www.cochlear.com](http://www.cochlear.com)

### ***Cochlear Implant Association, Inc. (formerly Cochlear Implant Club, International)***

5335 Wisconsin Ave. NW, Suite 440  
Washington, D.C. 20015-2003  
(202)895-2781  
[www.cici.org](http://www.cici.org)

### ***Los Angeles Funshine CIC***

Diane Rott  
41 East Rowland #29,  
Covina, CA 91732  
(626) 331-7547

### ***Orange County CIC***

Jack Belt  
353 Park Shadow Court  
Baldwin Park, CA 91706  
626-337-2913  
JABELT@aol.com

### ***MED-EL USA Corporation (MED-EL Implant)***

2222 East NC Hwy 54,  
Suite B-180 Durham, North Carolina 27713  
(919) 572-2222 (voice)  
[www.medel.com](http://www.medel.com)

## **PERSONAL & SOUND FIELD SYSTEMS AND ASSISTIVE TECHNOLOGY**

### ***Communication Access Realtime Translation (CART)***

Educational Transcription System.  
<http://cart.ncraonline.org/>

### ***Dragon Naturally Speaking***

320 Nevada Street Newton, MA 02460, USA  
(617) 965-5200 (voice)  
[www.dragonsys.com](http://www.dragonsys.com)

A speech recognition software by L & H  
Dragon Systems, Inc.

A website specializing in assistive listening devices, including FM systems, can be found at: [www.earlink.com/](http://www.earlink.com/)

### ***iCommunicator***

6448 Parkland Drive Sarasota FL 34243  
888-463-0474 (voice)  
800-362-4584 (TTY)  
[www.teachthedeaf.com](http://www.teachthedeaf.com)

Speech recognition software by Interactive Solutions, which converts speech to text, speech to sign language, speech to computer-generated voice, or text to computer-generated voice.

### ***Phonak's MicroLink***

4520 Weaver Parkway  
Warrenville, IL 60555  
888-777-7316 FM division (voice)  
[www.phonak.com/microlink/start\\_e.htm](http://www.phonak.com/microlink/start_e.htm)

MicroLink is the new wireless personal FM system (a free 30 day trial is available).

### ***Phonic Ear's Personal Hearing Systems and Sound Field Systems***

Personal and Sound Field Systems  
(FM and Infrared)

3880 Cypress Drive,  
Petaluma, CA 94954  
800-227-0735 (voice)  
[www.phonicear.com](http://www.phonicear.com)

The popular Solaris System used by many school districts can be found at this site:

### ***Teach Logic***

Personal and Sound Field Systems  
(FM and Infrared)

FM system.  
22981 Triton Way, Suite C  
Laguna Hills, CA 92653  
800-588-0018 (voice)  
[www.teachlogic.com](http://www.teachlogic.com)

### ***TypeWell***

Educational Transcription System.  
(805) 682-2387 (voice/TTY)  
[www.typewell.com](http://www.typewell.com)

## **OTHER VALUABLE WEBSITES**

### ***Classroom Acoustics Home Page***

[classroomacoustics.com/](http://classroomacoustics.com/)

This site is a resource for those who want additional information regarding the standards for classroom acoustics.

### ***The Classroom Acoustics Coalition***

[www.nonoise.org/quietnet/qc/index.htm](http://www.nonoise.org/quietnet/qc/index.htm)

The Classroom Acoustics Coalition provides important background on the nature and scope of the problems caused by bad acoustics in classrooms, and offers practical planning strategies and methods to avoid or correct bad acoustics in existing or planned educational facilities.

### ***Handspeak***

[www.handspeak.com](http://www.handspeak.com)

A sign language dictionary on-line.

Have you ever wondered about . . . THE EAR AND HEARING (Series 1 & 2)

<http://clerccenter.gallaudet.edu/infotogo/567/567.html>

<http://clerccenter.gallaudet.edu/infotogo/535/535-1.html>

Good for teaching young children about hearing and how the ear works.

### ***Hearing Exchange***

[www.hearingexchange.com/](http://www.hearingexchange.com/)

An on-line community for the exchange of ideas and information on hearing loss regardless of the communication methodology.

### ***Kids World Deaf Net***

<http://clerccenter.gallaudet.edu>  
(type kids world in search function)

A national communication network for parents and professionals involved in the education of deaf and hard of hearing children.

### ***Listen-Up Website***

[www.listen-up.org/](http://www.listen-up.org/)

This site was created by a parent of a child with a hearing impairment and contains a tremendous amount of resources and information. There is also a list serve that is designed to help parents advocate for the rights of their children.

## ***Parents of Deaf and Hard-of-Hearing Children in San Diego***

A listserv for parents of children with hearing loss. Email [mkeough@san.rr.com](mailto:mkeough@san.rr.com) and request instructions for becoming a member of [Deafchildren@egroups.com](mailto:Deafchildren@egroups.com) in the local San Diego area.

## ***Standards, Assessments and IEPs: Planning for Success in the General Education Curriculum***

University of Vermont  
[www.uvm.edu/~mhock/standards/main.html](http://www.uvm.edu/~mhock/standards/main.html)

A great resource for IEPs. Includes information on designing standards and IEP goals.

## ***Universal Hearing Health***

[www.uhhweb.com](http://www.uhhweb.com)

UHH is a non-profit, international website designed to link consumers with hearing loss to all categories of service providers and to assist them in developing a mutually beneficial relationship. It provides information concerning hearing issues, access to updated provider listings and manufacturers, a national resource directory, training opportunities, and online support in the form of chat rooms, e-mail consultation, and support groups.

## ***Whatcom Hearing Impaired Children's Help (W.H.I.C.H.)***

[www.ibwebs.com](http://www.ibwebs.com)

This website was created by a parent for other parents to address the lack of information provided to parents on how hearing loss affects the child, family, education, social issues and communication options.

## ***Windmill Works***

[www.windmillworks.com](http://www.windmillworks.com)

This website has several software programs focusing on language development for the Deaf or Hard-of-Hearing.

---

***For additional information on resources or the material presented in this manual contact:***

**Melanie Doyle**  
**(858) 455-7571**  
**[mdoyle3@san.rr.com](mailto:mdoyle3@san.rr.com)**



# BIBLIOGRAPHY

- Acoustical Society of America. "America's Need for Standards and Guidelines to Ensure Satisfactory Classroom Acoustics." Paper presented by David Lubman at the 133rd Meeting of the ASA, State College, PA, June 1997.  
[www.acoustics.org/133rd/2paaal.html](http://www.acoustics.org/133rd/2paaal.html)
- Acoustical Society of America. "Tuning Up Our Classrooms." Paper presented by Robin M. Towne at the May 1996 ASA Meeting.
- American Academy of Audiology website. Educational Audiology Perspectives Vol. 2 #2 1998; "Helping Parents Advocate For Children's Hearing Needs in School." [www.audiology.com/edaud/specmast.htm](http://www.audiology.com/edaud/specmast.htm).
- American Speech-Language-Hearing Association (ASHA). "Acoustics in Educational Settings, Position Statement and Guidelines for Acoustics in Education Settings." *ASHA*, March, 1995 (14), 15-19.
- Anderson, K. "The Impacts of Hearing Loss on Education." *Word of Mouth*, September 1997.
- Anderson, K. "The Sound of Learning." *The American School Board Journal*, October, 1997.
- Anderson, K. "When it Comes to Classroom Acoustics, What's Appropriate?" *Volta Voices*, 1999, (6) 5, 16-18.
- Architectural and Transportation Barriers Compliance Board (Access Board). Response to Petition for Rulemaking, November 1999.  
[www.access-board.gov/publications/acoustic.htm](http://www.access-board.gov/publications/acoustic.htm)
- California Department of Education. *Programs for Deaf and Hard of Hearing Students: Guidelines for Quality Standards*, 2000.  
[www.cde.ca.gov/deafhh](http://www.cde.ca.gov/deafhh)
- Carlsbad Unified School District/Magnolia Communication Center. Handouts on "Speechreading" and "How to Assist DHH Children in the Mainstream Environment."
- Cherow, E. "Have You Ever Wondered About The Ear and Hearing?" National Information Center on Deafness (NICD) and American Speech-Language-Hearing Association (ASHA), Rockville, Maryland. Gallaudet College, 1986.  
<http://clercenter.gallaudet.edu/>
- Cochlear Implant Association, Inc. (CICI) website. "What is a Cochlear Implant?" and, "Educating a Child Who Has a Cochlear Implant."  
[www.cici.org](http://www.cici.org)
- Crandell, C. "Classroom Acoustics: A Failing Grade." *Hearing Health*, September/October 1998, 11-15.
- Crandell, C., Smaldino, J. and Flexer, C. *Sound-Field Amplification*, Singular Publishing Group, San Diego, CA, 1995.
- Flexer, C. *Facilitating Hearing and Listening in Young Children*. Singular Publishing Group, Inc., San Diego, CA, 1994.
- Flexer, C. "Sound-Field FM Systems: Questions Most Often Asked about Classroom Amplification," *Journal of the Ohio Speech & Hearing Association*, 1997 (11) 2, 5-14.
- Girls and Boystown Website. "Understanding Hearing Loss: Diagnosis and Evaluation," and, "Hearing Aids and How They Work."  
[www.boystown.org](http://www.boystown.org)
- Gordon-Langbein, A. "Screening newborns for hearing loss - their time is hear!" *Volta Voices*, 1999, (6) 4, 7-10.

Herbert, K. "Poor Marks for Classroom Acoustics."  
*Building Operating Management*, 1999.  
[www.facilitiesnet.com](http://www.facilitiesnet.com)

Mangiardi, A. *A Child with a Hearing Loss in Your Classroom? Don't Panic!! A Guide for Teachers*.  
Washington, DC: A.G. Bell Association for the Deaf, 1993.

Oral Deaf Education Website. Glossary.  
[www.oraldeafed.org/](http://www.oraldeafed.org/)

Oticon Website  
Booklets: *Teachers' Guide, All about FM, Teacher's Resource Pack*  
[www.oticon.com/OtiKids/](http://www.oticon.com/OtiKids/)

Ross, M. (Ed.). *Hearing-Impaired Children in the Mainstream*. Parkton, Maryland: York Press, 1990.

San Diego City Schools. Flyer from the Deaf and Hard of Hearing Program. "How Teachers Can Help." 1993.

Self Help for Hard of Hearing People, Inc. (SHHH).  
*Teaching Hard of Hearing Students - Some Helpful Hints*. Information series #161. Bethesda, MD.  
(310) 657-2249.

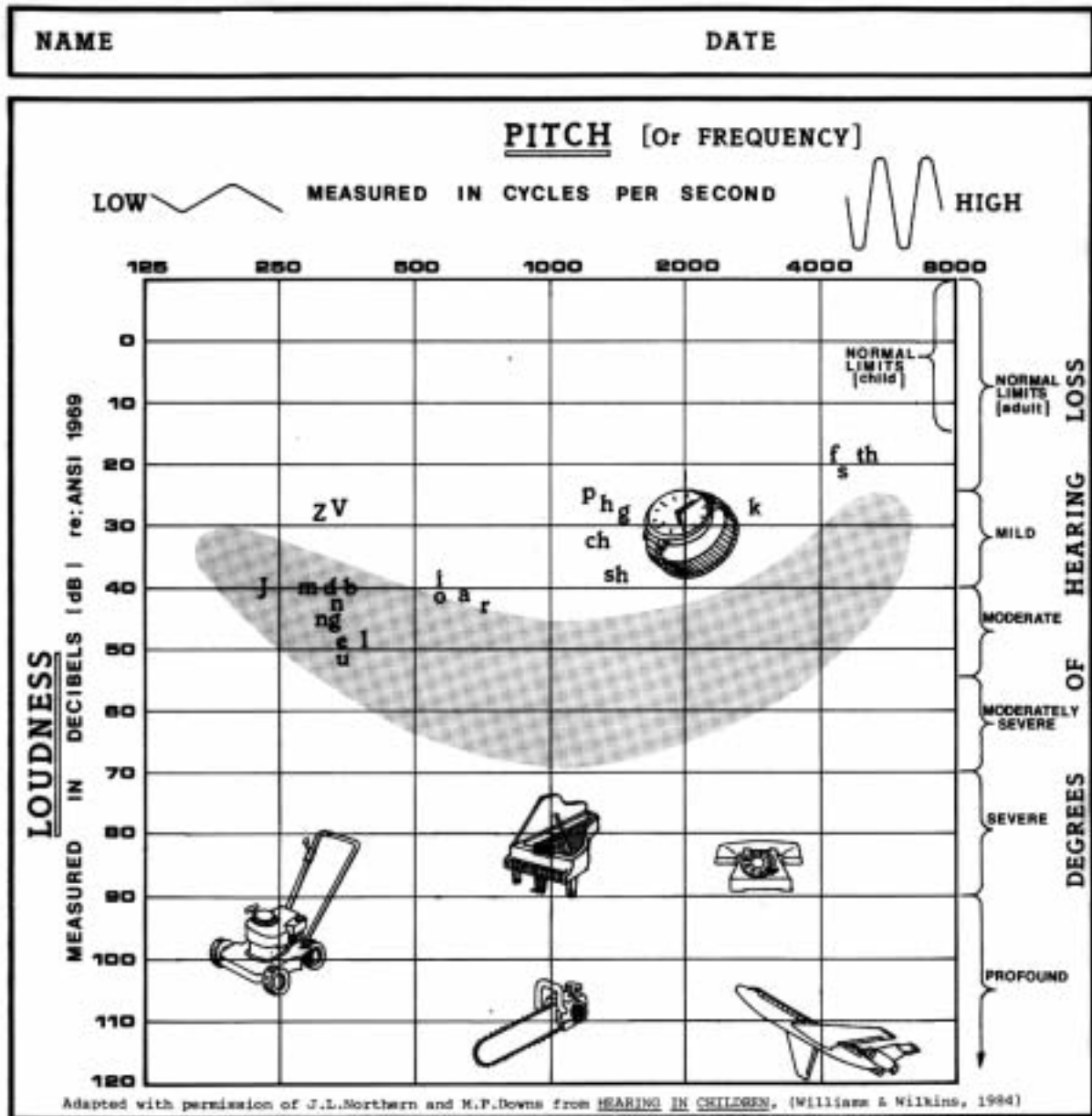
Self Help for Hard of Hearing People, Inc. (SHHH).  
Position Statement on Educating Hard of Hearing Children in Regular Education.  
[www.shhh.org/position/educate.htm](http://www.shhh.org/position/educate.htm)

Talbot, P. "Managing the Mainstream: Monitoring the Environment, the Child, the Team." The Listen-Up Website.  
[www.listen-up.org/](http://www.listen-up.org/)

Youdelman, K. "Computer-Assisted Notetaking in the Mainstream Classroom." *Volta Voices*, 2001 (8) 1, 9-11.

# Appendix A

## FAMILIAR SOUNDS AUDIOGRAM ©



LOUDNESS LEVELS OF COMMON SOUNDS [IN DECIBELS]		
10 dB Breathing	80 dB Rush Hour Traffic	120 dB Jet Airport
30 dB Whisper	90 dB Food Blender	140 dB Shotgun Blast
40-60 dB Conversation	100 dB Train	
70 dB Typewriter	110 dB Chain Saw	

SHADED AREA REPRESENTS RANGE OF CONVERSATIONAL SPEECH

1205 Familiar Sounds Audiogram Form-2, 6/84 B.A.Chauoin, M.S., CCC-A  
 To Reorder, call or write: Louisville Deaf Oral School, 414 W. Ormsby, Louisville, Ky., 40203, 1-502-636-2084

# Appendix B

## INSTRUCTION AND TEST ACCOMMODATIONS

Page 5 of \_\_\_\_

Student: \_\_\_\_\_ D.O.B. \_\_\_\_\_ Sp. Ed. Teacher \_\_\_\_\_  
 Draft Date: \_\_\_\_\_ Finalized Date: \_\_\_\_\_ Addendum to IEP dated \_\_\_\_\_

Based on a need demonstrated by the student, the IEP team has determined that the following accommodations are necessary to provide equal access to the general education curriculum and program, and allow the student to show what he or she knows.

<p style="text-align: center;"><b><u>Flexible Scheduling</u></b></p> <p><input type="checkbox"/> Time extension _____</p> <p><input type="checkbox"/> Adjust length of each session to allow for more breaks</p> <p><input type="checkbox"/> Administer tests over several sessions of specified duration</p> <p><input type="checkbox"/> Administer tests in several sessions over several days</p> <p><input type="checkbox"/> Allow: _____</p> <p><input type="checkbox"/> Allow: _____</p>	<p style="text-align: center;"><b><u>Revised Directions</u></b></p> <p><input type="checkbox"/> Simplify language in directions</p> <p><input type="checkbox"/> Provide additional examples</p> <p><input type="checkbox"/> Provide cues (e.g., arrows and stop signs) on answer form</p> <p><input type="checkbox"/> Highlight or underline verbs in instructions</p> <p><input type="checkbox"/> Read or sign directions to student</p> <p><input type="checkbox"/> Reread/re-sign directions for each page of questions</p> <p><input type="checkbox"/> Allow: _____</p> <p><input type="checkbox"/> Allow: _____</p>
<p style="text-align: center;"><b><u>Flexible Setting</u></b></p> <p><input type="checkbox"/> Administer tests individually in <input type="checkbox"/> same <input type="checkbox"/> separate location</p> <p><input type="checkbox"/> Administer tests to a small group in:</p> <p style="padding-left: 20px;"><input type="checkbox"/> same <input type="checkbox"/> separate location</p> <p><input type="checkbox"/> Adaptive or special equipment at:</p> <p style="padding-left: 20px;"><input type="checkbox"/> same <input type="checkbox"/> separate location</p> <p style="text-align: center;"><i>List equipment below:</i></p> <p>_____</p> <p>_____</p> <p>_____</p> <p><input type="checkbox"/> Preferential seating _____</p> <p><input type="checkbox"/> Provide: _____</p>	<p style="text-align: center;"><b><u>Use of Aids to Interpret</u></b></p> <p><input type="checkbox"/> Visual Magnification device</p> <p><input type="checkbox"/> Auditory amplification device</p> <p><input type="checkbox"/> Auditory tape of items</p> <p><input type="checkbox"/> Provide cues to maintain on-task behavior</p> <p><input type="checkbox"/> Masks to cover a portion of the text</p> <p><input type="checkbox"/> Markers to maintain place</p> <p><input type="checkbox"/> Repeat oral comprehension items</p> <p><input type="checkbox"/> Note taker</p> <p><input type="checkbox"/> NCR paper</p> <p><input type="checkbox"/> Peer tutor</p> <p><input type="checkbox"/> Provide: _____</p> <p><input type="checkbox"/> Read: <input type="checkbox"/> passages <input type="checkbox"/> questions <input type="checkbox"/> response choices</p> <p><input type="checkbox"/> Sign: <input type="checkbox"/> passages <input type="checkbox"/> questions <input type="checkbox"/> response choices</p>
<p style="text-align: center;"><b><u>Revised Presentation Format</u></b></p> <p><input type="checkbox"/> Braille editions or transcriptions</p> <p><input type="checkbox"/> Large print editions or transcriptions</p> <p><input type="checkbox"/> Increase spacing between items</p> <p><input type="checkbox"/> Reduce number of items per page</p> <p><input type="checkbox"/> Omit questions which cannot be revised</p> <p><input type="checkbox"/> Prorate credit</p> <p><input type="checkbox"/> Increase size of answer bubbles or answer blocks</p> <p><input type="checkbox"/> Arrange multiple choice items in vertical format</p> <p><input type="checkbox"/> Books on tape</p> <p><input type="checkbox"/> Alternative assignments</p> <p><input type="checkbox"/> Reduce: _____</p> <p><input type="checkbox"/> Use different materials _____</p> <p><input type="checkbox"/> Provide: _____</p>	<p style="text-align: center;"><b><u>Use of Aids to Respond</u></b></p> <p><b>Access to:</b></p> <p><input type="checkbox"/> Tape recorder</p> <p><input type="checkbox"/> Typewriter</p> <p><input type="checkbox"/> Word processor</p> <p><input type="checkbox"/> Spell check</p> <p><input type="checkbox"/> Grammar check devices</p> <p><input type="checkbox"/> Pointers</p> <p><input type="checkbox"/> Communication board</p> <p><input type="checkbox"/> Adaptive Instruments</p> <p><input type="checkbox"/> Record answers in test booklet for student</p> <p><input type="checkbox"/> Calculator</p> <p><input type="checkbox"/> Arithmetic tables</p> <p><input type="checkbox"/> Peer tutor</p> <p><input type="checkbox"/> Different materials</p> <p><input type="checkbox"/> Provide: _____</p>

# Appendix C



## Programs for Deaf and Hard of Hearing Students: Guidelines for Quality Standards

Federal and state laws govern the provision of educational services to all children who are deaf or hard of hearing. This document contains recommended guidelines for personnel to use in planning and monitoring programs for those students.

### Order Form

To: California Department of Education  
 CDE Press, Sales Office  
 P.O. Box 271  
 Sacramento, CA 95812-0271  
 (916) 445-1260 + FAX (916) 323-0823

Date \_\_\_\_\_

School/District \_\_\_\_\_

Name/Attention \_\_\_\_\_

Address \_\_\_\_\_

Please send me a free copy of the current *Educational Resources Catalog*.

City \_\_\_\_\_ State \_\_\_\_\_ ZIP code \_\_\_\_\_  
 Telephone ( \_\_\_\_\_ ) \_\_\_\_\_

Item number	Title of publication	Number of copies or sets	Price per copy or set	Total
1502	<i>Programs for Deaf and Hard of Hearing Students: Guidelines for Quality Standards (2000)</i>		\$00.00	\$
		Total number of copies		

Check made payable to California Department of Education

VISA  MasterCard

Card Number (Please write clearly.) \_\_\_\_\_ Expiration Date: Month \_\_\_\_\_ Year \_\_\_\_\_

Name on Card \_\_\_\_\_

Authorized Signature \_\_\_\_\_

Subtotal	\$ _____
California residents add sales tax.	\$ _____
Shipping and handling charges (See chart.)	\$ _____
<b>TOTAL AMOUNT</b>	<b>\$ _____</b>

**Note:** Mail orders must be accompanied by a check, a purchase order, or a VISA or MasterCard credit card number, including expiration date and your signature. Purchase orders without checks are accepted from educational institutions, businesses, and governmental agencies. Purchase orders and credit card orders may be placed by FAX (916) 323-0823. Telephone orders will be accepted toll-free (1-800-995-4099) for credit card purchases. Please do not send cash. Stated prices are subject to change. Please order carefully; include correct item number and quantity for each publication ordered. *All sales are final.*

Number of copies	Add	Number of copies	Add	Number of copies	Add
1	\$ 5.95	13-16	\$15.95	29-32	\$23.95
2-4	7.95	17-20	17.95	33-36	26.95
5-8	9.95	21-24	19.95	37-40	28.95
9-12	14.95	25-28	21.95	40+ call 1-800-995-4099	

Prices and availability are subject to change without notice. Please call 1-800-995-4099 for current prices and shipping charges.