



Digging Deeper: Collaboration While Working with Children with Hearing Loss

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About Us

- Personal Information
- Education Background
- Work Experience
- Current Position
- How We Know Each Other

Why Collaborate

- Different Areas of Training and Perspectives
 - Medical vs Child/Family-Centered Lens
- Synthesize information for Family/Staff
- The “Why” behind Suggested Student Supports
- Greater Parent Education + Better Staff Education = Best Outcomes for Students

Areas of Collaboration

- Assessment
 - Initial
 - Re-evals
- Determine Accommodations/Modifications/ Goals
- Family/Student Education
- In-servicing of Other Educational Staff
- Listening Checks
- Equipment and Troubleshooting

Evaluations -Standard Practice

Audiologist

- Observe classroom and school environments to assess access issues
- Evaluate access to communication, social interaction, self advocacy and education needs
- Assess expressive/receptive preferences and abilities to access communication

Teacher of Deaf and Hard of Hearing

- Observe classroom and school environments to assess access issues
- Evaluate access to classroom communication, social interaction, self advocacy and education needs
- Assess expressive/receptive preferences and abilities to access communication

Evaluations -Standard Practice, continued

Audiologist

- Perform functional and informal assessments of access of access to learning spaces
- Interpretation of medical records: pre- & post-natal risk factors, audiologic, ENT, ENT surgical and genetics

Teacher of Deaf and Hard of Hearing

- Assess academic, communication, social/self-concept, and identify areas of need
- Distinguish listening issues due to hearing status from learning/performance issues due to other conditions beyond hearing loss

Evaluations: Digging Deeper

- Work together to provide parent education **BEFORE** the discussion of goals/parent priorities (B-3) and planting seeds related to educational placement
- Team discussion of goals/priorities related to the child's hearing loss (B-3)
- Choosing materials and appropriate assessments for functional listening
- Part B: working collaboratively to complete a functional listening assessment with students with behaviors and/or low language/artic skills or unfamiliarity with the audiologist
- Part C: sound observations with family present and participating
- Participation in FGRBI Interview
- LittleEars - Norms, First 2 years of life/post amplification fitting
- Listening Fatigue - Vanderbilt Fatigue Scale (VFS-Peds) - Norms

Evaluations Digging Deeper

- Functional Listening Evaluation
 - Closed vs Open set
 - Words vs Sentences
 - Norm Referenced
 - Visual Speech Reading Cues/Other visual supports
 - Results drive accommodations, modifications, assistive technology

Accommodations/Modifications -Standard Practice

Audiologist

- Assess classroom acoustics and make recommendations to improve school environments (classroom choice, etc.)

Teacher of Deaf and Hard of Hearing

- Lead discussion of communication plan & effectiveness
- Use need statements and current functioning to determine accommodations and modifications

Determining Accommodations/ modifications: Digging Deeper

- Together Audiologist and TDHH review evaluation data to determine accommodations, modifications, assistive technology (keep it individualized)
- Often overlooked accommodations that may be appropriate include:
 - breaking information down into manageable chunks
 - rest breaks for auditory/ listening fatigue
 - moving small group discussions to alternate location (MS/HS)
 - pauses to give time for prior knowledge or to formulate answers

Student/Family Education - Standard

Audiologist

- Teach hearing loss prevention and the importance of limiting noise exposure
- Facilitate interactions between students with hearing loss to support: self-identity, advocacy, emotional support)
- Hearing Assessment

Teacher of Deaf and Hard of Hearing

- Teach hearing loss prevention and the importance of limiting noise exposure
- Facilitate interactions between students with hearing loss to support: self-identity, advocacy, emotional support)
- Develop high expectations of auditory oral skills and provide intervention

Ongoing Student/Family Education - Standard

Audiologist

Teacher of Deaf and Hard of Hearing

- provide support for development of:
 - sign language skills.
 - competence with communication in social, linguistic and academic contexts
 - pragmatic language skills
 - social skills and self concept
 - self advocacy/ compensatory skills
 - literacy skills

Ongoing Student/Family Education – Standard, continued

Audiologist

Teacher of Deaf and Hard of Hearing

- develop comprehension abilities
- preview/ review/ teach content vocabulary
- teach to specific delays in math, reading, writing
- deliver modified instruction in all academic areas of need (may be consultative)
- Plan provide teachers with appropriate teaching strategies

Ongoing Student/Family Education – Standard, continued 2

Audiologist

Teacher of Deaf and Hard of Hearing

- Act as liaison between students, parents, staff, and administrators to address ongoing student needs

Student/Family education: Digging Deeper

- Beyond discussing cause, degree and type of hearing loss, and familiar sounds audiogram, discuss Articulation Index (Count the Dot audiogram) and provide simulation
- Teach classes with students with hearing loss about how the ear works and hearing loss (ear obstacle course)
- Audiologist help identify students that might be good matches for parent and/or peer support and support DHH teacher in connecting them
- Audiologist supports DHH teacher in determining if access is an issue in a area where students aren't making expected progress with appropriate interventions
 - Formant frequencies

Ongoing Student/Family education: Digging Deeper

- Joint home visits for B-3 population
- Connecting families with outside supports (Hands and Voices, local Facebook groups, family events, Community Education ASL classes)
- supporting families in advocating at medical appointments, facilitating connection for CMV testing of birth blood spot for unknown etiology
- Providing families with research based information/ articles when appropriate
- Auditory training: audiologist is good resource for materials and information what is reasonable

In-servicing of Other Educational Staff - Standard

Audiologist

- Educate school staff about impacts of hearing loss and use of assistive technology
- In-service classroom teachers about required daily monitoring of amplification
- In-service teachers on appropriate modifications
- Reach out to teachers when hearing status changes occur that will impact classroom performance

Teacher of the Deaf/ Hard of Hearing

- Educate school staff about impacts of hearing loss and use of assistive technology
- In-service classroom teachers about required daily monitoring of amplification
- In-service teachers on appropriate modifications
- Plan/ provide general education teachers with appropriate teaching strategies

In-servicing of Other Educational Staff - Digging Deeper

- Simulation of child's hearing loss
- Visual representation of hearing loss
- Providing extra information - formant frequencies, Count-the-Dot Audiogram
- Review of FLA - word level testing importance
- Inclusion of student with staff in-servicing, when appropriate: Google Slides, letter outlining what they want and do not want said/done
 - Student present in demonstration of equipment (bonus - self-advocacy)
- DHH Top 10 presentation for all staff
- DHH trivia
- Discussion of Listening Fatigue and its impacts of learning
 - Periodically checking out, hidden curriculum (I can't expect to hear/learn like classmates, behaviors, physical fatigue, quality of life, etc.)

Equipment and Troubleshooting - Standard

Audiologist

- Teach student about use of amplification and troubleshooting malfunctions
- Appropriately select, set, validate & manage implementation of assistive hearing technology
- Gather information to determine if amplification is fit optimally

Teacher of the Deaf/ Hard of Hearing

- Teach student about use of amplification and troubleshooting malfunctions

Equipment and Troubleshooting - Digging Deeper

- One-on-one training in-person (DHH teacher + Audiologist) with equipment present
- Audiologist provides DHH teacher with equipment resources:
 - Cheat / summary Sheets
 - Stored Videos
 - Google Meets to troubleshoot equipment in live time
- Audiologist has trust in DHH teacher to provide basic troubleshooting and repairs
- Back-up parts provided to DHH teacher (audioshoe, extra receiver, Focus tubing)
- DHH teacher understands strengths and limitations when troubleshooting and repairing equipment

Katie's Soapbox



Listening Checks - Standard

Audiologist

- Perform basic technology checks and respond to student reports of malfunction
- Train support staff in performing listening checks

Teacher of the Deaf/ Hard of Hearing

- Perform basic technology checks and respond to student reports of malfunction
- Train support staff in performing listening checks
- Provide documentation sheets for listening checks
- Periodically check documentation of listening checks
- Reach out to audiologist when concerns arise

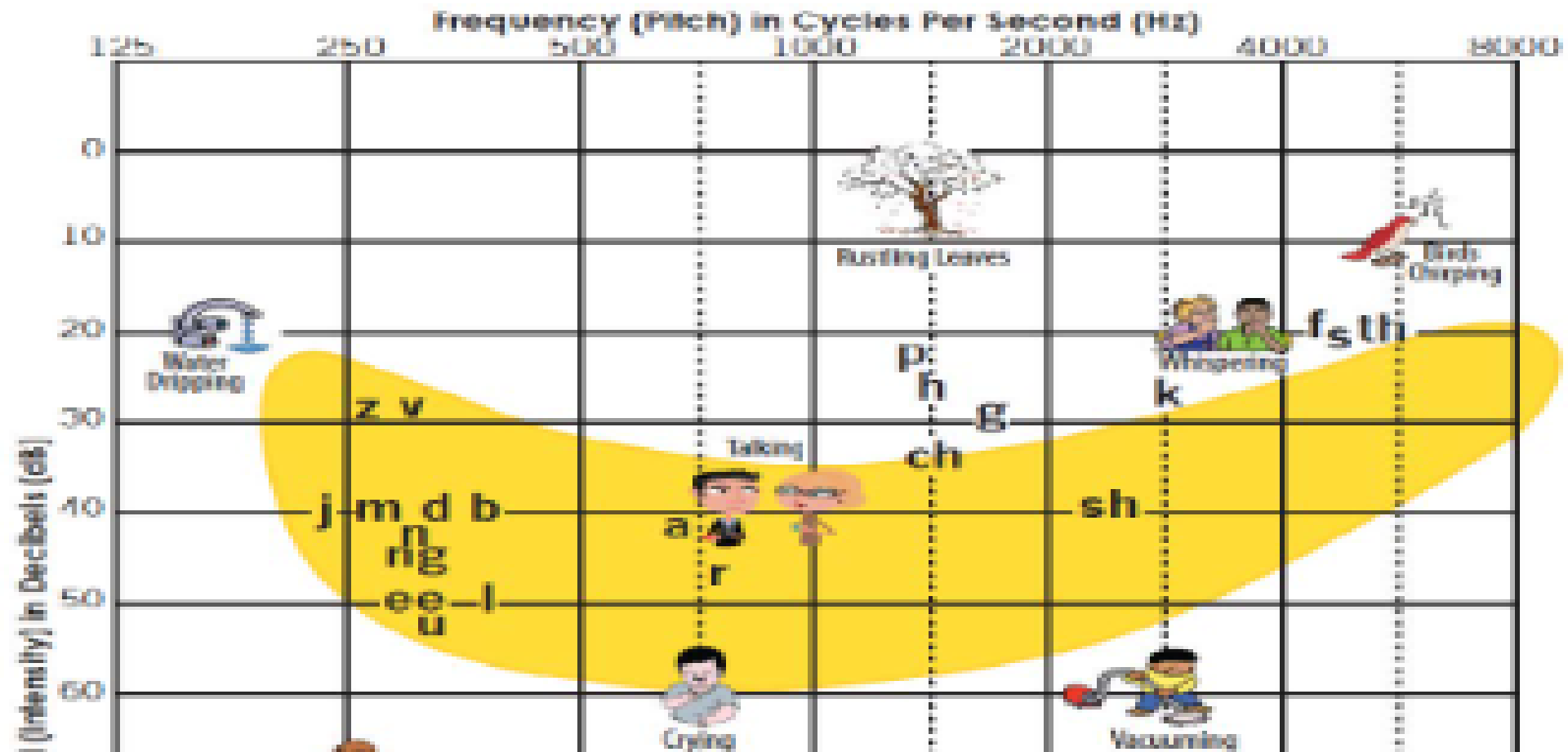
Listening Checks - Digging Deeper

- Two specific parts of listening checks:
 - Equipment Function
 - Students' hearing function through equipment
 - Importance of Ling 10 sound test
 - No sound response
- Thorough documentation of checks (custom made listening check sheets)
- Video of listening checks process - available in "Resources"
- work with audiologist if concerns arise (consistently missing sounds, they got before, having to move closer for student to repeat successfully)
- Use toys or pictures for nonverbal students, or young students

Deb's Soap boxes



Familiar Sounds Audiogram vs. Count the Dot audiogram



Why Familiar Sounds Audiogram is inaccurate: multiple frequency bands needed to distinguish between sounds

Formant (Frequency Band) Characteristics of Vowel and Consonant Sounds (Hz)		
Vowels	Formant 1	Formant 2
bo <u>o</u> ed	200-500	650-1100
g <u>oo</u> d	250-550	850-1250
pu <u>t</u>	450-700	750-1200
pa <u>w</u> ed	425-675	725-1200
br <u>a</u>	525-775	825-1275
bo <u>x</u>	650-1000	1200-1600
bu <u>d</u>	600-950	1175-1600
schwa	400-650	1250-1750
bir <u>d</u>	350-600	1325-1900
ba <u>d</u>	600-950	1750-2300
be <u>d</u>	450-700	2000-2500
bi <u>d</u>	250-525	2250-2850
be <u>a</u> d	150-450	2300-2900

Each speech sound is comprised of elements across various frequency bands. **Another term for frequency bands is formants.**

A formant is the characteristic frequency that occurs when the shape of a tube (throat) and cavity (mouth/lips) change.

As the speech sounds of English are formed, each one will have a characteristic 'footprint' of frequency bands.

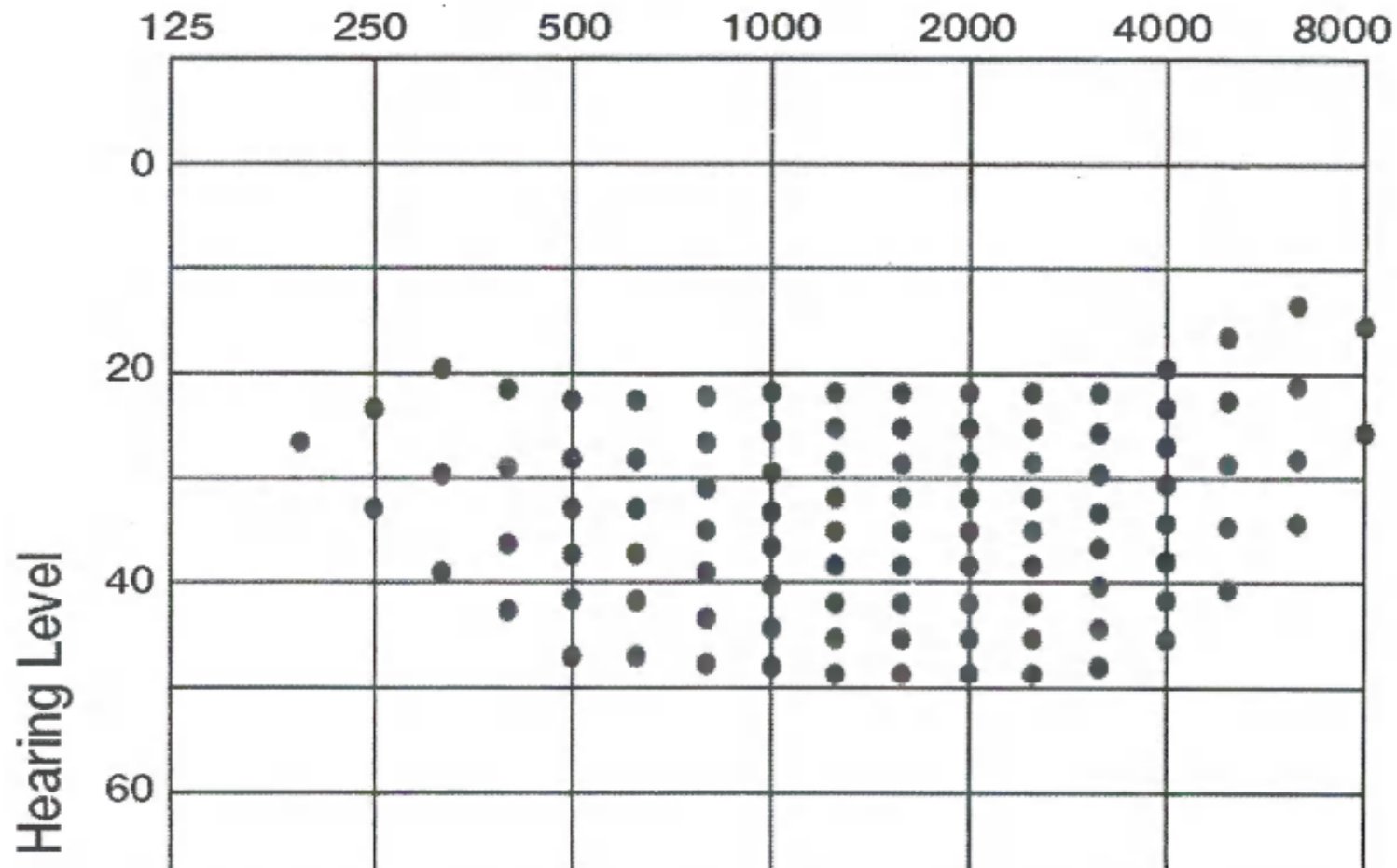
The ability to perceive speech sounds across all four formants is what allows a child to perceive speech completely.

Multiple bands to distinguish between sounds (continued)

Consonants	Formant 1	Formant 2	Formant 3	Formant 4	dB HL
r (err)	600-800	1000-1500	1800-2400		46
l (let)	250-450		2000-3000		43
sh (shot)			1500-2000	4500-5500	41
ng (wing)	250-450	1000-1500	2000-3000		41
ch (chat)			1500-2000	4000-5000	38
n (no)	250-350	1000-1500	2000-3000		37
m (me)	250-350	1000-1500	2500-3500		35
th (that)	250-350			4500-6000	34
t (tap)			2500-3500		34
h (hat)			1500-2000		32
k (kit)			2000-2500		34
j (jot)	200-300		2000-3000		36
f (for)				4000-5000	34
g (get)	200-300		1500-2500		33
s (sit)				5000-6000	32
z (zip)	200-300			4000-5000	31
v (vat)	200-300			3500-4500	31
p (pat)			1500-2000		30
d (dot)	300-400		2500-3000		29
b (bat)	300-400		2000-2500		29
th (thin)				about 6000	28

SII -Based Method for Estimating the Articulation Index

SII Count-the-Dots Audiogram Form

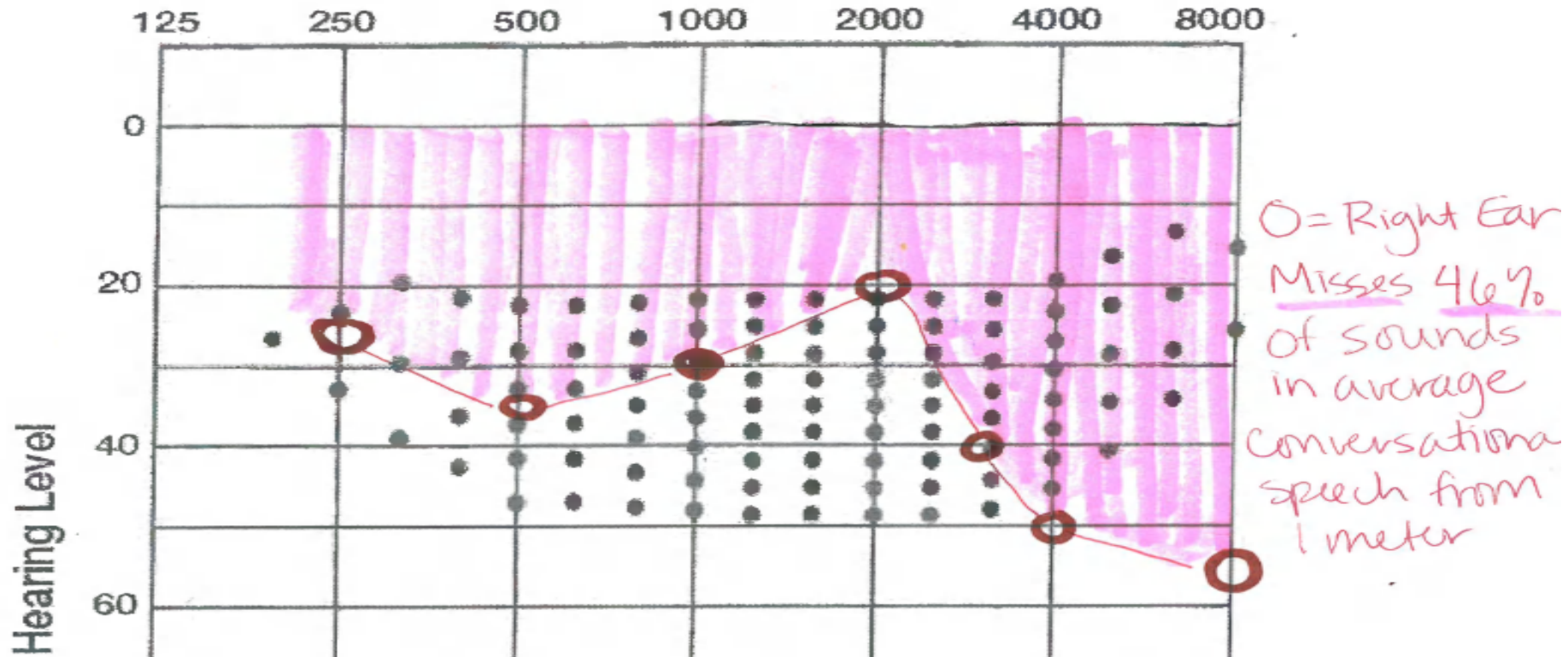


1. Plot Audiogram
2. 100 dots = 100% of average English conversational speech from 1 meter; 1 dot = 1% of speech sounds.
3. Dots above threshold = % missed sounds

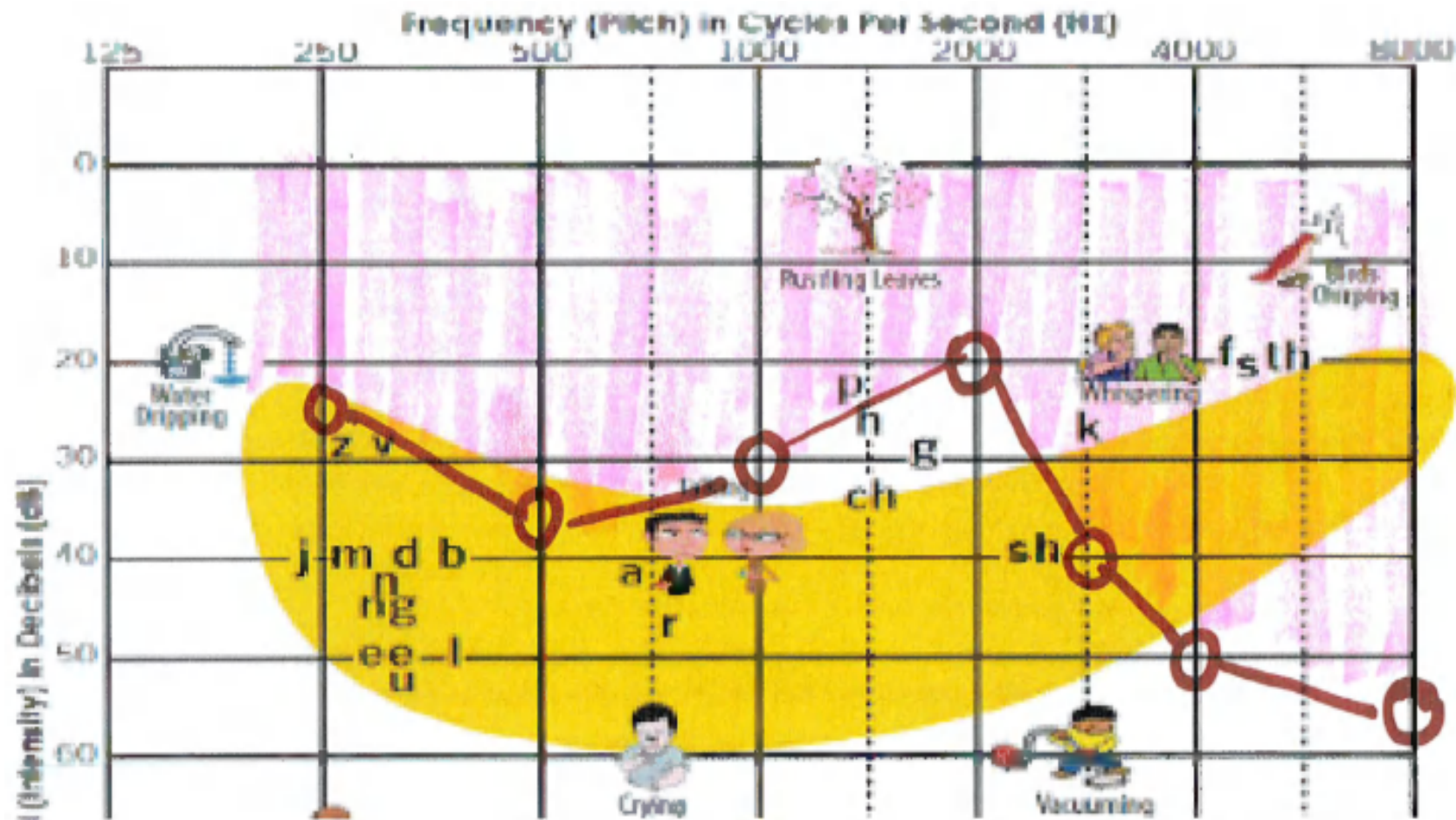
Same Hearing Loss- Count-the-dot Audiogram

The SII-Based Method for Estimating
the Articulation Index

SII Count-the-Dots Audiogram Form



Hearing loss: Pink = Misses Only /K/, /F/, /S/, /Th/ + /P/



Word Recognition Materials with Normative Values

The typically developing child can perform at about 90% or better – even in high levels of background noise when listening to soft speech.

Condition	CA	List	N	Male			Female			
				WR%	SD	95% CI	N	WR%	SD	95% CI
Quiet 50 dB	3-5	NU-C	14	98	3.7	96-100	12	98	3.2	96-100
Quiet 50 dB	6-8	PBK	13	98	3.1	97-100	12	98	3.2	96-100
Quiet 50 dB	9+	W-22	13	99	1.9	98-100	6	96	5.1	92-100
Quiet 35 dB	3-5	NU-C	19	95	5.2	92-97	13	96	4.8	93-98
Quiet 35 dB	6-8	PBK	23	97	3.7	95-98	24	98	3.1	97-99
Quiet 35 dB	9+	W-22	17	98	2.8	97-100	9	96	4.2	93-98
50 @ +5 SNR	3-5	NU-C	28	93	4.6	91-95	16	94	4.1	92-96
50 @ +5 SNR	6-8	PBK	13	94	4.5	92-96	25	95	5.1	93-97
50 @ +5 SNR	9+	W-22	17	97	4.1	95-99	7	93	3.8	90-96
50 @ 0 SNR	3-5	NU-C	23	91	6.9	88-94	17	92	6.5	89-95
50 @ 0 SNR	6-8	PBK	18	91	5.4	89-93	28	93	6.0	90-95
50 @ 0 SNR	9+	W-22	19	95	4.7	93-97	11	93	4.8	91-96
35 @ 0 SNR	3-5	NU-C	23	90	6.1	87-93	16	92	6.0	89-94
35 @ 0 SNR	6-8	PBK	28	91	6.2	88-93	28	90	6.1	87-92
35 @ 0 SNR	9+	W-22	18	91	6.2	88-94	11	90	7.0	86-94

CI = confidence interval

Bodkin, K, Madell, J., & Rosenfeld, R. (1999). *Word recognition in quiet and noise for normally developing children*. Poster presented at the AAA Convention, Miami, FL.

Reference: Anderson, Karen. Building Skills for Success in the Fast-Paced Classroom. Pg 107.

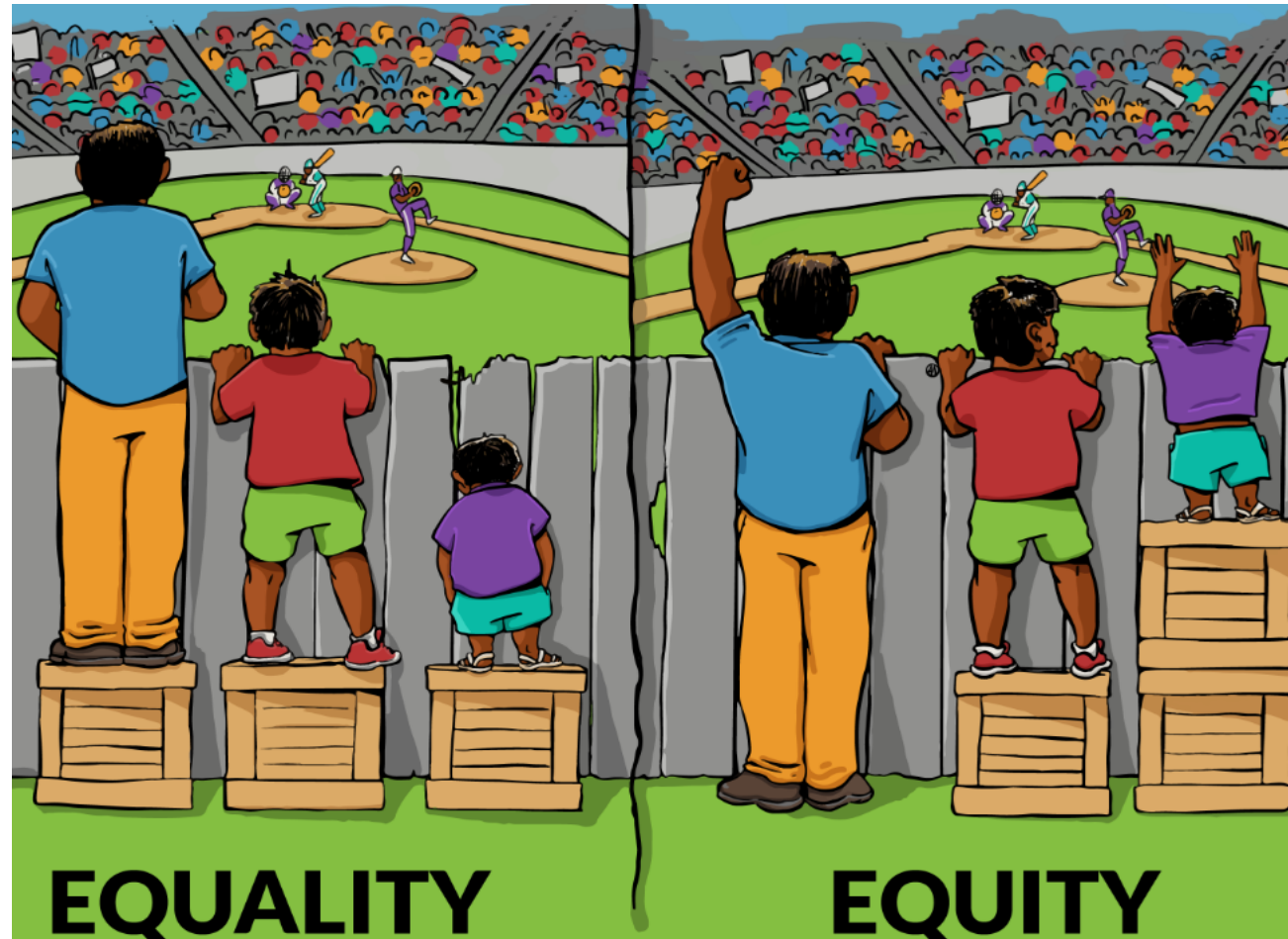
Rationale for Using Single Syllable Word Lists with Normative Values for Functional Listening Assessment

- Represents worst case scenario when students are unfamiliar with topic/new vocab; they are unable to use contextual cues (i.e. chlorophyll, photosynthesis)
- Ability to make comparisons with typically hearing peers to determine **Hearing and Access Gap:**
- Explains listening fatigue for student
- Note whether responses are delayed / said with confidence - listening effort
- Provides documentation of what is needed to make instruction more EQUITABLE for each student?

Rationale for Using Single Syllable Word Lists with Normative Values for Functional Listening Assessment (Continued)

- Provides documentation of what is needed to make instruction more EQUITABLE for each student? Could include the need for:
 - Amplification/Assistive technology
 - Listening Breaks
 - Pre-teaching, Re-teaching, and/or Small Group Instruction
 - Visual supports (Speech reading cues, Sign language, Visual phonics, Picture Supports, Real world experiences, Writing assignment on board, etc.)
 - Shortened Instructions Punctuated/Innumerated by Order
 - Optimal Acoustics
 - Repeating Overhead Announcements/Alarms through FM System
 - Quieter Location for Lunch, Small Group Cooperative Learning Groups

Equitable vs Equal



Equitable vs Equal - Listening through a damaged auditory system is not “equal.”



Resources

- Hearing Loss Simulations- Bilateral hearing loss:
 - Jane Madell, Hearing Loss in the Classroom: Need for FM and pass-around mic/teacher repeat peer responses into FM Transmitter
- Hearing Loss Simulations - Unilateral: Med-El; requires use of over-the-ear headphones
- Katie Barth's "How to complete a Listening Check" Tutorial:
- Functional Listening Assessment - Karen Anderson Normative Values - page _____ of Book, _____
- Count-the-Dot Audiogram reference
- LittleEars Auditory Questionnaire - purchase through Med-El
- Vanderbilt Listening Fatigue Measure (Free):



Thank you!

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