

# Functional Strategies for Treating Childhood Apraxia of Speech in Schools

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OSSPEAC Conference, October 23, 2018

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## Financial Disclosure

➤ There are no financial or non-financial disclosures to report

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## Learning Objectives:

- differentiate between Childhood Apraxia of Speech (CAS) and severe phonological disorders
- name different treatment approaches for CAS
- prioritize speech targets/goals for students with CAS
- list a variety of activities to elicit and practice speech targets
- write IEP goals and objectives to target improved speech for students with CAS

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Meet RF- from the Profile section of his IEP (May, 2018)

- On his previous ETR, written in June, 2015, indicated **significant receptive and expressive language delays**, specifically, that RF could not complete the receptive portion of the test, and that he **vocalized without using any consonant sounds**.
- He is transitioning to kindergarten, and was assessed in March, 2018 to determine his current level of functioning.
- On the GFTA-3, RF's score on both the Sounds-in-Words and Sounds-in-Sentences subtests was 40, far below the average range of 85-115. An analysis of the test protocol indicates that he has a comparable number of initial and final sound errors in words. He has **multiple speech sound errors on initial and final word positions**. Errors include: /k, g, f, s, r, th, sh, z, dg, l, ch, s, and z/. RF's speech is very difficult to understand, and his **intelligibility is judged to be 60% in known contexts and 50% in unknown contexts**.

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- Informal language testing indicate his language skills are similar to that of same-age peers.
- In the classroom, he primarily uses phrases to communicate. His teacher wants him to use his words more.



- Any guess what his goals were?

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RF IEP Goals as Received

- By the end of this IEP, during a structured articulation task, when given a set of picture cards, RF will independently use /k/ and /f/ sounds in words with 80% accuracy in 3 out of 4 trials, as measured by anecdotal records.
- All objectives for /k/ and /f/ only

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# Severe speech sound disorders... aren't they all the same?

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Let's take a look...

<p><u>Multiple Phonological Processes</u></p> <ul style="list-style-type: none"> <li>➤ Multiple sound errors</li> <li>➤ Final Consonant Deletion</li> <li>➤ Medial Consonant Deletion</li> <li>➤ Stopping of fricatives</li> <li>➤ Can have a "favorite" sound</li> <li>➤ Can be unintelligible</li> </ul>	<p><u>Childhood Apraxia of Speech</u></p> <ul style="list-style-type: none"> <li>➤ Multiple Sound errors</li> <li>➤ Final Consonant Deletion</li> <li>➤ Medial Consonant Deletion</li> <li>➤ Stopping of Fricatives</li> <li>➤ Can have a "favorite" sound</li> <li>➤ Can be unintelligible</li> </ul>
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American Speech-Language Hearing Association (2018) Selected Phonological Processes (4 items). Available at <https://www.asha.org/Practice-Portal/Clinical-Topics/Speech-Sound-Disorders-Articulation-and-Phonology/Selected-Phonological-Processes>.

American Speech-Language Hearing Association (2019) Childhood Apraxia of Speech: Signs and Symptoms: Other Reported Characteristics. Available at <https://www.asha.org/PRP/Specific-Topic.aspx?folderid=458993338&catid=Signs-and-Symptoms>.

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But they are actually very different!

<p><u>Multiple Phonological Processes</u></p> <ul style="list-style-type: none"> <li>➤ Can often produce the sound in other contexts</li> <li>➤ Errors are pretty consistent</li> <li>➤ Can usually produce the process with cuing</li> <li>➤ Is a rule-based speech sound disorder</li> <li>➤ Can resolve the processes relatively quickly with therapy</li> </ul>	<p><u>Childhood Apraxia of Speech</u></p> <ul style="list-style-type: none"> <li>➤ Often has limited phonemic repertoire</li> <li>➤ Errors are often inconsistent, oral groping may be present</li> <li>➤ Might need multiple teaching/cuing to produce the sound in context</li> <li>➤ Is a motor planning disorder</li> <li>➤ Has a very slow acquisition rate</li> </ul>
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Apraxia-Kids (2018) About Childhood Apraxia of Speech- Handout. Available at <https://www.apraxia-kids.org/wp-content/uploads/2013/01/BHSM-Fact-Sheet-1.1.pdf>.

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### Childhood Apraxia of Speech

- Might have what looks like phonological processes (i.e. final consonant deletion)- not because they have a rule for that process- **they cannot physically coordinate all of the movements necessary to produce sounds in this way!**
- Unscientific Analogy:
  - It's like they know what they want to say in their brains, but the wires connecting their brains to their mouths short circuit and can't make the tongue and lips move correctly
- Because this is a motor planning and coordinating disorder, they do not tend to respond to treatment approaches used for other disorders!
- It is important to know which disorder you are treating!!!

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### Why this is tricky business...

- CAS can often look like a severe phonological disorder
- As it resolves, and the child gets older, it can look like a straight articulation problem
- Sometimes it takes a while of working with a student to figure out the true diagnosis
- CAS does not respond to traditional therapy methods

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### You know it's Apraxia when...

- You see oral groping for sounds
- Vowels are incorrect
- Errors are inconsistent
- Speech is much worse in connected speech than in single words/ isolation
- **YOU ARE NOT SEEING PROGRESS DESPITE YOUR BEST THERAPY EFFORTS!**

Caspari, Sue (2018) Childhood Apraxia of Speech- Handout. Available at [www.apraxia-kids.org](http://www.apraxia-kids.org) Apraxia Information Downloads/ About Childhood Apraxia of Speech

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### Meet Rocco

- In Kindergarten
- Never had therapy before school
- Speech was very difficult to understand
- Vowel errors
- No real syllable shapes
- Slow to imitate, with oral groping

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### Therapy Techniques- Phonological Processes

- “Because it would be an impossible task to teach a child every target sound in every relevant word and word position, the speech-language pathologist plans treatment with the minimal amount of teaching in mind – this in exchange for the greatest structural change, generalization, and improvement in the sound system” (Geirut, 1998)
- “An ultimate goal of phonological treatment is to induce the greatest, most widespread change in a child’s sound system in an effort to bring that system more into accord with the phonology of the target language” (Gierut, 1998)
- Teach each process (rule) with multiple sounds that are affected
- Can follow a Cycles Approach (Hodson, 1991)

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### Therapy Techniques- Childhood Apraxia of Speech To Begin:

- Take a Speech Sample
- Listen to their vowels
- They may have a limited phonemic inventory
- Most importantly...
  - Look at Syllable Shape!!!

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### Syllable Shapes

- V (I, oh, ooh)
- VC (up, eat, in)
- CV (no, two, my, knee)
- VCV (oh no, apple, open)
- CVCV (mama, booboo, bye-bye)
- CVCV<sub>2</sub> (mommy, puppy, bubble)
- CVC<sub>2</sub>V<sub>2</sub> (tummy, bunny, bottle)
- CVC (cup, mine, cat)

From Kaufman (K-SLP) Treatment Kit-1 Basic Level

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### Successive Approximations

- Follows developmental norms
  - Baby will say "baba" before able to say "ba-do," long before shaping the final /l/ shape in "bottle"
- Even if not completely accurate, is still intelligible
  - All final /l/ sounds treated as /o/
  - All final /r/ sounds treated as /n/
  - If unable to say a sound (i.e. /k/), you can teach the syllables with sounds in their repertoire (i.e. /l/)
  - "tup" is better than "uh" or "up" for "cup"
  - You can still understand "I taught I taw a putty tat!"
- We are working toward intelligibility (intelligibility > accuracy)
- Success breeds success!
  - Some kids know they "can't" say things, so they won't even try
  - "Pee-doh"

Kaufman, N. (2018) The "Successive Approximation" Method of Therapy for Children with Apraxia of Speech. Retrieved from <https://www.apraxia-kids.org/library/the-successive-approximation-method-of-therapy-for-children-with-apraxia-of-speech>

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### Practice Syllable Shapes

1. Book	• CVC
2. Table	• CVC <sub>2</sub> V <sub>2</sub>
3. See	• CV
4. People	• CVCV <sub>2</sub>
5. Mouse	• CVC
6. Eye	• V
7. Apple	• VCV
8. Pickle	• CVC <sub>2</sub> V <sub>2</sub>

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### Practice Syllable Shapes- With Approximations

- |             |   |
|-------------|---|
| 1. Noodle   | • CVC <sub>2</sub> V <sub>2</sub> /nu-do/                                   |
| 2. Drink    | • CCVC -> CVC- /dɪt/ or /dɪk/   |
| 3. Pencil   | • CVCCV -> CVC <sub>2</sub> V <sub>2</sub> - /pē-so/                        |
| 4. Play     | • CCV -> CV /pe/  |
| 5. Brother  | • CCVCV -> CVC <sub>2</sub> V <sub>2</sub> /bʌ-dʌ/                          |
| 6. Scissors | • CVCVC -> CVCV <sub>2</sub> /sɪ-sʌ/  |
| 7. Teacher  | • CVC <sub>2</sub> V <sub>2</sub> ->CVC <sub>2</sub> V <sub>2</sub> /ti-tʌ/ |
| 8. lunch    | • CVCC->CVC/wʌ:t/   |

Kaufman, N. (2013) *Children Who Struggle to Speak: The Kaufman Speech to Language Protocol* [Workshop]  
Retrieved from: file:///C:/Users/becky/Downloads/2187\_Handout\_091220131210pm.pdf

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### Practice Syllable Shapes- Phrases

- |                   |  |
|-------------------|--|
| 1. Got it         | 1. /gʌdɪ(t)- CVC <sub>2</sub> V <sub>2</sub> (C)                           |
| 2. I want it      | 2. /aɪ wʌnɪ(t)- V CVC <sub>2</sub> V <sub>2</sub> (C3)                     |
| 3. Wanna go       | 3. /wʌnʌgo/- CVC <sub>2</sub> V <sub>2</sub> C <sub>3</sub> V <sub>3</sub> |
| 4. I need a...    | 4. /aɪ ni:dʌ/- V CVC <sub>2</sub> V <sub>2</sub>                           |
| 5. Go potty       | 5. /go pʌdi/- CV CVC <sub>2</sub> V <sub>2</sub>                           |
| 6. Where'd it go? | 6. /wɜːrdɪ go/- CVC <sub>2</sub> V <sub>2</sub> CV                         |
| 7. My turn        | 7. /mʌl tɜː(n)- CVC <sub>2</sub> V <sub>2</sub> (C3)                       |
| 8. He's eating    | 8. /hɪz ɪti/- CVC VCV  |

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### Principles of Motor Learning

- Many repetitions needed to establish motor patterns
- Against Successive Approximations- takes too long to establish a new pattern
  - But approximations might be developmentally normal (i.e. w/r)
- **NEED ACCURATE PRODUCTIONS!**
  - Do NOT want to practice incorrectly!
    - Errorless productions
    - As much as possible, choose targets that have sounds the child can say
  - Co-Speaking with fading
- Practice single word/target (blocked practice), then mix them up (random practice)
- Backwards Chaining

Mass, E. (July 2010) *Principles of Motor Learning applied to Childhood Apraxia of Speech, An Overview and New Evidence*. 2010 National Conference on Childhood Apraxia of Speech, Pittsburgh, PA.

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### Backwards Chaining Examples

#### Potato

- -to
- Tay-to
- Po-tay-to

#### Extinguisher

- /ekstɪŋwɪʃə/ = Ek- sting- wish- er
- -wisher
  - Sting-wisher
  - Ek-sting-wisher

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### Practicing Words

- "Kaufman Cards" (Kaufman (K-SLP) Treatment Kit-1 Basic Level ©)
  - Work through each syllable shape
- Word FLiPs ©
  - Once CV words are mastered, can help train CV+CV+CV words
- iPad pictures- (homemade)
  - School related words
  - Verbs+ ing
- Articulation apps (any)
  - Choose sounds they can say in the medial position of words to work on CVCV words

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### Practicing Words

- Make the words as functional as possible
- Establish a syllable shape and find words from their environments (names, etc.) that fit that syllable shape
- After 2-syllable words are established, practice verbs+ing- it will help with carryover and will also target language goals
- If it takes other children 100 repetitions to master, it might take a child with CAS 1000 repetitions!

Kaufman, N. (2013) Children Who Struggle to Speak: The Kaufman Speech to Language Protocol [Workshop] Retrieved from: file:///C:/Users/becky/Downloads/2187\_Handout\_091220131210pm.pdf

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## Teaching Final Consonants

Final consonants are a big deal toward intelligibility!

Some kids produce them easily; for others, it is very difficult to get that motor pattern.

- Start with VC
- Try CVC words, if too difficult:
  - Can I... (/kæ-nal/ → /kæn...al/)
  - Got a... (/gə-t/ → /gət.../)
  - Need a... (/ni-d/ → /nid.../)
  - Want a... (/wā-t/ → /wāt.../)

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## What about new speech sounds?

- My student has a limited number of phonemes! He can't just say /p,b,m,t,d/!!!
- True, but...
  - Without the structure of the syllables, new sounds will have nowhere to go
  - You can teach a new sound ONLY in syllable shapes they can already say
  - I recommend getting 2-syllable words down before teaching new sounds

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## Choosing new sounds to target

- Use sounds they have accidentally produced, or can produce with minimal cuing
- If not stimulable for other sounds, try fricatives first
  - Practice blowing activities
    - Blow tissues in front of your face
    - Blow cotton balls across table with use of a bendy straw
    - Blow horns/kazoos
    - See how long they can maintain forward flow of air
  - Practice blowing with articulation
    - Voiceless will likely be easier than voiced, because it's one less thing to teach
- Be aware that sometimes it is easier for kids to get sounds at the ends of words than at the beginning of words
  - Then start with VC and CVC words

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Work on Carryover activities as soon as possible!

- Language is often significantly delayed. They have not had the practice to build language. Try to start building functional use of sounds in language.
- Apraxia does not generalize well- must get practice in real time to make it stick!

Kaufman, N. (2013) Children Who Struggle to Speak: The Kaufman Speech to Language Protocol [Workshop]

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## Carryover Activities

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- Farm Set
- VC
  - Oink, up, eat, in, out
  - CV
  - Cow, moo, baa, neigh, walk, go
  - CVCV
  - Moomoo, baabaa, byebye, peepee(p), night-night
  - VCV
  - Open, I want,
  - CVC,V<sub>2</sub>
  - My turn, go here
  - CVC
  - Pig, sheep, horse,

### Carryover Activities

Preschool/ Early Elementary

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**Carryover Activities**  
Preschool/ Early Elementary



**Marble Run**

- > Drill words before each piece and/or marble
- > Or, within the activity:
- > VC
  - > Up, on, in
- > CV
  - > Down (/dau/), ball, more /mo/, please /pi/, one (/wʌ/), two, blue (/bu/)
- > CVC;V<sub>2</sub>
  - > More please (/mo pi/), blue please, marble, yellow
- > CVC
  - > Red, green, help

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**Carryover Activities**  
Preschool/ Early Elementary




**Blocks**

- > VC
  - > On, off, up, M (/em/), S (/s/)
- > CV
  - > P, D, blue (/bu/), more (/mo/), two
- > CVC
  - > Block (/bak/), please (/piz/), red
- > CVC;V<sub>2</sub>
  - > Can I, ready,
  - > Phrases: Ready, set, go!, Can I... have it, I do,
- > Good to work on concepts!
  - > Spatial, Colors, Numbers, Letters

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**Carryover Activities**  
Preschool/ Early Elementary

Other related activities:








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## Carryover Activities

School Age




Board Games

Phrases:

- I go (VCV)
- My turn (CVC<sub>2</sub>V<sub>2</sub>(C))
- I got (VCV(C)) + color or number word

CandyLand: lots of activity on the board- talk about what the characters are doing: hiding, eating, throwing

Hi Ho Cherry-O: can call them "apples"- build phrases: one apple, no apples, bad dog

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## Carryover Activities

School Age




Card Games (Go Fish, Matching)

- Use artic cards or other picture cards with words they can say, or regular cards with numbers

Phrases:

- I have it (/al hævI/)
- Do you (/duju/) have a (/hævʌ/)
- I don't (/aldɒ/)... have it (/hævI/)
- I got (/aɪgə/)... two \_\_\_\_\_
- No match (/nɒmæt/)

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## Carryover Activities

School Age

- Use classroom vocabulary
- During Centers, give them phrases that they can say repetitively during each activity
  - Dice games: I got (/aɪgə/)...+number
  - Letter names
  - Words they are spelling
- Find out repetitive phrases used in the classroom
  - I am here today (to blend between vowels, use /j/- /aljæm hɪə tədeɪ/)
  - Can I go... (/kæn aɪgə/)
  - I need (to) go potty
- Books
  - Practice verbs+ing to talk about actions "He is walking" (/hɪz(w) wɔːkɪŋ/)
  - Great for answering questions to work on spontaneous productions

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Meet AZ

- In high school
- Looks like artic case: /l/ /r/, th, sh, ch, j
- BUT groping for sounds, inconsistent productions, perseverating on previous sounds/syllables
- No real progress in therapy- same errors since grade school

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Older students

- Still look at syllable shape!
- Practice vocabulary words that are meaningful
  - See AZ School Word List
  - [AZ School Word List.xlsx](#)

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Older students- Articulation Needs

Think of Principles of Motor Learning when addressing articulation errors

- Will need many more repetitions to achieve sound mastery- many more years of negative practice to overcome
- Listen for accidental correct production of errored sounds
  - AZ could say /ar/- use it to try and get /r/ initial (around → a round)
  - AZ could say "ch"- use it to try and elicit "sh" ("it should" = /itʃʊd/ → /it...ʃʊd/).
- Might need to pay close attention to vowel shapes near the target sound
  - Lee (/li/) might be really different than La (/la/) due to coarticulation
  - See AZ L-word list [AZ L-words.docx](#)

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### Remember Rocco?

- Three years later, he is a much different kid!
- Articulation errors- /r/, /s/ vs "sh" vs "ch"
- Oral groping
- Slow to "set" mouth and produce the sounds
- Perseverations of earlier productions
- Prosody is a little "off"




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## IEP Goals

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### Goals RF

- Old Goal:
  - By the end of this IEP, during a structured articulation task, when given a set of picture cards, RF will independently use /k/ and /f/ sounds in words with 80% accuracy in 3 out of 4 trials, as measured by anecdotal records.
- New Goal:
  - By the end of this IEP, RF will produce age-appropriate sounds in grammatically correct simple sentences in imitation with 75% accuracy on 2 out of 3 trials, as measured by therapist's data collection sheets.
    - 1.1 RF will produce medial consonants in multi-syllabic words in phrases with 75% accuracy following a model on 2 out of 3 occasions.
    - 1.2 RF will produce final consonants in words and phrases, given a model, with 75% accuracy on 2 out of 3 occasions.
    - 1.3 By the end of this IEP, RF will produce fricative sounds (/s/, "sh", /h/, /z/) in words and phrases when given a model with 75% accuracy on 2 out of 3 occasions.
    - 1.4 RF will produce back sounds (/k/, and /g/) in syllables and words when given a model with 75% accuracy on 2 out of 3 occasions.
    - 1.5 RF will produce simple, grammatically correct sentences containing "is", "the", "to", etc. to describe pictures with 75% accuracy on 2 out of 3 occasions.

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### Goals- Rocco

- Rocco will produce sounds in a variety of syllable shapes to support production of words and phrases/sentences that are understood by teachers and peers and are 90% accurate on 3 consecutive sessions.
- Rocco will produce age-appropriate sounds in 5 different syllable shapes (VCV, CVCV, CVCV2, CVC2V2, CVC) with 90% accuracy of consonants (C) and vowels (V) on 3 consecutive sessions.
- Rocco will spontaneously name people, objects, and places, using correct vowels and age-appropriate consonants 90% of the time on 3 consecutive sessions.
- Rocco will produce simple phrases and sentences to request and describe pictures or actions using age-appropriate speech sounds with 90% accuracy on 3 consecutive sessions.

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### AZ (in HS, looks like articulation)

- By the end of this IEP, AZ will fluently produce multisyllabic words chosen from books, readings, and/or vocabulary lists in sentences with only one attempt at doing so with 85% accuracy on 4 out of 5 occasions,
- AZ will fluently produce multisyllabic words chosen from books, readings, and/or vocabulary lists in sentences with only one attempt at doing so with 85% accuracy on 4 out of 5 occasions,
- AZ will fluently produce the /l/ sound in the initial and medial positions of words, and in blends in sentences with 85% accuracy on his first attempt on 4 out of 5 occasions,
- AZ will fluently produce the /r/ sounds in all positions of words in sentences with 85% accuracy on the first attempt on 4 out of 5 occasions
- AZ will produce the "sh" sound in all positions of words with 85% accuracy on the first attempt on 4 out of 5 occasions,
- AZ will produce past tense verbs with ed endings (final sound blends) in spontaneous sentences with 80% accuracy on 4 out of 5 occasions,

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### Goals- PH- (in K, severe CAS)

- By the end of this IEP, PH will produce phrases with correct vowel sounds and syllable shapes and will self-evaluate the accuracy of her productions 80% of the time on 4 out of 5 occasions,
- PH will produce correct vowel sounds in all target words and phrases with 80% accuracy on 4 out of 5 occasions.
- PH will produce words in 3 different syllable shapes (CVC<sub>2</sub>V<sub>2</sub>, CVC, CVCVCV), and in phrases with 80% accuracy on 4 out of 5 occasions.
- PH will spontaneously produce mastered words to answer questions, name, or request 80% of the time on 4 out of 5 occasions.
- PH will listen to her attempts at target words and determine if it was accurate or not with 80% accuracy on 4 out of 5 occasions.

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### Goals- AS (in K, severe CAS)

- By the end of this IEP, AS will produce sounds in a variety of syllable shapes in simple sentences to describe pictures with 80% intelligibility on 3 out of 4 occasions as measured by therapist's data collection sheets.
- AS will produce medial and final consonants in 5 different syllable shapes (VCV, VC, CVCV, CVC<sub>2</sub>V, CVC where C= Consonant and V= Vowel) with 80% accuracy in each syllable shape on 3 out of 4 occasions,
- AS will produce the correct initial consonant in picture naming tasks, including long sounds (/s/, /l/, /sh/), with 80% accuracy on 3 out of 4 occasions
- AS will produce simple Subject-Verb-Object sentences with correct pronouns and "is", when appropriate, to describe actions in pictures with 80% accuracy on 3 out of 4 occasions

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### Questions?

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### References

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Useful Websites

- [www.kidsspeech.com](http://www.kidsspeech.com) (Nancy Kaufman)
- [www.apraxia-kids.com](http://www.apraxia-kids.com) (formerly knowns as CASANA)
- [www.asha.org](http://www.asha.org)

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