

IMPLEMENTATION GUIDELINES FOR SPEECH IMPAIRMENT WITH AN ARTICULATION DISORDER*



**TEXAS SPEECH LANGUAGE HEARING
ASSOCIATION**

2010

***This manual is to be used as an extension of, or to augment, the TSHA Eligibility Guidelines for Speech Impairment, 2009. It is not intended to be used as a standalone guide.**

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***For information regarding articulation evaluation in students with cultural and linguistic diversity, see the CLD Articulation Eligibility Manual.**

****Indicates forms that are essential to completing a comprehensive evaluation but are district specific and therefore not included in this manual.**

I. General Information

PURPOSE AND INTENDED USE OF THE ARTICULATION ELIGIBILITY GUIDELINES

The purpose of the Articulation Eligibility Guidelines is to provide a structure within which the speech-language pathologist (SLP) can use consistent, evidence-based evaluation practices in accordance with the law to:

- Provide information to teachers and parents regarding the nature of articulation and disorders of articulation and, when indicated, provide classroom intervention recommendations based on data collected by the Student Support Team (SST).
- Complete a comprehensive evaluation of a student's articulation abilities following a referral for articulation concerns for a Full and Individual Evaluation (FIE) for special education.
- Identify whether an articulation disorder is present.
- Determine if the presence of an articulation disorder results in a disruption in academic achievement and/or functional performance, and document the need for specially designed instruction by the speech-language pathologist (SLP).
- Make recommendations to the Admission, Review, Dismissal (ARD) Committee regarding eligibility for special education services and support based on speech impairment (SI).

These guidelines are intended to be used in combination with the information provided in the *Texas Speech Language Hearing Association (TSHA) Eligibility Guidelines for Speech Impairment, 2009*, with the understanding that use of the tools in this articulation guidelines manual require additional, specialized training. SLPs should become very familiar with the information in that manual and be aware that information from both manuals is essential to completing a comprehensive evaluation of articulation.

Please see the *Texas Speech Language Hearing Association (TSHA) Eligibility Guidelines for Speech Impairment, 2009*, for additional information (available online at www.TSHA.org).

II. Informational Materials Regarding Articulation

A. INFORMATION ON ARTICULATION AND DISORDERS OF ARTICULATION FOR PARENTS AND TEACHERS*



Articulation

Articulate: 1. In speech, to execute the movements and adjustments of the speech organs necessary to make a speech sound. 2. Able to satisfactorily express oneself with words; easy and fluent verbal expression of thoughts, attitudes, feelings, etc. (Nicolosi, 1989).

An individual has an articulation problem when he or she produces sounds, syllables, or words incorrectly so that the listener does not easily understand what is being said. For example, children who say “ring” as “wing” are substituting /w/ for /r/. Another example of a substitution is the interchanging of /th/ for /s/ so that “soup” is pronounced “thoup.” Substitutions are the most frequent speech errors. When a sound is said inaccurately, but sounds something like the intended sound, it is called a distortion. The child may also omit sounds. The articulation disorder affects the student’s ability to accomplish the listening and speaking grade level standards or TEKS. It may also impact the student’s oral reading, spelling, and relations with peers. In a school environment, articulation therapy refers to the remediation process for correcting errors of specific speech sounds that impede the learning process.



Are some sounds easier to produce than other sounds?

Defined most simply, a phoneme is a speech sound. Phonemes differ across regions of the United States. These are what we hear as a region’s “accent” or “dialect.” An example of this is the way a Texan may pronounce the /r/ in comparison with someone who is native to New York.

Phonemes are produced by moving the articulators of the mouth. These include lips, tongue, and teeth. Varying sounds can be made when articulators are used either together or alone. The earliest sounds a child makes are usually either bilabial or lingua-alveolar. Bilabial sounds refer to using both lips, as in the /p/, /b/, and /m/ phonemes. Lingua-alveolar refers to using the tongue and the ridge of tissue behind the teeth, as in the /t/ or /d/ phonemes. This explains why a baby’s first words may be “dada” or “mama.” As a child develops, his mouth grows. Sounds requiring elaborate tongue placement are very difficult for a young child due to the size of his mouth and the amount of control he has over his tongue movement (Weiss & Gordon, 1987). Later-developing sounds include /r/, /s/, /z/, /th/, /sh/, and /ch/.

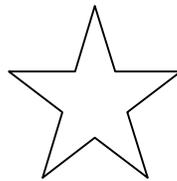


Why do some children exhibit articulation errors?

Learning speech sounds begins at a very early age. Sounds are learned as the child listens to the speech around him/her. Frequent ear infections during this important listening period may result in later articulation errors. Articulation problems may also be directly related to dental problems or physical handicaps, such as cerebral palsy, cleft palate, or hearing loss. While it is possible that the above issues may result in speech errors, not all causes are readily identifiable.

What should I do if I suspect a child has an articulation problem?

Consult with your speech-language pathologist (SLP) to determine whether the errors you are hearing are developmentally appropriate for that child's age. If not, or if you note a number of sound errors, contact the person in charge of the Student Support Team (SST) and ask that the child be added to the meeting's agenda for discussion with parents and teacher(s). It is recommended that the hearing and vision screening and the parent and teacher Articulation Observations be completed before concerns are addressed by the SST. The SST may make recommendations for interventions by the general education teacher and/or SLP; see "Classroom Considerations and Articulation Intervention Recommendations" in Section II-B of this manual. If these interventions are not deemed successful in a reasonable time period or if the child presents with an obvious disability, a referral for a Full and Individual Evaluation (FIE) for special education may be warranted. With parental notice and consent, the SLP will then begin the process of evaluating the child. If the child exhibits an articulation disorder that interferes with mastery of grade level objectives or TEKS, an Individual Education Program (IEP) may be designed for the child so that remediation of the error(s) can be addressed.



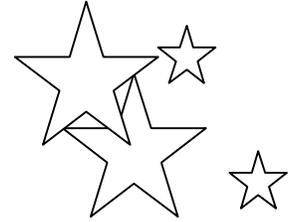
Nicolosi, L. (1989). *Terminology of Communication Disorders*, 3rd ed. Baltimore: Williams & Wilkins.

Weiss, C., & Gordon, E. (1987). *Clinical Management of Articulatory and Phonological Disorders*, 2nd ed. Baltimore: Williams & Wilkins.





When Is a Sound Error a Concern?



★ **K/G plus additional sounds**
Kindergarten

★ **S plus additional sounds**
First grade

★ **S only or R plus additional sounds**
Second grade

★ **R only**
Third grade

/th/ as the only sound error can possibly be remediated in the classroom



Note:

Very rarely will other sounds, such as /l/, /sh/, /ch/, /f/, and /v/, be the *only* sound a child will produce incorrectly. These sounds are considered the “additional sounds” referred to in the list above. Normally, if these additional sounds are produced incorrectly, /s/, /t/, /k/, or /g/ may also be produced incorrectly.



Going Forward with a Concern



Based on the information provided in the preceding pages, look at the following students and indicate one of the following: going directly to a referral, implementing classroom interventions, or waiting to see if the student develops the sound given more time. (R= referral; C = consider waiting or classroom intervention)



1. A 1st grader who pronounces “red” as “wed.”
2. A 4th grader who pronounces “paper” as “papah” and “several” as “several.”
3. A 2nd grader who pronounces “calling” as “cawing.”
4. A 3rd grader who says “dood” for “good.”
5. A kindergartener who says “fumb” instead of “thumb.”
6. A 1st grader who pronounces “please” as “pweath.”



Practice:

What are two sounds that are still developing in a kindergarten student? Show your partner how these sounds are frequently misarticulated.

What forms should be completed prior to a referral for speech evaluation?

Think of one way you can help address the correct production of a sound in your classroom for a student who exhibits a speech error.

Suggestions for Parent/Teacher Presentations

Forums for Presentations

- Staff Meetings
- Grade Level Meetings
- Team Leader Meetings
- Student Support Team
- Brown Bag Luncheon
- PTA Meetings
- Brochures for Teachers/Parents

Topics for Presentations

- What Is Articulation?
- When Is a Sound Error a Concern?
- Going Forward with a Concern
- How to Implement Classroom Intervention Recommendations

Resources for Parents and Teachers

- Speech-Language Pathologist at Local Campus
- ASHA Website (www.asha.org) [**Site Location:** Home > The Public > Speech, Language & Swallowing > Development >]
- Pre-referral Intervention Recommendations

B. CLASSROOM CONSIDERATIONS AND ARTICULATION INTERVENTION RECOMMENDATIONS

The following suggestions may be given to classroom teachers and/or parents as recommendations for stimulating sound production prior to referral for a Full and Individual Evaluation (FIE) for special education services. The SLP should check for level of understanding of each recommendation through the Student Support Team (SST) meeting.

Consideration or Recommendation	Check if Attempted	Results
1. Be sure student's hearing has been checked within last 3 months.		
2. Determine if more than one language is spoken in the home.		
3. Discuss with parent and teacher the developmental appropriateness of sound errors in question.		
4. Determine if the student recognizes a difference in the correct and error sounds. Say a word with the error sound and with the correct sound and ask if student knows the correct production. For example, "rain" and "wain"		
5. Teacher or parent may talk with the student about the error sound and what he/she may do differently. An example is raising the tongue tip to say /l/ instead of rounding lips for /w/ for the w/l substitution. Be sure the parent or teacher emphasizes the "sound" and not the "letter" targeted: /l/ instead of /el/.		
6. Reinforce correct productions of words containing target sound(s). It is recommended that this be done privately or without calling undue attention to the student's error sounds.		
7. Allow student to tape record a sample of his speech and identify correct or error sounds.		
8. Provide practice times for teacher, parent, or peer to model correct production of the sound.		
9. When the student is using the sound correctly in some contexts, the following may be helpful reinforcing activities: <ul style="list-style-type: none"> a) Ask student to cut pictures from magazines or draw pictures of words containing the error sound(s). b) Make the student a list of words containing the error sound(s) to read for practice. c) Use words from student's reading material, spelling lists, and everyday vocabulary for practice. d) Student, parent, or teacher may keep a list of difficult words to practice at specific times. 		
10. It is recommended that attempts to stimulate or reinforce correct sound production be discontinued at any time the child shows a resistance to the activities or frustration with attempts to make correct sounds. These concerns should be brought to the attention of the Student Support Team.		

III. Data Collection for Student Support Team

A. HEALTH INFORMATION

Health information forms are essential to completing a comprehensive evaluation but are district-specific and therefore not included in this manual.

B. PARENT AND TEACHER INFORMATION

General student information from the teacher is essential to completing a comprehensive evaluation but is district-specific and therefore not included in this manual.

General student information from the parent is essential to completing a comprehensive evaluation but is district-specific and therefore not included in this manual.

Parent/Teacher Articulation Observation forms are provided on the following page.

C. STUDENT SUPPORT TEAM DELIBERATIONS

Student support team deliberations are essential to completing a comprehensive evaluation. The forms are district-specific and therefore not included in this manual.

D. RESULTS OF CLASSROOM INTERVENTIONS

Results of classroom interventions, including the student's response to focused interventions, are essential to completing a comprehensive evaluation. The forms are district-specific and therefore not included in this manual.

Parent/Teacher Articulation Observations

Student: _____ Date of Birth: _____ Child's Age: _____
 Campus: _____
 Person Completing Form: _____ Date Form Completed: _____

Directions: Listen as your child/student engages in conversation with you. Indicate which sounds you note the child is producing incorrectly (+ indicates correct, - indicates incorrect). You may circle the words indicating the sound is said incorrectly in the beginning, middle, or end of the word. You may consider any words the child says with the indicated sound, not just those listed.

Sound	+	-	Sound	+	-
/p/ as in <u>p</u> ig, <u>a</u> pple, cu <u>p</u>			/f/ as in <u>f</u> ood, co <u>ff</u> ee, o <u>ff</u>		
/b/ as in <u>b</u> aby, we <u>b</u>			/v/ as in <u>v</u> ote, o <u>v</u> en, st <u>ov</u> e		
/t/ as in <u>t</u> oy, wa <u>t</u> er, ba <u>t</u>			/s/ as in <u>s</u> ock, mi <u>ss</u> ing, i <u>ce</u>		
/d/ as in <u>d</u> oll, mi <u>dd</u> le, be <u>d</u>			/z/ as in <u>z</u> oo, fu <u>zz</u> y, fu <u>zz</u>		
/k/ as in <u>k</u> ing, po <u>ck</u> et, ra <u>k</u> e			/sh/ as in <u>sh</u> oe, wi <u>sh</u> ing, fi <u>sh</u>		
/g/ as in <u>g</u> oat, bu <u>gg</u> y, ta <u>g</u>			/zh/ as in ple <u>as</u> ure		
/m/ as in <u>m</u> ad, ha <u>mm</u> er, th <u>umb</u>			/ch/ as in <u>ch</u> air, wa <u>ch</u> ing, pi <u>ch</u>		
/n/ as in <u>n</u> ame, fu <u>nn</u> y, fa <u>n</u>			/j/ as in ju <u>d</u> ge, en <u>g</u> ine		
/ng/ as in fi <u>ng</u> er, ri <u>ng</u>			/th/ (soft) as in <u>th</u> ing, hea <u>th</u> y, to <u>oth</u>		
/r/ as in <u>r</u> un, ca <u>rr</u> ot			/th/ (hard) as in <u>th</u> ose, bro <u>th</u> er, ba <u>th</u> e		
/er/ as in <u>e</u> arly, nu <u>r</u> se, fu <u>r</u>			/w/ as in <u>w</u> ay, any <u>w</u> ay		
/l/ as in <u>l</u> ion, pi <u>ll</u> ow, ta <u>ll</u>			/y/ as in <u>y</u> ellow, ca <u>ny</u> on		
/h/ as in <u>h</u> at, any <u>h</u> ow			Number of missed sounds:		

To the parent: Do you feel the sound errors you noted are typical for children who are your child's age? Yes or No (Please circle.)

Please list at least 20 words your child has difficulty pronouncing: _____

To the teacher: Do you feel these sound errors adversely affect the student's educational performance? Yes or No (Please circle.)

If yes, please comment: _____

IV. Standardized Assessment of Articulation

A. GUIDELINES FOR ADMINISTERING STANDARDIZED TESTS OF ARTICULATION

1. Guidelines for administering the standardized test
 - a. It is important to follow the standardized instructions in the manual. Deviations from the standardized procedure must be reported and results interpreted in light of those modifications.
 - b. The most common concern in test administration is children being unable to name the pictures.
 - (1) The most commonly used solution is to ask the child to imitate the word.
 - (2) Differences between spontaneous and imitated words must be considered.
 - (3) Kresheck & Socolofsky (1972), Templin (1957), Siegel et al. (1963), and Paynter & Bumpas (1977) all compared spontaneous naming and imitation of words without clear results as to a difference in how the child produces the word. The question as to whether or not it would clinically make any difference has not been answered.
 - (4) At a minimum, the speech-language pathologist (SLP) should record whether the utterance was spontaneous naming or an imitation of the word.
2. Guidelines for transcribing standardized tests
 - a. Every word that has any articulation error should be transcribed in its entirety using either diacritical markings or an expanded phonetic alphabet.
 - b. Words articulated without error need not be transcribed.
3. Guidelines for completing the test protocol
 - a. All identifying information should be completed.
 - b. *Remember:* Percentiles, not standard scores, should be recorded for tests of articulation. See information from the Goldman Fristoe 2 Test of Articulation on page 19 of this manual.
 - c. Age scores should not be entered on the form.
4. For English Language Learner (ELL) students, see the Cultural and Linguistic Diversity (CLD) Companion to this manual.

B. STANDARDIZED TESTS OF ARTICULATION

Goldman-Fristoe 2* Test of Articulation

Goldman-Fristoe 2 Test Information

GFTA-2

- Purpose is to assess an individual's articulation of consonant sounds used in Standard American English.
- The test samples both spontaneous and imitative sound production.
- There are three sections included in the test: sounds-in-words, sounds-in-sentences, and stimulability.
- Normative information is available for interpreting the results of the sounds-in-words section.
- No reading is required of the examinee.

Sounds-in-words section

- Takes approximately 5 to 15 minutes to administer
- Contains 34 picture plates with 53 target words
- Tests 61 consonant sounds in initial, medial, and final position
- Tests 16 consonant clusters in initial position

Sounds-in-sentences section

Provides semi-structured observation of the examinee's spontaneous sound production by asking the examinee to retell one or two simple picture-based stories.

Stimulability section

Assesses examinee's ability to correctly produce a previously misarticulated sound after the examinee watches and listens to the examiner's production.

Notations:

- Substitution: Write substituted sound in cell
- Omission: Mark cell with an Ø
- Distortion: Write 2 in cell for mild distortion, write 3 in cell for severe distortion
- Addition: Write additional sound plus the correct sound

GFTA-2 norms information

- Normed for ages 2-0 through 21-11
- Normed on a nationwide sample of 2,350 examinees. This sample matched most recent U.S. Census data on gender, race/ethnicity, region, and mother's education.
- Added standard scores: mean = 100; standard deviation = 15
- There is not a precise age at which use of any given consonant sound "turns on."
- 23 of 25 sounds are included on the test. The two sounds not included are:
/hw/: Not phonemic in most dialects and not normally a focus in therapy.
/_/: Least frequently occurring consonant; not a high priority in therapy, and the words that contain this sound are typically outside of a young child's vocabulary.

*Goldman, R., & Fristoe, M. (2000). *Goldman-Fristoe Test of Articulation*, 2nd Edition. American Guidance Service.

Scoring

Standard scores:

- *A standard score indicates the distance of an individual's raw score from the average, taking into account the variability of scores among examinees of that age.*
- *Distribution of articulation errors across ages are greatly skewed, so counting the number of errors will not create a normal distribution at most ages.*
- *Percentiles should be used.*

Percentile rank:

- *A percentile rank indicates the percentage of individuals in the reference group who performed at or below the examinee's level.*
- *In the case of articulation, percentiles may be a more appropriate way of representing the child's ability than standard scores.*
- *Percentiles are an ordinal or rank order measurement, rather than an interval scale of measurement (standard score).*
- *Percentiles cannot be arithmetically manipulated.*

Standardization

- May–November 1999; done to collect data to develop national norms.
- 2,350 examinees between ages 2-0 and 21-11 were tested at more than 300 sites nationwide.
- A random sampling procedure selected 1,175 males and 1,175 females.
- The authors looked at genders separately because of the gender differences in developmental growth of articulation abilities.
- There was an even distribution by region and socioeconomic status (based on mother's education).
- Special education children were included in representation.

Internal reliability: the internal consistency of the items or tasks on the test

- High internal reliability reflects that all items of the test are measuring the same type of performance or content domain.
- GFTA-2 task is to look at consonant articulation ability.
- The median reliability was .96 for females and .94 for males.

Standard Error of Measurement (SEM):

- When the individual's standard score on a test is banded by its SEM, there is a 68% chance that individual's true score falls within this interval.
- Median of SEM on the sounds-in-words section is 3.0 for females and 3.7 for males.

Test/re-test:

- The test was administered twice to 53 examinees ranging from ages 4-6 to 7-0.
- Interval between tests ranged from the same day to 34 days; median interval was 14 days.
- Same examiner administered both tests.
- The percent of agreement for presence of error between the first and second testing for each test item was high. See Table 6.3 on p. 53 in test manual.

Interrater reliability: Two examiners tested the same sample of 30 people twice.

- Their agreements ranged from 100% to 70%.
- For more than half of the judgments, the 2 examiners were in 90% or greater agreement.
- See Table 6.4 on p. 54 in test manual.

Content validity: Do the items tested adequately sample the domain that the test says it measures?

- GFTA-2 tests 23 of 25 consonants; the 2 not included are on lower intervention priority; 16 more commonly occurring consonant clusters are used.

Construct validity: Is the test measuring what the test says it measures?

- GFTA-2 claims to measure the ability to correctly articulate consonants and consonant clusters.
- The evidence is provided by the developmental progression of total raw scores and of item scores.
- Table 6.5 on p. 55 in the test manual shows a steady decrease in mean raw scores as measured by the number of articulation errors.
- Table 6.6 on p. 56 in the test manual indicates the age at which 85% of the standardization sample correctly produced the consonant.

Goldman-Fristoe 2 Ages for Concern

<u># GFTA errors</u>	<u>Female</u> (Yr-Mo)	<u>Male</u> (Yr-Mo)
3	11	13
4	10	11
5	9-6	11
6	8-6	10
7	8-3	9
8	8	8-6
9	7-9	8-3
10	7-6	8-3
11	7-3	8
12	7	7-9
13	6-8	7-9
14	6-8	7-9
15	6-6	7-6
16	6-2	7-3
17	6-2	7
18	6	7
19	5-10	6-10
20	5-6	6-8
21	5-4	6-8
22	5-4	6-6
23	5-4	6-4
24	5-4	6-4
25	5-4	6-2
26	5-2	6
27	5-2	5-10
28	5-0	5-8
29	4-10	5-8
30	4-10	5-4
31	4-10	5-4
32-33	4-8	5-2
34-35	4-6	5-0
36-37	4-6	4-10
38-39	4-4	4-8
40-41	4-2	4-6
42-43	4-0	4-4
44	3-10	4-2
45-46	3-10	4-0
47-48	3-8	3-10
49	3-6	3-8
50	3-6	3-6

f/v	8 errors
k/g	11
l	9
sh	3
ch	3
s/z	10
r	9
th	5

Arizona Articulation Proficiency Scale, 3rd Revision* (Arizona 3) Information Sheet

Test

- Simple picture presentation format (42 line drawing pictures)
- Administration and scoring can take 2 to 10 minutes.
- Scoring is done by a total score on a scale 1 to 100.
- Column labeled “90% Mastery Age” lists the youngest age group in which 90% of the participants were able to produce the sound correctly.
- Test covers all major speech sounds in the English language, including initial and final consonants, blends, diphthongs, and vowels (67 sounds tested).

Four major purposes of the Arizona 3 assessment

- Determine whether a child is eligible for services.
- Determine whether an in-depth assessment is needed in related areas.
- Identify strengths and weaknesses of the child.
- Develop an individualized therapy program for the child.

Recording errors

- Record type of error for substitution
- Omissions (Ø)
- Distortions (X)
- Tongue Thrust (TT)
- Protrusional lisp (pro)
- Lateral lisp (lat)

Scoring the test

- **Total score:** based on the frequency of occurrence value for the speech sounds produced correctly. This score is put in normative context by comparing it to same age groups and also gender in some cases.
 - Each sound is weighted according to how frequently it occurs in American speech. Sound values were determined by the Barker (1960) and Barker & England (1962) studies.
 - The total of all 67 values adds up to 100.
 - This weighted value leads to more generalization on how the sound will impact the examinee’s intelligibility on a daily basis.
- **Standardized score:** The total score can be used to compare individuals to their age peers. Mean of 100; standard deviation of 15.
 - For ages 1-6 to 5-11, the normative scores are in separate tables depending on gender.
 - For ages 6-0 to 18-11, gender has not proved to be a clinical relevant factor in development; for this group total score is compared to age norms.
- **Z-scores:** Mean of 0 and standard deviation of 1
Example: If an examinee scores a –1 Z-score, it means they are one standard deviation below the mean.
- **Normal curve equivalents:** Convert percentiles to interval scores to compare individuals or groups.
- **Percentile rank:** Placement of the examinee’s performance in the normative sample. Authors of this test recommend use of standardized Z-scores and standard scores for this measure.

- **Optional assessment tasks:** These tasks are not formally standardized (except the word reading administration) but are tasks that can be used to gather more informal information.
 - Word Reading Administration: alternate method for administering the standard Arizona 3 by allowing the examinees to read a list of printed words
 - Make sure the examinee reads slowly to be able to record errors.
 - This is not meant to be a reading task; if the examinee has difficulty reading the words, go back to pictures.
 - You can still calculate total and standardized scores.
 - Language Screening Task: small sample of the examinee’s overall language and cognitive skills
 - The picture cards provide brief questions or verbal prompts related to language developmental milestones.
 - The language screening items show an age range within which children should be able to produce specific responses (50% at a younger age and 90% at an older age).
 - Continuous Speech Language Sample: can collect a short sample of the examinee’s spontaneous utterances
 - Two additional cards are shown after the standard articulation picture cards.
 - The cards show groups of children involved in a variety of activities.
 - These cards are designed to encourage the examinee to describe the activities they see or recollections of their own activities.
 - The examiner should record verbatim the sample given by the examinee. No more than about 100 words need to be recorded. With younger children you might only get a couple of utterances.
 - All articulation errors should be noted.
 - Speech Intelligibility Interpretation Values:

The total score can be converted into an intelligibility rating. Since each sound is weighted according to its impact in everyday speech, the total score can be generalized to show how much the articulation errors impact intelligibility. This is NOT age-normed because it is a descriptive element. Descriptive information would not change based on the child’s age.
 - Level of Articulatory Impairment: Used for evaluating assessment results. The table defines ranges to represent mild, moderate, or severe levels of articulatory impairment. These ratings should be used as rough estimates based on the performance of the normative sample and using the standard deviation as the criterion for each level.
 - Percentage of Improvement Scores: Used to evaluate and retest to determine the percentage of improvement an examinee has made after a therapy plan has been put in place. There is a formula to follow that is provided on the last page of the test booklet.
 - Developmental Age Scores: Relates the total score to a normative group with the closest mean total score. *The use of this score is discouraged because it is often misunderstood.*

Standardization

- Re-standardized on a sample of 5, 515 individuals who represent the U.S. population in the years 1998–1999, according to
 - Geographic region (32 sites in 20 different states)
 - Ethnicity
 - Parents’ education level
 - Equal number of girls and boys from 18 months to 19 years

Test Reliability

- Standard Error of Measurement:
 - Estimate of how much an individual examinee's scores may vary in a range around the actual score.
 - It is important to keep this range in mind when looking at qualification.

- Internal Consistency:
 - Estimate of how clearly the individual test items are intercorrelated and ordered in difficulty across a set of students in a single study.
 - Estimates have been high across the variety of ages.
 - The study reported numbers ranging from .96 to .78, with the median of .925 for ages 1-6 through 1-11. The lower estimates were with older age groups.

- Rater Reliability:
 - Interrater reliability: consistency of test scores in scoring by different examiners
 - Mean interrater reliability over 3-year study was a coefficient of .82 with a range of .68 to .99; achieved by 16 examiners on 13 subjects in three phases of study.
 - Intrarater reliability: consistency of test scores in scoring by the same examiner
 - In a study of 29 children (1976), the examined intrarater reliability of 5 children was 95% averaged across all target sounds.

- Test-Retest Reliability:
 - 259 examinees, ages 1-6 to 19-5; test-retest interval was 1 week
 - Median correlation was $r = .97$

Test Validity

- Articulation test was administered to 45 children ages 6–12; articulation ranged from normal to severely impaired.
- One additional minute of spontaneous speech was tape recorded.
- Ten judges did the rating. The speech sample ratings were correlated with the Arizona total scores and there was a correlation of .92.
- This high correlation indicates a valid measure of articulatory proficiency.
- The Arizona 3 was compared to the Goldman-Fristoe 2: 612 examinees, ages 1-6 to 16-11. The correlation score was $r = .88$.

*Fudala, Janet B., Arizona Articulation Proficiency Scale, Third Revision, Western Psychological Services, 2000.

C. USE OF DEVELOPMENTAL NORMS FOR DETERMINING AN ARTICULATION DISORDER

The TSHA Articulation Eligibility Development Team determined that speech-language pathologists should not use developmental norms to make decisions regarding recommendations for eligibility as Speech Impaired for articulation disorders. This decision was based on several premises.

Primarily, there has been no consensus on the exact or even general age of development for speech sounds. Data from various researchers over many years of study have yielded a wide variety of results (for example, see chart below summarizing development of the /s/ sound).

A second premise is that the TSHA Eligibility Task Force has developed a scope of assessment for evaluation that is considered to be a more consistent and reliable process from which to identify the presence of a speech disorder.

Third, when a well-used test, the Arizona 3 Articulation Proficiency Scale, 2000, was reviewed, it was discovered that most preschool students (2-6 to 5-11) at various ages who had not acquired any of the sounds above their present age levels would have scored at 1.5 SD or greater below the mean, indicating a concern with their performance on this test (see chart).

There is usefulness in reviewing developmental norms, discussing these with parents and teachers, and considering them in determining steps to remediation.

Production of /s/ Sound (Bankson & Bernthal)

Study	Age of Acquisition	Percentage Required
Wellman et al. (1931)	5	75%
Poole (1934)	7 1/2	100%
Templin (1957)	4 1/2	75%
Sanders (1972)	8	90%
Prather et al. (1975)	3 / 4	75% / 90%
Fulda & Reynold (1986)	11	90%
Smit et al. (1990)	9	90%

Arizona Articulation Proficiency Scale, 3rd Revision

The following chart represents scores preschool children at various ages would achieve if they had mastered only those sounds as indicated by their age levels on the Arizona Articulation Proficiency Scale. The purpose was to show that almost all the age levels would have standardized scores in the area of concern if we were looking at developmental norms.

Gender Age Score SS SD

Girls	2-6 to 2-11	48.5	70	-2.0	Concern
Girls	3-6 to 3-11	65.5	76	-1.6	Concern
Girls	4-6 to 4-11	72	73	-1.8	Concern
Girls	5-6 to 5-11	81	75	-1.7	Concern
Boys	2-6 to 2-11	48.5	75	-1.7	Concern
Boys	3-6 to 3-11	65.5	79	-1.4	?
Boys	4-6 to 4-11	72	76	-1.6	Concern
Boys	5-6 to 5-11	81	76	-1.6	Concern

V. Informal Assessment of Articulation

A. RATIONALE FOR INFORMAL ASSESSMENT

The primary reason for completing informal assessment is to determine if the standardized test (usually a single word test) adequately tapped the child's skills. To determine if the single word test accurately represented the child's errors, a comparison needs to be made between the child's performance in single word and connected speech samples on an informal measure. If there is a difference, then it could be assumed that the single word, standardized test did not tap the child's true difficulties. If the single word and spontaneous samples are similar, then it can be assumed that the standardized test was an accurate representation of the child's skills. Of great importance is determining if there is a *difference* in the scores on the single word and connected speech samples. Of lesser importance is the level of scores independent of a comparison. In the event of a difference, there is evidence to suspect the accuracy of the standardized test for determining the presence of an articulation disorder. Following are some examples of informal measures:

1) Point-to-Point Comparison

Point-to-point comparison is a quick, side-by-side look at what parents, teachers, the SLP, and the standardized measure show. If all are in agreement, there is no need to complete further testing. If differences are noted, then more informal assessment may be indicated. If there is an apparent difference between single words and connected speech, one of the following informal measures is recommended. The results of these measures provide an indication of the magnitude of the difference between single words and connected speech, and objectively document professional judgment.

Example:

Ralph scores in the 11th percentile on the GFTA—not in the range of concern. Parent and teacher indicate he can't produce /r/, /l/, /st/, /sp/, /sk/, /str/, /sl/, /sw/, /skw/, /f/, /v/, and /th/. On the GFTA, he didn't miss /f/ or the /s/ blends. The single word test may not be an accurate measure of his number of errors. One of the following measures is indicated:

2) Percentage of Consonants Correct

This is a procedure that tells if the single word measure differs from the connected speech sample in the percentage of correct consonants. If different, the single word test score is underestimating the difficulties. It is the *difference* between single word and connected speech that is a concern. If the PCC on the connected sample is 15 points more than the PCC on the single word test, the standardized test may not be representative of the child's skill. The difference of 15 points was selected by looking at the data in the tables for severity presented in the referenced article.[†] The general point difference for the levels of severity was 20 points. The TSHA Guidelines team took a conservative 15 points as the difference to use, but this criterion has not been empirically established. Districts should feel free to revise the criterion if they wish.

[†]Shriberg, L., & Kwialkowski, J. (1982, August). "Phonological Disorders III: A Procedure for Assessing Severity of Involvement," *JSHD (Journal of Speech and Hearing Disorders)*, 256–270.

Example:

Sam scores in the 12th percentile on the GFTA—not in the range of concern. A point-to-point look indicates more errors in connected speech than in single words. His PCC on the GFTA is 86%, and his PCC on the spontaneous sample is 78%. The levels are different, but there are only 8 points of difference. These results support the results of the GFTA.

*It is suggested that the 15-point difference be interpreted by the speech-language pathologist with some flexibility. When percentiles on standardized measures are close to levels indicating concern, the SLP may elect to use a smaller difference. All decisions should be supported by data.

3) Error Consistency Index (CI)[†]

This measure reveals how consistent the child's errors are. It assesses the variation of the child's production of consonants. If articulation were normal, all consonants would be produced consistently and the consistency index would be 0 for both single words and connected speech. The higher the consistency index, the more inconsistent the child's productions. If the single word and connected speech samples differ by 15 or more points on the consistency index, then the single word test was not an accurate representation of the child's articulation skills. This is a good measure for students who pronounce words differently with every production. Articles using this measure have suggested that a consistency index of 19 or higher indicates a concern. The TSHA Guidelines Team recommends using a more conservative difference of 15 points; however, this has not been empirically established. Districts should feel free to revise the criterion, but a baseline criterion should be established.*

Example:

Claude scores at the 25th percentile on the GFTA—not in the range of concern. His teacher indicates she can't understand him in class half the time. A Consistency Index on the GFTA words and the connected sample reveals a CI on the GFTA of 5, while the CI on the connected speech sample is 35. This information supports teacher data.

*It is suggested that the 15-point difference be interpreted by the speech-language pathologist with some flexibility. When percentiles on standardized measures are close to levels indicating concern, the SLP may elect to use a smaller difference. All decisions should be supported by data.

There are other informal measures, such as ratings of intelligibility, not covered here. The measures described above are recommended by the TSHA Guidelines team. Documentation and consistency are critical.

Tyler, A. (2002). Language-based intervention for phonological disorders. *Seminars in Speech and Language*, 23, 69–82; and Tyler, A., Lewis, K. & Welch, C. (2003). Predictors of phonological change following intervention. *American Journal of Speech Language Pathology*, 12, 289–298.

B. INSTRUCTIONS FOR INFORMAL EVALUATION FOR MEASURES OF ARTICULATION

Comparing Single Word Sample to Connected Speech Sample

1. A single word sample will be obtained from the administered standardized test. **(All words containing errors should be transcribed in their entirety.)**
2. A connected speech sample of 50 to 100 words will be collected. The examiner may elicit the connected sample by verbalizing a story illustrated by a series of pictures and asking the child to retell the narrative. The story should be age appropriate, should be presented using the mean length of utterance for the child's age/grade level, and should include most or all of the phonemes expected for age or grade level. *Stories for Eliciting Speech Samples* (www.mindworksresources.com) offers appropriate photo stimuli for collecting a connected speech sample. Stories from the Goldman-Fristoe Test of Articulation 2 "Sounds in Sentences" subtest (<http://ags.pearsonassessments.com/>) may be used for young children. If all phonemes are not elicited, the examiner should ask the child to make up a sentence regarding a target picture.
3. The SLP performs a point-to-point comparison.
 - a) First, record the sounds produced in error on the single word articulation test.
 - b) Next, record the sounds in error in the connected speech sample.
 - c) Then, compare the sounds in error for the two samples. If the same sounds are in error, it would suggest that the standardized test is a good representation of the child's articulation. If error sounds do not match, a more comprehensive informal procedure is indicated.
4. When warranted, determine which of the following Informal Procedures (IP) will be used:
 - a. Percentage of Consonants Correct (PCC)
 - b. Consistency Index (CI) (also known as the Error Consistency Index)
5. The IP should be completed on both the single word sample (from the formal articulation test) and connected speech sample using the steps recommended for the selected procedure.
6. If the IP connected speech sample score is worse than the IP single word score by 15 points or more, this indicates a concern. (If there is less than a 15-point difference, the examiner may utilize another informal procedure if the first procedure did not adequately tap the child's difficulties.) If the connected sample IP score is not worse than the single word IP score, then the formal articulation test may be adequately tapping the child's skills.
7. "Concern" or "No Concern" should be marked on the checklist.

Example: Sam’s standard articulation test score fell at the 14th percentile (not a score indicating a concern). If his connected speech has errors not found in single word productions, the SLP performs a PCC for the single word sample and the connected sample. If the PCC for single words was 82% and the PCC for the connected sample was 75%, there is not a large difference between the two. Since there was not a 15-point difference or greater, “No concern” would be marked on the checklist.

In a second example, John has a single word score of 80% and a connected speech score of 63%. This suggests that John is performing worse in connected speech than in single words. The 17-point difference would be entered on the checklist indicating a concern.

The HIGHER the PCC score is, the better the child’s skills are; the LOWER the (in)consistency score—that is, the CI—the better the child’s skills are.

Point-to-Point Comparison

It is suggested that one of the easiest ways of comparing the Single Word Articulation (SWA) tests with a spontaneous speech sample is to compare the sounds in error in the two samples.

First, record the sounds produced in error on the Single Word Articulation test.

Next, record the sounds in error in the spontaneous word sample (SWS). The parent/teacher form can provide data for this. Then compare the sound in error for the two samples. If the same sounds are in error in single words and connected speech, the standardized test is a good representation of the sample. If the errors are not the same, the SLP completes one of the more comprehensive types of informal assessment.

The following table will assist in making the analysis.

Comparison of Single Word Articulation and Spontaneous Speech Sample Error Sounds		
Single Word Articulation Test (SWA)	Spontaneous Word Sample (SWS)	Comparison
Initial Position Errors	Initial Position Errors	Produced in error on SWA, but correct on SWS
		Produced in error on SWS, but correct on SWA
Medial Position Errors	Medial Position Errors	Produced in error on SWA, but correct on SWS
		Produced in error on SWS, but correct on SWA
Final Position Errors	Final Position Errors	Produced in error on SWA, but correct on SWS
		Produced in error on SWS, but correct on SWA

Percentage of Consonants Correct (PCC)

The following steps are completed to determine the percentage of consonants correct as suggested by Shriberg & Kwiatkowski, 1982.

1. Tape record a connected speech sample of between 50 and 100 utterances.
2. Determine the meaning of each word to make certain that correct analysis can be completed.
3. Calculate the Percentage of Consonants Correct as follows:
 - a. Use only consonants, not vowels (syllabic r's are considered vowels. That is, /r/ is counted if it starts or is not the only vowel in the syllable; e.g., "her" has an initial consonant and a vocalic r, which is not counted as a consonant; "hair" has an initial consonant, a vowel, and a final consonant /r/.
 - b. Do not score target consonants in the second or successive repetitions of a syllable (e.g., in "f-fish," score only the first /f/).
 - c. Do not score target consonants in the third or successive repetition of adjacent words unless articulation changes. For example, if the child said /tap/, /tap/, /tap/ for "stop," only the first two words of the series would count. However, if the child said /tap/, /tap/, /stap/, all three would be counted.
 - d. Do not score target consonants in words that are completely or partially unintelligible or whose gloss* is highly questionable.
 - e. Consider the following types of changes as incorrect:
 - i. deletions of a target sound
 - ii. substitutions of another sound
 - iii. partial voicing of initial target consonant
 - iv. distortions, no matter how subtle
 - v. additions of sounds
 - vi. Initial /h/, final /n/, and /ng/ deletions are scored as incorrect only when they are in stressed syllables.
 - vii. Questionable articulation should be scored in the incorrect category.
 - viii. Words should be glossed for dialect or as they are said in conversation.
4. The percentage of consonants correct is calculated by dividing the number of correct consonants produced by the total number of consonants produced and multiplying by 100.

The following guidelines are used in determining concern: After identifying the percentage of consonants correct for single words and a connected speech sample, subtract the connected speech sample percentage from the single word percentage. If the difference is 15 points or greater, the result indicates an area of concern.

**Gloss* refers to what the SLP interprets a word to mean. The word should not be glossed if it is unintelligible.

Percentage of Consonants Correct Scoring for Goldman-Fristoe 2			
Word	Transcription	Total Number of Consonants	Number of Consonants Correct
house		2	
tree		2	
window		3	
telephone		4	
cup		2	
knife		2	
spoon		3	
girl		3	
ball		2	
wagon		3	
shovel		3	
monkey		3	
banana		3	
zipper		2	
scissors		3	
duck		2	
quack		3	
yellow		2	
vacuum		4	
watch		2	
plane		3	
swimming		4	
watches		3	
lamp		3	
car		2	
blue		2	
rabbit		3	
carrot		3	
orange		3	

fishing		3	
chair		2	
feather		2	
pencils		5	
this		2	
bathtub		4	
bath		2	
ring		2	
finger		3	
thumb		2	
jumping		4	
pajamas		4	
flowers		4	
brush		3	
drum		3	
frog		3	
green		3	
clown		3	
balloons		4	
crying		3	
glasses		4	
slide		3	
stars		4	
five		2	
Total Consonants		153	
Total Consonants Correct			
PCC = $\frac{\text{Number of Correct Consonants}}{\text{Total Number of Consonants}} \times 100$ PC = X 100 =			

Percentage of Consonants Correct Scoring for Arizona 3

Word	Transcription	Total Number of Consonants	Number of Consonants Correct
horse		2	
baby		2	
bath tub		4	
pig		2	
cup		2	
nine		2	
train		3	
monkey		3	
comb		2	
cake		2	
wagon		3	
dog		2	
table		3	
red		2	
cat		2	
jumping		4	
shoe		1	
fish		2	
television/TV		5/2	
stove		3	
ladder		2	
ball		2	
airplane		4	
yellow		2	
cold		3	
bird		2	
fork		2	
knife		2	

Percentage of Consonants Correct Scoring for Arizona 3

Word	Transcription	Total Number of Consonants	Number of Consonants Correct
car		1	
ear		0	
ring		2	
trees		3	
this/that		2	
chair		1	
green		3	
watch		2	
thumb		2	
mouth/teeth		2	
zipper		2	
nose		2	
sun		2	
house		2	
steps		4	
nest		3	
carrots		4	
books		3	
Total Number of Consonants in Sample		110/107	
Total Consonants Correct in Sample			
$\text{PCC} = \frac{\text{Number of Correct Consonants}}{\text{Total Number of Consonants}} \times 100$ $\text{PC} = \frac{\text{Number of Correct Consonants}}{\text{Total Number of Consonants}} \times 100 =$			

Percentage of Consonants Correct Scoring for Connected Speech Sample			
Word	Transcription	Total Number of Consonants	Number of Consonants Correct
Total Number of Consonants in Sample			
Total Consonants Correct in Sample			
$\text{PCC} = \frac{\text{Number of Correct Consonants}}{\text{Total Number of Consonants}} \times 100 \quad \text{PC} = \frac{\text{Number of Correct Consonants}}{\text{Total Number of Consonants}} \times 100 =$			

Error Consistency Index (CI)*

A measure of phonology which may be helpful in looking at children's articulation, especially when trying to look at the difference between conversational speech and single word articulation, is the **consistency** with which children produce errors. One way of measuring consistency is through the use of the **Consistency Index**. This is a measure of overall consistency defined as a raw number that reflects the total number of different substitutions which occur across the 23 phonemes of the language. It takes into account errors in all three positions.

To calculate the **Consistency Index**, the examiner takes a sample of the child's speech. Using a table, the examiner looks at the errors which occur for each sound. For example, the child produces the /s/ sound three times in initial position, three times in final position and one time in medial position. In the initial position, it is produced one time as an /s/ and twice as a /t/. In the medial position it is produced as a /z/, and in the final position, it is produced one time as a /t/ and is omitted twice. The following entries would then be made on the table below in the row for the /s/ sound:

Calculation of the Consistency Index				
Target	Substitutes			Total
	Initial	Medial	Final	
s	t	z	t, Ø	3

In computing the total, you count each different substitution as one. So the t, z, and Ø (omission) each count as an error for a total of 3. You do not count a substitution twice. So, although the /t/ occurs in both initial and final position, it is counted only one time.

The same procedure is then completed for each sound. The total is the total number of sounds that are substituted for the total 23 phonemes.

A low consistency index score reflects fewer errors per phoneme; a high score reflects a lack of consistency in the child's production. If no sound errors exist in the student's speech, the **Consistency Index** would be zero. Currently no normative data exist, but this measure appears to be a very promising practice. The TSHA Task Force on Eligibility recommends considering a 15-point or greater difference in consistency from single words to conversational speech to be of concern.

*Derived from Tyler, A. (2002). Language-based intervention for phonological disorders. *Seminars in Speech and Language* 23, 69–82; and Tyler, A., Lewis, K. & Welch, C. (2003). Predictors of phonological change following intervention. *American Journal of Speech Language Pathology* 12, 289–298.

Calculation of the Consistency Index

Target	Errors			Total
	Initial	Medial	Final	
m				
n				
ng				
p				
b				
t				
d				
k				
g				
w				
f				
v				
voiceless th				
voiced th				
s				
z				
sh				
h				
ch				
j				
l				
r				
y				
Total of all errors:				

Assessment of Intelligibility*

The procedure for determining an intelligibility score includes tape recording a randomly selected 100 consecutive word sample from the student during contextual speech. The score is the percentage of words understood from the sample. For example, from a 100-word sample, the student spoke 35 utterances that appeared to be words but were not understandable to the listener. The student's intelligibility would be 65%, based on the fact that 65 of 100 words were understood.

For this procedure, transcribe a recorded sample by writing down each word that is intelligible and indicating a blank () for each word that is not intelligible. Calculate the score by totaling the number of blanks and subtracting that total from 100, resulting in the percentage of intelligibility.

Another possible method is to count syllables. If this procedure is used, each unintelligible syllable in the utterances would be indicated with a blank space. The intelligibility score would then be calculated on the basis of 1_ syllables representing one word. In the sentence sample, "Me () () ball ()", the three blanks would represent three unintelligible syllables or two unintelligible words. This procedure is most useful for young children with a high level of unintelligibility.

Note that an intelligibility score of 100% does not necessarily indicate perfectly normal articulation, but rather 100% understandable articulation even though articulation errors may be present. According to Weiss, a student whose intelligibility score is more than 10 percentage points below expected for chronological age indicates a concern.

Weiss' Guideline for Analyzing Intelligibility Scores*:

Intelligibility Score	Chronological Age Equivalent
25–49%	18 months
50–59%	24 months
60–74%	30 months
75–89%	36 months
90–99%	42 months
100%	48 months

*Adapted from Weiss, C. E., Gordon, M. E., & Lillywhite, H. S. (1987). *Clinical Management of Articulatory and Phonological Disorders*, 2nd ed. St. Louis, MO: C. V. Mosby.

C. CONSIDERATIONS FOR EXCEPTIONS TO STANDARD PROCEDURES FOR EVALUATING ARTICULATION DISORDERS*

- 1. Concern with vowel production:** If parent data, teacher data, and/or SLP opinion indicate errors with production of vowel sounds, then alternative methods of standardized testing should be considered for preschool and elementary students. Alternative tests recommended include the Templin Darley Test of Articulation or the Arizona Articulation Proficiency Scale.
- 2. Lateral production of sibilant sounds (s, z, sh, ch, j):** Lateral production of sibilants does not occur in typically developing children and is considered “deviant” when it does occur. Therefore, it is possible that a student’s performance on standardized testing may not be considered “in the range of concern,” but an articulation disorder may exist when this error is present. The SLP should carefully consider the information from the teacher about the significance or impact of the distortion or lateralization on classroom performance. In addition, parent information should be considered. Since the SLP typically has a more sensitive ear for even slight distortions, caution should be used when identifying students with slight lateralized production of sibilants as students with a disability. Informal testing should be completed to support the consistency of lateralization at the conversation level.
- 3. Lack of mastery of /r/ and/or vocalic /r/:** If a student has not mastered these sounds by 3rd grade, articulation is considered to be significantly delayed and in the range of concern. The SLP should determine the percentage of incorrect usage of these sounds and consider error productions occurring more than 30% of the time to be of concern.

*Note: these exceptions are not required, but are recommendations of the TSHA Eligibility Guidelines developers. Individual districts may choose to accept or add other exceptions.

VI. Making a Recommendation for Eligibility as Speech Impaired with an Articulation Disorder

A. ARTICULATION DISORDER CHECKLIST

Student: _____ SLP: _____
 Date of Birth: _____ CA: _____ Campus: _____ Date Completed: _____

Evaluation Tool	Results	Data Supports Concern?	
		Yes	No
Sounds in error identified by teacher:	Errors identified by teacher produced correctly on Standardized Test:		
Sounds in error identified by parents:	Errors identified by parent produced correctly on Standardized Test:		
Standardized Test _____ Sounds in error:	Percentile:		
SLP opinion—sounds in error:	Errors identified by SLP produced correctly on Standardized Test:		
If all four of the measures reported above express concern or if all four express no concern, the data needed have been collected and FIE may be written and ARD held. If there is any disagreement in concern in the four above, continue the evaluation by performing an informal assessment using a procedure listed below.			
Comparison of Single Word Articulation to Spontaneous Speech			
Procedure used: _____ Sample obtained from:			
Single Word Response			
Continuous Speech Sample			
# of points difference between Single Word Responses and Continuous Speech Sample			
Other information			

B. GUIDELINES FOR DETERMINING AN ARTICULATION DISORDER

Parameters Assessed	Disorder Guidelines
<p>Informal Evaluations</p> <ul style="list-style-type: none"> ❑ Parents' observation ❑ Teacher's observation ❑ Point-to-Point Comparison ❑ Observation in academic setting ❑ Percentage of Consonants Correct ❑ Consistency Index* ❑ Percentage of Intelligibility on 100-word sample (PK) <p>Standardized Tests</p> <ul style="list-style-type: none"> ❑ Goldman-Fristoe 2 Test of Articulation ❑ Arizona Articulation Proficiency Scale, 3rd Revision 	<p>Parent data Teacher data SLP opinion</p> <p><i>and</i></p> <p>Results on standardized test at the 7th percentile or below</p> <p>If the above are not in agreement, select from the following informal measures for additional data:</p> <p>Point-to-Point Comparison differs by significant amount</p> <p><i>or</i></p> <p>Percentage of Consonants Correct yields a difference of 15 points or greater for single words than for spontaneous speech</p> <p><i>or</i></p> <p>Error Consistency Index for spontaneous speech is 15 points or greater than for single words</p> <p><i>or</i></p> <p>Intelligibility measure for pre-school-aged students (See "Assessment of Intelligibility" in Articulation Eligibility Manual, Section V)</p>

*Currently no information is available for determining a concern for Consistency Index.

C. DOCUMENTATION OF ADVERSE EFFECT OF AN ARTICULATION DISORDER ON ACADEMIC ACHIEVEMENT AND FUNCTIONAL PERFORMANCE AND NEED FOR SPECIALIZED INSTRUCTION

Once it has been determined that an articulation disorder exists, the next step for the multidisciplinary team is to determine if there also exists an adverse effect on the student's academic achievement and/or functional performance as a result of the articulation disorder. Consultation among the parent, teacher(s), and speech-language pathologist is essential in determining what, if any, impact the articulation disorder is having on the student. This determination can be achieved by consideration of the expected grade level curriculum, the Prekindergarten Guidelines (for preschool students), the Texas Essential Knowledge and Skills (TEKS), and the status of the student's participation in the classroom and interactions with adults and peers as observed by the speech-language pathologist and reported by parents and teachers.

For example:

Correlations to Prekindergarten Guidelines II (Language and Communication Domain) C—Speech Production Skills indicates that “young children must learn to vocalize, pronounce, and discriminate among the sounds of the alphabet and words of language” with the expected outcome being that the “child's speech is understood by both the teacher and other adults in the school.” Although young children are continuing to develop speech sounds into their early school years, being understood must be considered as a factor.

For school age students, reference may be made to the TEKS for specific areas to target related to articulation. Section 110.10, Texas Essential Knowledge and Skills for English Language Arts and Reading, Elementary, implemented in 2009–10, includes a number of references to articulation skills. For example, TEKS §110.11 (23) to 110.16 (28) indicate that students are expected to “speak clearly....” In addition, competent articulation skills are essential to many other TEKS. The multidisciplinary team has the responsibility of determining the impact on academic achievement and functional performance, and the speech-language pathologist has the responsibility of reporting such findings. Complete TEKS can be located on the Texas Education Agency website, www.tea.state.tx.us.

The next responsibility of the multidisciplinary team is to determine whether the specialized skills of a speech-language pathologist are required for the student to make academic progress. Although classroom teachers are trained and adept at instruction in phonemic awareness and assisting children in learning sound-symbol connections, it is often the case with a student with an articulation disorder that the specific training needed for a child to learn reduction of phonological processes or the skills needed to produce specific sounds are not skills directly addressed in the classroom. However, when the student is stimulable to produce error sounds with some ease, the classroom teacher and parent may be the best intervention providers. Determination of the need for specialized services may be identified by some or all of the following impacts of the articulation disorder:

- the student's level of concern with the difference
- the student's willingness to participate in classroom discussion and to interact verbally with teachers and peers
- the degree to which the speech differences call attention to the student's communication
- the impact on the student's intelligibility
- the impact on reading, writing, spelling, or other academic skills

Results of these considerations should be included in the Full and Individual Evaluation (FIE) report.

D. REPORTING USE OF INFORMAL MEASURES

Sample in which student would meet guidelines following informal evaluation:

GOLDMAN-FRISTOE TEST OF ARTICULATION

The Goldman-Fristoe Test of Articulation uses a series of pictures to assess the percentage of consonant sounds correctly articulated. It also provides a means for comparing articulation in a single-word response with that occurring in connected speech through story retelling. Scores at the 8th percentile or above are not generally of concern.

Standardized testing revealed the following sound errors:

w/r	initial position
omission of /er/	medial and final position
f/th	all positions
v/th	medial position
distortion of /l/	all positions and blends

Summary: John's score was at the 11th percentile, which is within the range expected for his age by _____ ISD Guidelines. However, parents and teachers report that John is more difficult to understand in connected speech than in single words. The Percentage of Consonants Correct for single words and conversation was administered to determine whether there is a discrepancy in the two contexts. Results indicate that errors were significantly more frequent in conversational speech than in single words, consistent with parent and teacher report. Therefore, it is recommended that the ARD Committee consider eligibility for John as a student with Speech Impairment due to an articulation disorder.

Sample in which student would not meet criteria following informal evaluation:

Summary: Joe's score was at the 18th percentile, which is within the range expected for his age by _____ ISD guidelines. However, Joe's parents report that he is more difficult to understand in connected speech than in single words. The Percentage of Consonants Correct for single words and connected speech was administered to determine whether there is a discrepancy in the two contexts. Results indicate that there was not a significant difference in errors in conversation when compared with errors in single words. Therefore, results of this assessment do not indicate that Joe has an articulation disorder at this time. It is recommended that he be referred if sounds do not develop in [period of time].

Sample in which student exhibits significant lateralization of sibilants:

Summary: Joe's score was at the 18th percentile which is within the range expected for his age by _____ ISD guidelines. However, it was noted by parents and teacher that Joe exhibits significant distortion during production of s, z, sh, ch, and j. These sounds were noted to be in error on standardized testing as well as during informal evaluation of conversational speech using the Percentage of Consonants Correct. Joe is producing these sounds with lateral air flow rather than frontal air flow, creating significant distortion of the sounds in connected speech. Therefore, it is recommended that the ARD Committee consider eligibility for Joe as a student with Speech Impairment (SI).