Language & Literacy in STEM

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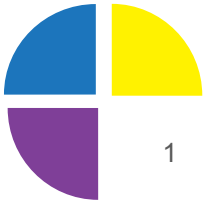
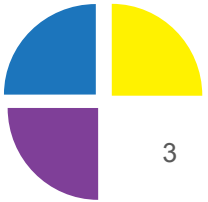


01
We’re All Language Teachers

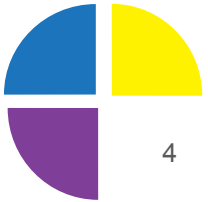
Language is the Heart of Deaf Education

A. One of the key reasons Deaf schools/programs exist is to provide language access!
B. Most schools represented here espouse the ASL/English multilingual/multicultural teaching philosophy.
C. Language delays and deprivation contribute to a wide variety of academic, social, and functional difficulties for students.
D. ALL educators in Deaf schools/programs should be building the language and literacies of our students.



STEM is the “Safe” Place to Build Language

A. We are NOT English class. That’s a good thing ;)
B. STEM subjects are a “safe” place to build and use language. We are content and world knowledge language heavy, but we are also visually and kinesthetically more accessible to that language.
C. We are NOT the background to what the English and ASL instructors are doing - we are a key partner is parallel language building and modeling!
D. We have a responsibility to *use* and *teach* language in ways that build a student’s overall language proficiency.



What do we do?

This is what we're going to discuss today:

1. Using language frameworks to consider what we're doing.
    a. I picked the Language Abilities and Approaches Wheels and the Deaf Reading Rope for today.
2. What shifts can we easily implement in our approaches to teaching and learning?
3. Think, Share, Prepare!

02
LAAWS Framework

Language Abilities and Approaches Wheels

The Clerc Center at Gallaudet has developed a research-backed approach to understanding what teachers need to do to support language growth in students.

These LAA Wheels are to be considered for comprehension/composition of language for ASL Signacy, English Literacy, and English Oracy.

https://clerccenter.gallaudet.edu/resources/language-abilities-and-approaches-wheels/

Whole Child

Language isn't an isolated event, it's part of the whole experience of child, not just them as a student. Teachers need to consider:

- **Motivation for Language Learning**: Making learning language engaging and desirable.
- **Language Use**: Be intentional about language learning activities and the types used.
- **Knowledge Building**: Focus on multiple skills of language learning and cross-content skills.

Foundational Skills

Part of learning language is understanding the building blocks of that language. Teachers (even in older grades) need to teach and explore:

- **Concepts of Words**: What is a “word” and how do you make/understand/use it?
- **Morphological Awareness**: What are the pieces of words and how do you use them?
- **Decoding & Encoding**: How do you decide what a word means and how do you express words?
- **Vocabulary**: Give students a rich, varied vocabulary.
- **Fluency & Expression**: Help students develop smooth, rich, meaningful expression.
- **Conventions**: Grammar. Got to know it.

Experience

Students need to experience a wide variety of language usage, content-specific literacies, and interactions with others. Teachers need to consider:

- **Structures and Genres**: Gotta catch ‘em all! Fiction & nonfiction and ALL the types of writing across ALL subject areas.
- **Comprehension Strategies**: Teach strategies for making sure they understand what they are viewing/reading and how to fix misunderstandings or missed information.
- **Processes and Strategies**: Use the composition process (planning, organizing, editing, revising) for expressing language.

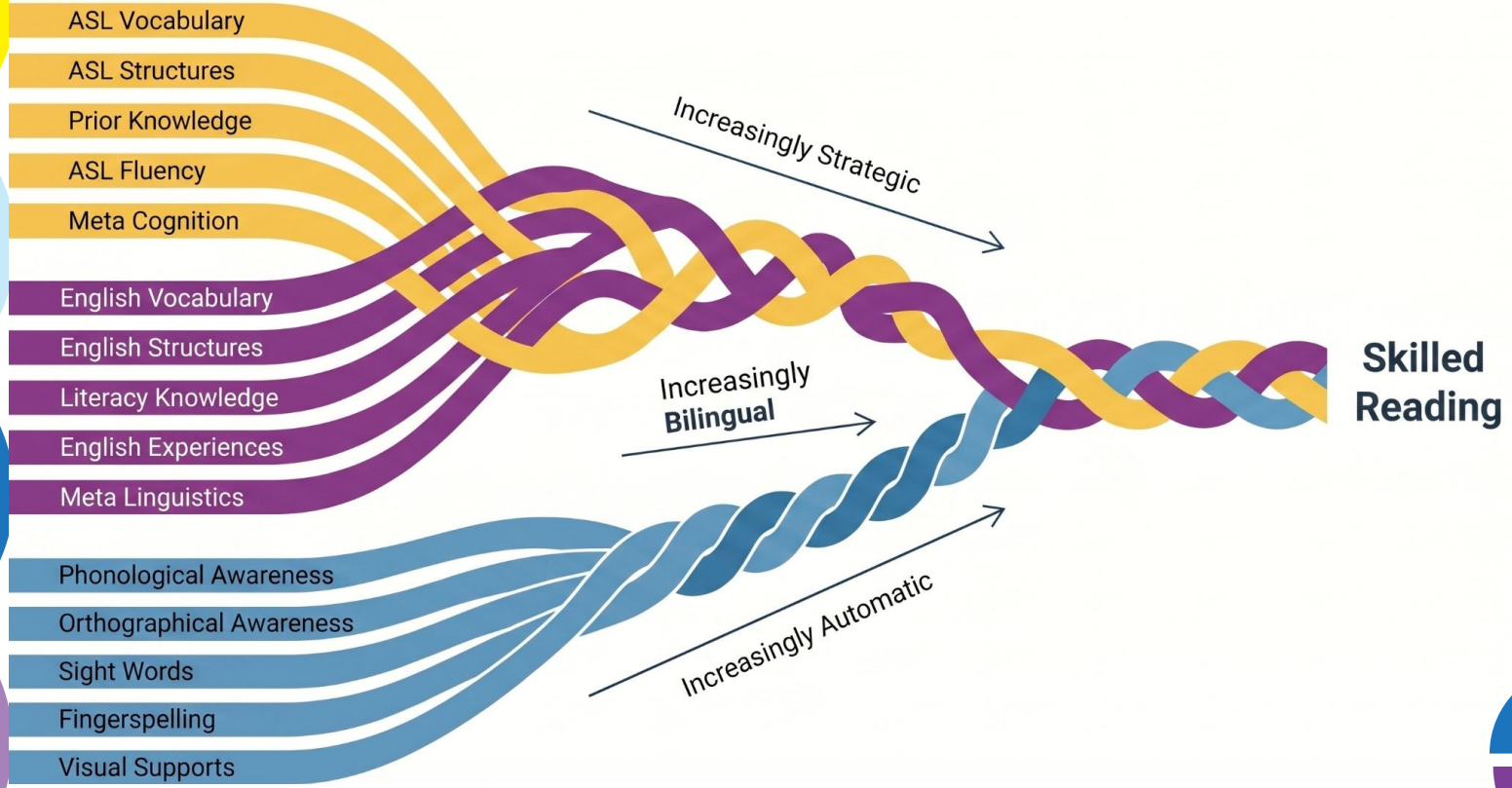
Instructional Design

Teachers need to be purposeful and intention about how they design their teaching bilingually. Consider:

- **Classroom Organization and Time Management**: How do you plan in language activities, how do you support both languages, how much time does each language get?
- **Assessments for Instruction**: How do you assess the content area bilingually? How do you assess sign language? How do you assess English language?

03
Deaf Reading Rope Framework

The Deaf Reading Rope Braids



ASL Strands: ASL Vocabulary

Students need a breadth and depth of ASL vocabulary to understand and discuss reading.

- Academic, social, and home vocabulary
- Multi-meaning signs
- Classifiers & other ASL features

How it could look in the classroom:

- Social Studies teachers using grade level ASL with all students
- ELA teachers giving “spelling” and “signing” quizzes
- ECE teachers labeling and expanding on expressions

ASL Strands: ASL Structures

Students need to understand how ASL is created, structured, and communicated in order to apply translanguaging and to have richer ASL.

- Discuss the 5 parameters of ASL in all classes
- Correct misarticulation of signs
- Model and reflect grammatically correct ASL

What it could look like in the classroom:

- STEM teachers expecting concepts to be signed accurately
- ELA teachers including comparative grammar lessons
- PE teachers expecting full sentences from students

ASL Strands: Prior Knowledge

Help students connect, apply, and generalize their prior knowledge to reading and how to use reading to enhance their schema.

- Using anticipatory sets in lessons to engage world knowledge
- Using real life pictures, home examples, and community examples to connect to students' live experiences
- Assume students have something to share

What it could look like in the classroom:

- Art teachers discussing culturally important aspects of home as a muse for art.
- ELA teachers doing pre-reading discussions.
- Elementary teachers using fieldtrips to prep for lessons

ASL Strands: ASL Fluency

The ability to comfortably and confidently express and understand in ASL is vital to doing the same in English.

- Being able to discuss stories, information, reasoning, perspective.
- Building more than 1 word answers and expecting “why” to be answered.
- Having dialogue about reading and being able to understand instruction.

What it could look like in the classroom:

- EVERY teacher using dialogue EVERY day
- Showing students videos of fluent signers beyond the teachers they already know

ASL Strands: Meta Cognition

Being able to think about your thinking - what make sense, what doesn't, what's missing, or what should be added to this is vital to reading comprehension.

- Make invisible thinking visible and discussed.
- Move as high as you can on Bloom's taxonomy.
- Depth of Knowledge tasks of higher level complexity.

What it could look like in the classroom:

- Math teachers modeling their thinking about a story problem.
- ELA teachers asking reading comprehension questions that can't be answered in 1 word.
- ECE teachers asking students what a character is feeling and WHY.

English Strands: English Vocabulary

Just like for ASL, if students don't have the English vocabulary then they don't have the English reading!

- Connect ASL vocabulary to English and vice-versa.
- Emphasis on multi-meaning words and phrases.
- Understand "bridge" phrases.

What it could look like in a classroom:

- PE teachers teaching sports by their sign and English name.
- Chaining! Sandwiching!
- Just having English print or just signing does not mean you are teaching vocabulary.

English Strands: English Structures

Students need to understand the grammar of English and the reasoning behind it, as well as how to compare/contrast with ASL grammar.

- Talk about word order and what would happen if it reversed.
- Practice English grammar and identify errors in text.

How it could look in the classroom:

- Science teachers talking about word order in lab directions before students do the actions.
- ELA teachers having mini-lessons about grammar using practice that students care about.

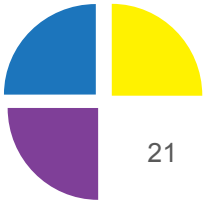
English Strands: Literacy Knowledge

Students need to understand genre, the reading process, and how to navigate text to be able to read for understanding.

- Expose students to as many book types, genres, and text purposes as possible.
- Teach students how to use and navigate texts.
- Read to learn, read to enjoy, read to pose questions/prompt ideas.

What it could look like in the classroom:

- Social studies teachers using historical fiction to supplement learning.
- ECE teachers using different types of text as the main theme text.



English Strands: English Experiences

Students need to experience a wide variety of reading types, purposes, lengths, formats, and

- Reading should occur in EVERY subject EVERY day.
- Read for learning *and* read for pleasure.
- Read every possible thing you can read.

What it could look like in the classroom:

- Vocational teachers bringing in manuals or guidebooks from real life places.
- ELA teachers not just focusing on 1 fiction book, bring in many different kinds of texts.
- Magazines, newspapers, pamphlets, online, wikipedia, etc.

English Strands: Meta Linguistics

Students should be able to be aware of what they are signing or writing, actively apply translation and translanguaging strategies, and look for and resolve breakdowns in understanding.

- Complete ASL thoughts to complete English thoughts and vice-versa.
- Model how to translate, apply language, and compare/contrast.

What it could look like in the classroom:

- STEM teachers helping students sign story problems.
- ELA teachers doing the essay first in ASL then supporting the translation to English.
- ECE teachers modeling and expecting students to repair communication breakdowns.

Word Recognition Strands: Phonological Awareness

There are many D/HH students that benefit from phonics and/or understanding the phonetic nature of English words.

- Phonetic understanding will look different for each student.
- This is a great place to collaborate outside of the classroom.

What it could look like in the classroom:

- When showing media, make sure the sound is on.
- Collaborate with SLPs (and other providers) one what you're doing in the classroom.
- ELA teachers reminding students about the phonological nature of English as a language and how it impacts its written form.

Word Recognition Strands: Orthographical Awareness

English is filled with patterns in how words are spelled, combined, and created. Knowing those patterns unlocks wider vocabulary access.

- Word families, prefixes and suffixes, typical word types for a subjects
- Spelling patterns

What it could look like in the classroom:

- STEM teachers showing Greek roots of words.
- Social studies teachers talking about a historic use of word and a modern adaptation of that word based on history.
- ELA teachers helping students understand the “why” of spelling rather than just the “what”.

Word Recognition Strands: Sight Words

For many D/HH students, sight words provide the quickest access to word decoding when reading.

- Sight words is basically the recognition side of ASL & English vocabulary building.
- The more words are used in context (and a variety is better) the easier it is for the word to become a sight word.

What it could look like in the classroom:

- PE teachers helping students master key game vocabulary
- STEM or social studies teachers building word walls, dictionaries, or other word building tools.
- ELA teachers collaborating across content areas for vocabulary.

Word Recognition Strands: Fingerspelling

Fingerspelling is the bridge of ASL and English and the only part of both languages that is 1-to-1. Research shows that fluent fingerspellers use it in compensatory ways to phonetic information.

- Expect and use fluent, accurate fingerspelling in classrooms.
- Chaining! Sandwiching!
- “Chunk” your spelling to students in syllabic, orthographic, or phonetic ways.

What it could look like in the classroom:

- Chaining and sandwiching beyond the initial introduction.
- Train students to wait for chunks while spelling.
- Expect fingerspelling back from students.

Word Recognition Strands: Visual Supports

Beyond the words themselves, text is filled with so much subtle information to support understanding. In addition, students need to learn how to use tools to identify meanings of words.

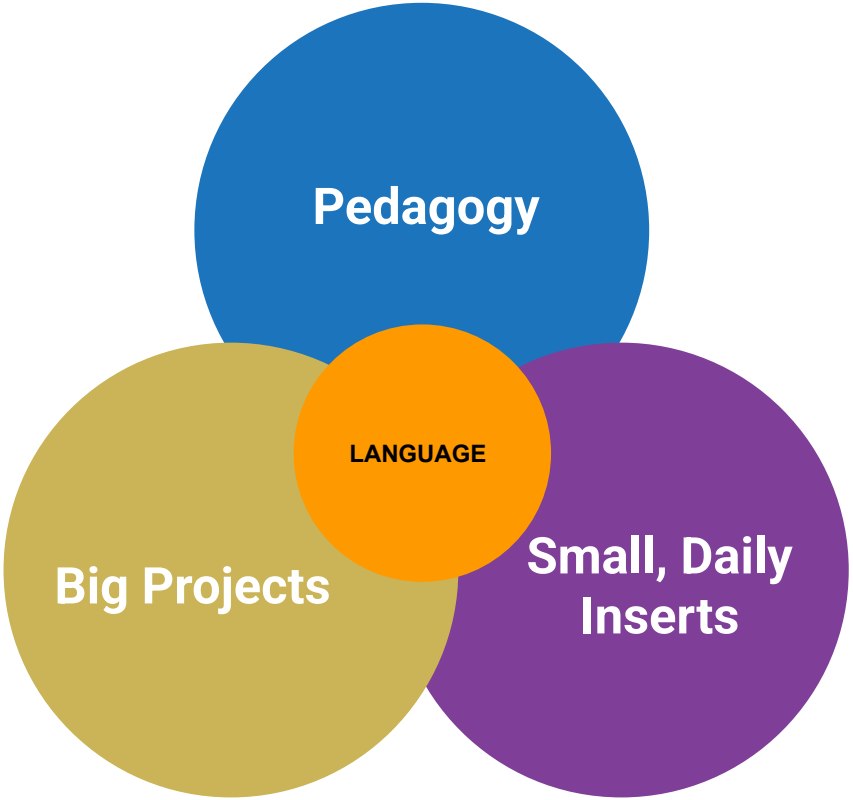
- Model how a text page can help you understand context and key words.
- Practice how to use a dictionary, Google, or other word-meaning tools.
- Build classroom vocabulary tools.

What it could look like in the classroom:

- STEM teachers using a variety of texts for learning and discussing the “style” of each one.
- Vocational teachers discussing how to use Google effectively to find information.
- ELA teachers having mini-lessons on different types of text.

04
Making Changes

Shifts in STEM Teaching toward Language



Pedagogy Shifts toward Language

1. View yourself as a language teacher!
2. Plan for language as part of your instruction.
    a. Standards & Goals
    b. Assessments
3. Teach academic signing.
4. Expect reading and writing.

Small, Daily Inserts toward Language

1. Reading, Writing, Signing, and Viewing DAILY
2. Teaching moments for language.
3. Classroom communication and dialogue.
4. Textbooks and supplemental materials.
    a. Making your own materials!

Big Projects toward Language

1. End-of-Unit assessment and the role of literacies (content, English, ASL)
2. No project is complete without literacy
3. Collaboration with other Deaf schools/programs
4. Collaboration with other content teachers

05
Plans for the Future

Let's Discuss!

Turn to a neighbor(s) and discuss the following questions:

1. What do you already do for language and literacy?
2. What is something that you've been thinking about trying in your classroom related to literacy?
3. Looking at the frameworks, what's an area you feel is weaker in your language approaches in your classroom?
4. What's an easy step to bringing more language into your teaching and learning?

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