

Dyslexia Main Doc

- Use on program
- Overall information

Data that matters to the AI:

- How Dyslexic students respond to questioning
- How to determine if students are learning over just doing
- How to teach kids with Dyslexia
 - And how to help when they don't understand (specially with dyslexia)

Presentation of text (extremely important):

- Font size: 18pt - 26 pt
- Character spacing: +7% - +14%
- Line spacing: 1.2 - 1.4 (preferably 1.4)
- Paragraph spacing: 2 lines in between
- Lines between 44 - 66 characters
- Black on white text (AVOID grey on white/ vise versa)
 - High contrast is CRUCIAL
- When text is presented under optimized conditions, the eye movements of children with dyslexia begin to resemble those of non-dyslexic peers, suggesting that the typographic environment plays a significant role in reading behavior.
- Use dyslexic specific font
- Easier for the children to read -> higher reading comprehension
<https://dyslexiefont.com/en/dyslexie-font-files/>

Text simplification strategies:

- Children with dyslexia benefit most from seeing word synonyms, not from replacing words with simpler alternatives or breaking them down
 - AI should not just simplify words, it needs to teach.
- Implementing optional synonyms helps build stronger reading comprehension and allows dyslexic learners to better understand content

Structured Library:

Phonology

- Sound structures of words (rhyming, syllables, phonemic awareness)
- Dyslexic readers struggle with breaking words into sounds (trains core strength for reading)

Sound-Symbol Association

- Teaching how sound matches letters

- Must be explicit and bidirectional: letter -> sound, and sound -> letter

Syllable Instruction

- 6 types of syllables
- Helps students break down long/unfamiliar words more accurately

Morphology

- Study of prefixes, roots, and suffixes

Syntax

- Teaching how words function in sentences
- Identifying subject/verb pairs, understanding clauses

Semantics

- Meaning and comprehension

- Structured literacy includes teaching how to understand what was read

Sources:

Rello, Luz, Ricardo Baeza-Yates, Dario Hegedus, and Jeffrey P. Bigham. "Simplify or Help? Text Simplification Strategies for People with Dyslexia." Proceedings of the 10th Web for All Conference (W4A), 2013. <https://www.superarladislexia.org/pdf/2013-Luz%20Rello-w4a.pdf>

Rello, Luz, Ricardo Baeza-Yates, and Aitor Soroa. "How to Present Text to People with Dyslexia." Universal Access in the Information Society, 2017. https://www.superarladislexia.org/pdf/2017-Luz%20Rello-UAIS_How%20to%20present%20text.pdf

International Dyslexia Association. "Effective Reading Instruction for Students with Dyslexia." Baltimore, MD: The International Dyslexia Association, March 27, 2018. <https://app.box.com/s/hvjb2c4dctr2jrsrpmi6kqg9f4k1bjsl>

Phonology

Phoneme Awareness:

- Phonemes are the smallest units of sound in spoken language (the /k/ in cat)
 - gaining understanding of the alphabetic principle
- Phoneme awareness is not the same as phonics
 - Phoneme awareness = hearing & manipulating sounds
 - Phonics = connecting sounds to letters
- *Without Phoneme students see words and just things to memorize rather than to read*

Phoneme problems in Dyslexic students:

- Dyslexic readers often struggle to identify, isolate, or manipulate phonemes
- These students can:
 - Confuse similar sounds
 - Struggle with blending sounds into words (/d/ /o/ /g/ = “dog”)
 - Have difficulty segmenting words (“ship” = /sh/ /i/ /p/)

Phoneme awareness is a strong predictor of future reading success especially in kindergarten and early elementary school.

(Good for young tutoring)

How to teach Phoneme:

- Explicit: Directly tell student what to do (don’t expect discovery learning)
- Systematic: Introduce skills in a planned sequence (simple to complex)
- Focused: (One or two skills at a time, not a mix.)
 - Blending one day, segmentation another
- Intensive: Most effective in short lessons (10-15 min) 3-5 times a week
- Multisensory: Use of senses to improve learning (possible games/interactive experiences for the kids)

Skills to teach Phoneme:

- Phoneme Isolation: “What’s the first sound in ‘sun’?” = /s/
- Phoneme Identity: “What sound is the same in ‘bat,’ ‘ball,’ and ‘bug’?” = /b/
- Phoneme Categorization: “Which word doesn’t belong: bus, bun, rug?” = rug
- Phoneme Blending: “What word is /d/ /o/ /g/?” = dog
- Phoneme Segmentation: “Say all the sounds in cat.” = /k/ /a/ /t/
- Phoneme Deletion: “Say smile without the /s/.” = mile
- Phoneme Addition: “Add /s/ to the beginning of top.” = stop
- Phoneme Substitution: “Change the /h/ in hat to /b/.” = bat

Difficulty Dyslexic students/teachers will face:

- Saying letter names instead of sounds
- Teachers skipping explicit modeling
- Mixing too many skills in one session
- Relying only on visuals or printed letters without auditory practice

Overall teaching strategies for Phoneme:

- Keep it oral + auditory (sound-based) at the beginning
- Add letters after students can hear and manipulate sounds
- Use hand motions, counters, or tapping to represent each phoneme
- Make it fun (use rhymes, songs, silly words)

Application for Tutor (where to start to follow):

- Begin with simple phoneme games
 - “Say the first sound in...”
 - “Say the last sound in...”
- Give instant feedback
 - “Good! /d/ is the first sound in dog”
- Build scaffolding:
 - If a student is wrong, “Let’s try again. Say ‘dog’ slowly with me.”
 - Allow students to draw the conclusion on their own guided by the software
- Progress to blending and segmentation over time!

After the student has mastered the ability to identify Phonemes, it is essential that they begin to work on graphemes (C = /k/ /c/ /ck/), repeating the same Phonemes process over again but this time learning the differences between the two and how to identify what sound is being made

Things that are effective for students:

- Picture matching
- No letters at first (originally teach by sound not letters)
- Oral blending sounds (What does /d/ /o/ /g/ make?)

Students who received help in Phoneme showed higher fluency in reading and better decoding skills

Sources for Phonemes:

International Dyslexia Association. "Building Phoneme Awareness: Know What Matters." *DyslexiaIDA.org*, September 2021. <https://dyslexiaida.org/building-phoneme-awareness-know-what-matters/>

Taruna, Savitri, Wahyu Widhiarso, and Hening Widyastuti. "Phonemic Blending Intervention for Children with Dyslexia." *Asia Pacific Journal of Developmental Differences* 9, no. 1 (2022): 73–89. <https://das.org.sg/wp-content/uploads/2023/10/APJDD-V9-1-2022-TARUNA.pdf>

Sound-Symbol Association (Phonics)

- Primary focus: Help students understand how letters link to sounds (phonemes) and apply that knowledge to read and spell.
- 44 types of Phonemes

Types of Phonics Instructional Approaches:

- Synthetic Phonics: Explicitly teaches students to convert letters into sounds and blend them.
- Analytic Phonics: Teaches analysis of letter-sound relations in whole words (not isolated).
- Analogy Phonics: Uses familiar word chunks (rimes) to decode unfamiliar words.
- Phonics Through Spelling: Focuses on segmenting words into phonemes to spell
- Embedded Phonics: Taught in the context of reading texts (less structured, more incidental).

How to teach Phonics:

- Begin with learning Phonics, try to catch at a very early age (K-1st)
- Do not solely focus on Phonics (ineffective if not taught in application)

Easy Phonemes (constants + short vowel)

- /m/ – m as in man
- /s/ – s as in sun
- /t/ – t as in top
- /n/ – n as in net
- /p/ – p as in pan
- /b/ – b as in bat
- /f/ – f as in fun
- /d/ – d as in dog
- /k/ – c/k as in cat, kit
- /g/ – g as in go
- /h/ – h as in hat
- /ă/ – a as in cat
- /ĕ/ – e as in bed
- /ĭ/ – i as in sit
- /ŏ/ – o as in hot
- /ŭ/ – u as in cup

Medium Phonemes (consonants, digraphs, and long vowels)

- /l/ – l as in lip
- /r/ – r as in run
- /y/ – y as in yes
- /w/ – w as in wet
- /z/ – z as in zip
- /ch/ – ch as in chip
- /sh/ – sh as in ship
- /th/ – th as in thin
- /ng/ – ng as in ring
- /ā/ – a_e or ai as in cake, rain
- /ē/ – e_e or ee as in these, see
- /ī/ – i_e or igh as in kite, high
- /ō/ – o_e or oa as in hope, boat
- /ū/ – u_e or ew as in cube, few

Harder Phonemes (vowel teams, r-controlled vowels, constant blends, and tricky sounds)

- /ou/ – ou as in out
- /oi/ – oi/oy as in coin, toy
- /ow/ – ow as in cow
- /ar/ – ar as in car
- /or/ – or as in fork
- /ər/ – er/ir/ur as in her, bird, fur
- /j/ – j or ge as in jam, cage
- /v/ – v as in van (often confused with /f/ for dyslexia students)
- /ks/ – x as in box

Most difficult Phonemes (rare sounds)

- /zh/ – s as in measure (rare & abstract)
- /aw/ – aw/au as in saw, author
- /air/ – air/are/ear as in hair, care, bear
- /ear/ – ear as in hear
- /ure/ – ure as in cure
- /al/ – al as in talk or a in walk

Multi-sensory Methods:

- Auditory Methods
 - Sound isolation games: “What’s the first sound in sun?”
 - Minimal pairs listening: Hear and identify differences (pat vs. bat)
 - Stretch and say: Slowly stretch the word to emphasize each phoneme.

- Tactile & Kinesthetic Methods
 - Arm tapping: Tap your arm once for each phoneme as you say it
 - Air writing: Say each sound aloud while writing the corresponding letter in the air.
 - Sand/salt tray writing: Trace the letters while pronouncing the phoneme aloud.
 - Phoneme finger counting: Hold up one finger per sound (not letter).
- Visual Methods
 - Phoneme-grapheme mapping charts: Show how each sound matches a letter or digraph
 - Color coding: Use colors to represent different sounds (blue = /b/, green = /g/)
 - Elkonin boxes (sound boxes): Place a token in a box for each sound as you say it.
- Multisensory Blending & Segmenting
 - Moveable letter tiles or magnets:
 - Blend sounds to form a word (/c/ /a/ /t/ -> cat)
 - Break a word into sounds (segmenting: cat -> /c/ /a/ /t/)
 - “Say it, Tap it, Map it, Write it” routine:
 - Say the word: dog
 - Tap each phoneme: /d/ /o/ /g/
 - Map sounds to graphemes on paper
 - Write the whole word
- Movement-Based Games
 - Hop for a sound: Jump once for each phoneme
 - Clap or stomp phonemes: Great for high-energy learners

Sources:

Reading Rockets. “Phonics Instruction: The Value of a Multi-Sensory Approach.” Reading Rockets. Accessed July 2, 2025. <https://www.readingrockets.org/topics/curriculum-and-instruction/articles/phonics-instruction-value-multi-sensory-approach>.

Orton Gillingham Mama. “The Principles of the Orton-Gillingham Approach.” Orton Gillingham Mama. Accessed July 2, 2025. <https://ortongillinghammama.com/orton-gillingham-principles/#:~:text=Multisensory%20techniques%20are%20used%20throughout,%E2%80%93Comprehension>.

Dyslexia Reading Well. “44 Phonemes in English.” Dyslexia Reading Well. Accessed July 2, 2025. <https://www.dyslexia-reading-well.com/44-phonemes-in-english.html>.

Reading Rockets. “Phonics Instruction.” Reading Rockets. Accessed July 2, 2025. <https://www.readingrockets.org/topics/phonics-and-decoding/articles/phonics-instruction>.

Blending Words

Blending and Segmenting (difference):

- Phoneme blending: Combining individual sounds to form words
- Phoneme segmenting: Breaking words into individual sounds
 - *On the previous doc*

Instructional Goals:

- Train children to:
 - Hear and isolate phonemes
 - Blend sounds to read
 - Segment words to spell
- Move from spoken sounds to letter representations later
- Strengthen auditory memory and sound manipulation

Games to Help Kids:

Blending Slide

- How it works:
 - Teacher slowly stretches out a word (/sss/ /uuuu/ /nnn/), and the student must “slide” the sounds together to say the full word (sun).

Syllable Stretch

- How it works:
 - Say a word (apple) and have students stretch or clap out the syllables: ap-ple.

Say It and Move It

- How it works:
 - Use counters or tokens. For each sound in a word, the student moves a token.
cat = 3 tokens -> move one for each sound

Guess the Word

- How it works:
 - Teacher says the sounds slowly (/d/ /o/ /g/) and the student has to guess the word (dog).
- Variation: Student gives the teacher a sound string, and teacher guesses.

Sound Boxes (Elkonin Boxes)

- How it works:
 - Draw boxes (one per phoneme). Child places letters or tokens in each box based on sounds they hear.

I Spy With Sounds

- How it works:
 - “I spy something that starts with /b/.” Students must guess a matching object.

What this helps with:

- Understanding Phonology is difficult but the blending of sounds can be the difference between reading fluency and confusion.

Sources:

Reading Rockets. *Blending and Segmenting Games*. Accessed June 2025.

<https://www.readingrockets.org/classroom/classroom-strategies/blending-and-segmenting-games>

Syllable Types

- Spoken syllables are about sounds, while written syllables follow orthographic conventions

6 types of Syllables

- Closed Syllable
 - Ends in a consonant; vowel is short
 - Examples: cat, rabbit
- Vowel-Consonant-e (VCe) or "Silent e"
 - Long vowel with final "e"
 - Examples: make, bike
- Open Syllable
 - Ends in a vowel; vowel is long
 - Examples: he, go
- Vowel Team (Vowel-Consonant)
 - Two vowels combine to make one sound
 - Examples: team, boat
- Vowel + R-Controlled Syllable
 - Vowel followed by "r"; vowel sound changes
 - Examples: car, bird
- Consonant-le (C-le)
 - Final syllable: consonant + "le"
 - Examples: little, bubble

How to teach it (overall summary):

- Focus on classifying words rather than memorizing rules verbally
- Definitions = clear and consistent

Specifics of teaching each syllable type:

1. Closed Syllable
 - Teach VC/CVC patterns, short vowels, and use syllable clapping and word sorts
 - VC = vowel constant
 - CVC = constant vowel constant
2. Open Syllable
 - Teach CV pattern; use mouth shape, long vowel sounds, and compare to closed words.
 - CV = constant vowel
3. Vowel-Consonant-e Syllables
 - Teach "magic e" rule; use decodable texts and minimal pairs
 - (cap vs cape)

4. Vowel Team Syllables
 - Focus on common teams (ai, ee, oa)
 - use color coding and rhyming lists
5. R-controlled Syllables
 - Teach "bossy R" with posters/mnemonics; compare to non-r words
 - (bud vs bird)
6. Consonant-le (C-le) Syllables
 - Teach "count back 3 letters" rule
 - practice dividing multisyllabic words ending in C-le.

Patterns + recognition

- VC/CV Pattern
 - Rule: Divide between two consonants that come between vowels.
 - Examples: rabbit, napkin
 - How to Teach: Use visual aids like colored blocks or cards to physically split and pronounce each syllable.
- V/CV Pattern
 - Rule: When there's one consonant between two vowels, try dividing before the consonant.
 - Examples: music, lazy
 - How to Teach: Teach students to try this division first, then test if it creates a real word. If not, try VC/V.
- VC/V Pattern
 - Rule: If V/CV doesn't make a real word, divide after the consonant instead.
 - Examples: level, cabin
 - How to Teach: Encourage students to "flip and check" both options to see which makes a real word.
- Consonant-le Pattern (C-le)
 - Rule: When a word ends in consonant + l + e, count back three letters and divide before the consonant.
 - Examples: table, bubble
 - How to Teach: Use spelling patterns to show that this chunk (consonant + le) is treated as a full syllable.
- Compound Words
 - Rule: Divide directly between the two smaller words.
 - Examples: sunset, football
 - How to Teach: Ask students: "Can you hear two smaller words inside this bigger word?" Use word puzzles or visual cut-aparts.
- Prefixes and Suffixes
 - Rule: Teach these as separate, meaningful word parts.

- Examples: replay, hopeless
- How to Teach: Use morpheme (meaning-based) flashcards and show how the base word connects with the prefix or suffix.

Sources:

Orton-Gillingham Mama. “Unlocking Multisyllabic Words: The Power of Syllable Division in Reading Instruction.” Orton-Gillingham Mama. Accessed July 2, 2025.

<https://ortongillinghammama.com/unlocking-multisyllabic-words-the-power-of-syllable-division-in-reading-instruction/>.

Reading Rockets. “The Six Syllable Types.” *Reading Rockets*. Accessed July 2, 2025.

<https://www.readingrockets.org/topics/spelling-and-word-study/articles/six-syllable-types>.

Morphology

- Text structure helps students understand the organization of ideas.
- Morphology helps them break down and understand unfamiliar words.
- Together, they enhance reading comprehension and decoding at both the sentence and word levels.

Morphology Definition:

- The study of morphemes: the smallest units of meaning in language
- Roots, prefixes, suffixes

Combining text structures (in depth):

1. Description

- Teach students to look for descriptive signal words (for example, such as, looks like)
- Reinforce with morphological breakdowns:
 - appearance -> appear + -ance
 - characteristic -> character + -istic
- Graphic organizer tip: Add a “morpheme box” next to each descriptive word to explore its parts.

2. Cause and Effect

- Use signal words like because, due to, as a result.
- Highlight related words with prefixes/suffixes:
 - consequence -> con (with) + sequ (follow) + -ence
 - prevent -> pre (before) + vent (come)
- Ask: “How does the morpheme meaning help explain the cause/effect relationship?”

3. Compare and Contrast

- Use words like similar, different, both, unlike.
- Break down words like:
 - comparison -> com (together) + par (equal) + -ison
 - contrast -> contra (against) + -st
- Practice finding opposites through prefixes (un-, dis-, in-).

4. Chronology / Sequence

- Teach words that signal order: first, then, finally.
- Incorporate word analysis:
 - chronological -> chrono (time) + -logical (related to logic)
 - sequence -> sequ (follow) + -ence
- Writing activity: Break down timeline events and identify roots that indicate time or order.

5. Problem and Solution

- Signal words: problem, solution, in order to, dilemma.

- Deconstruct complex academic words:
 - resolution -> re (again) + solve + -tion
 - remedy -> re (again) + med (heal)
- Ask: “Which morphemes show change or fixing?”

Lesson Tips:

- Before Reading:
 - Preview signal words and related morphemes.
 - Use flashcards with both morphemes and structure labels.
- During Reading:
 - Mark both text structure clues and morphemes in vocabulary.
 - Use graphic organizers that include word breakdowns.
- After Reading:
 - Have students rewrite passages using structure + new morphemes.
 - Use morpheme maps within compare/contrast charts or timelines.

Why It Works for Dyslexic Learners

- Multisensory: Combines visuals (graphic organizers), sound (reading aloud), and movement (building words).
- Repetitive: Reinforces patterns across both sentence and word levels.
- Strategic: Helps struggling readers anchor comprehension with consistent, scaffolded supports.

How to Teach Morphology

1. Explicit instruction:
 - Teach meaning and function of prefixes/suffixes/roots.
 - Use word-building exercises to analyze word parts.
2. Word sums:
 - Decompose words
3. Matrix approach:
 - Show many combinations of roots and affixes to build vocabulary.
4. Practice with real texts:
 - Embed morpheme practice in content-area reading (science, history, etc.).

Sources

Reading Rockets. "Teaching Text Structure." Reading Rockets. Accessed July 2, 2025.

<https://www.readingrockets.org/classroom/comprehension/teaching-text-structure>.

Savvas Learning Company. "What Is Morphology?" Savvas Insights. Accessed July 2, 2025.

<https://www.savvas.com/resource-center/blogs-and-podcasts/savvas-insights/science-of-reading-for-upper-elementary-series/what-is-morphology>.

Syntax

What is Syntax?

- Syntax is the system that governs the structure and arrangement of words, phrases, and clauses within sentences. It determines how language components combine to create meaning.
- **Syntactic Awareness:** The conscious understanding of how words function in sentences, enabling readers and writers to interpret and construct grammatically correct sentences.
- **Processing Role:** Readers must use working memory to hold, analyze, and integrate syntactic cues along with vocabulary to make sense of text (Paris & Hamilton, 2009).
- Syntactic instruction bridges decoding with comprehension, helping students interpret full ideas, not just individual words.

Why Syntax Matters (Especially for Dyslexic Learners):

- Sentence-Level Comprehension
- Cognitive Load
- Predictor of Readability
- Writing Clarity
- Equity in Access

How to Help Dyslexic Students with Syntax:

- **Start Early:** Build syntactic knowledge through rich oral language exposure (read alouds)
- **Explicit Grammar Instruction:** Directly teach sentence parts (subject, predicate, objects), phrases, and clauses
- **Leverage Familiar Content:** Use sentences from texts the student has already read to analyze or manipulate structure.
- **Visual Supports:** Use graphic organizers and color coding to represent different sentence parts
- **Scaffold Complexity:** Begin with simple sentences and gradually introduce compound and complex structures.

How to Teach Syntax to Dyslexic Students:

1. Sentence Scramble

- Provide students with sentence words out of order.
- **Goal:** Reconstruct a grammatically correct sentence.
- Start with 3–4 words and increase complexity over time.
- **Tips:**
 - Scaffold with capitalized first word and punctuation.
 - Use vocabulary from current lessons.

2. Sentence Elaboration

- Begin with a simple sentence (“The turtle slept”).
- Prompt students to expand it using:
 - Who? What? Where? When? Why? How?

3. Sentence Combining

- Present two or more simple sentences (“The dog barked. The dog was loud.”)
- Have students combine them into one sentence (“The dog barked loudly.”)
- Encourages grammatical flexibility and fluency.

4. Kernel Sentence Work

- Start with a bare sentence (“She ran.”)
- Ask students to add detail:
 - “She ran quickly.” -> “She ran quickly through the park after school.”

5. Syntactic Mapping

- Use sentence diagramming or simple visual mapping to show how sentence parts fit together.
- Helps with understanding the function of each component.

Sources:

Joan Sedita. “Syntactic Awareness: Teaching Sentence Structure (Part 1).” *Keys to Literacy*, June 2, 2020. <https://keystoliteracy.com/blog/syntactic-awareness-teaching-sentence-structure-part-1/>

Margie Gillis, Ed.D. “The Syntax Attuned Educator: Supporting Students’ Ability to Comprehend Sentences.” Presented by IDA-GA, Feb. 9, 2022. <https://ga.dyslexiaida.org/feb9-2022the-syntax-attuned-educator-supporting-students-ability-to-comprehend-sentences/>

Semantics

What Is Semantics?

- The meaning of words, phrases, and sentences.
- It's a component of language that helps students connect words with ideas and understand nuances in meaning.
- Strong semantic skills support:
 - Vocabulary growth
 - Reading comprehension
 - Oral and written expression

How to teach Semantics to Dyslexic learners:

1. Explicit Vocabulary Instruction

- Teach tiered vocabulary:
 - Tier 1: everyday words (happy, car)
 - Tier 2: academic/abstract words (predict, contrast)
 - Tier 3: subject-specific terms (photosynthesis)
- Use student-friendly definitions.
 - Ask them to come up with their own definition to help them understand

2. Semantic Mapping

- Create visual webs or graphic organizers that:
 - Connect a central word to synonyms, antonyms, categories, examples, and non-examples.
- Helps students build word relationships and conceptual understanding.

3. Context Clues and Morphology

- Teach students to use context clues and morphemes (prefixes, suffixes, roots) to infer meaning.
- Example: transportation = trans- (across) + port (carry) + -ation (noun suffix)

4. Sentence-Level Practice

- Use sentence frames or fill-in-the-blank tasks that require understanding of word meaning.
- Encourage sentence generation and semantic flexibility (how to use bright in different contexts: a bright light, a bright student).

5. Play With Language

- Riddles, metaphors, idioms, and analogies are great for older students.
- Help students recognize non-literal language and figurative meaning

Sources:

“Syntax and Semantics in Structured Literacy” – The Measured Mom

<https://www.themeasuredmom.com/syntax-and-semantics-in-structured-literacy>

“The Role of Semantics in Reading Comprehension” – NIH/NLM PMC (Article ID: PMC8458192)

<https://pmc.ncbi.nlm.nih.gov/articles/PMC8458192>