National UNIVERSITY

AN INTRODUCTION TO DYSLEXIA

Module 1

Dyslexia Professional Development Series

Module 1: Definition of dyslexia and the neuroscience of dyslexia

Module 2: Assessment and eligibility

Module 3: Multi-sensory instructional strategies

Module 4: Assistive technology and parental support

Norms

- Participants should mute their microphones when not speaking.
- Participants should keep their cameras on.
- Be present and engaged by not multitasking.
- Questions can be put into chat or on Jamboard.

Agenda

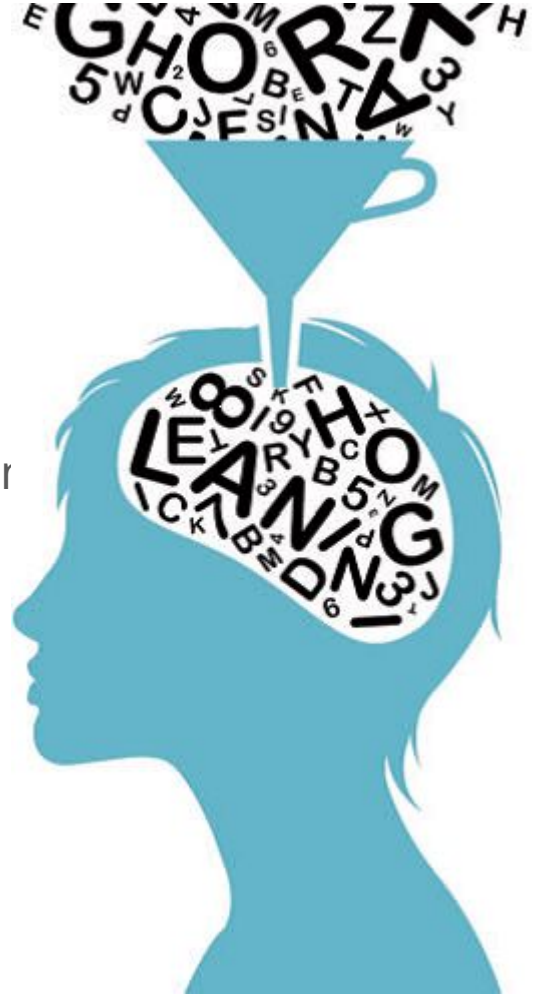
- What is Dyslexia?
- Dyslexia Legislation
- The Science of Reading/Neuroscience

Type your answer into the chat

What do you think about when you hear the word dyslexia?

What is Dyslexia?

- Specific learning disability with a neurobiological origin
- Difficulties with accurate and/or fluent word recognitior
- Poor spelling and decoding abilities
- Cannot be explained by poor vision or hearing, lack of motivation or educational opportunities.



International Dyslexia Association, 2002

Definition of Dyslexia

"Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction.

Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge."

Adopted by the IDA Board of Directors, Nov. 12, 2002.

Indicators of Dyslexia

Age Group	Possible Indicators (Examples)
Preschool	• Difficulty naming things quickly or automatically • Difficulty learning nursery rhymes
Kindergarten-Grade 1	• Inability to create a rhyme for a simple one-syllable word like "hot" or "cat" • Inability to segment spoken words into their constituent sounds
Grades 2-3	• Consistent reading and spelling errors • Difficulty telling a story in sequential order
Grades 4-8	• Frequent errors in reading common sight words (e.g., "where," "there," "what," "then") • Difficulty learning a foreign language
High School-College	• A tendency to read with great effort and at a slow pace • A tendency to pause or hesitate often when speaking and the use of imprecise language, such as "stuff" and "things"

Source: CDE. (2017). *California Dyslexia Guidelines*. Sacramento: CDE. (p. 14-22)

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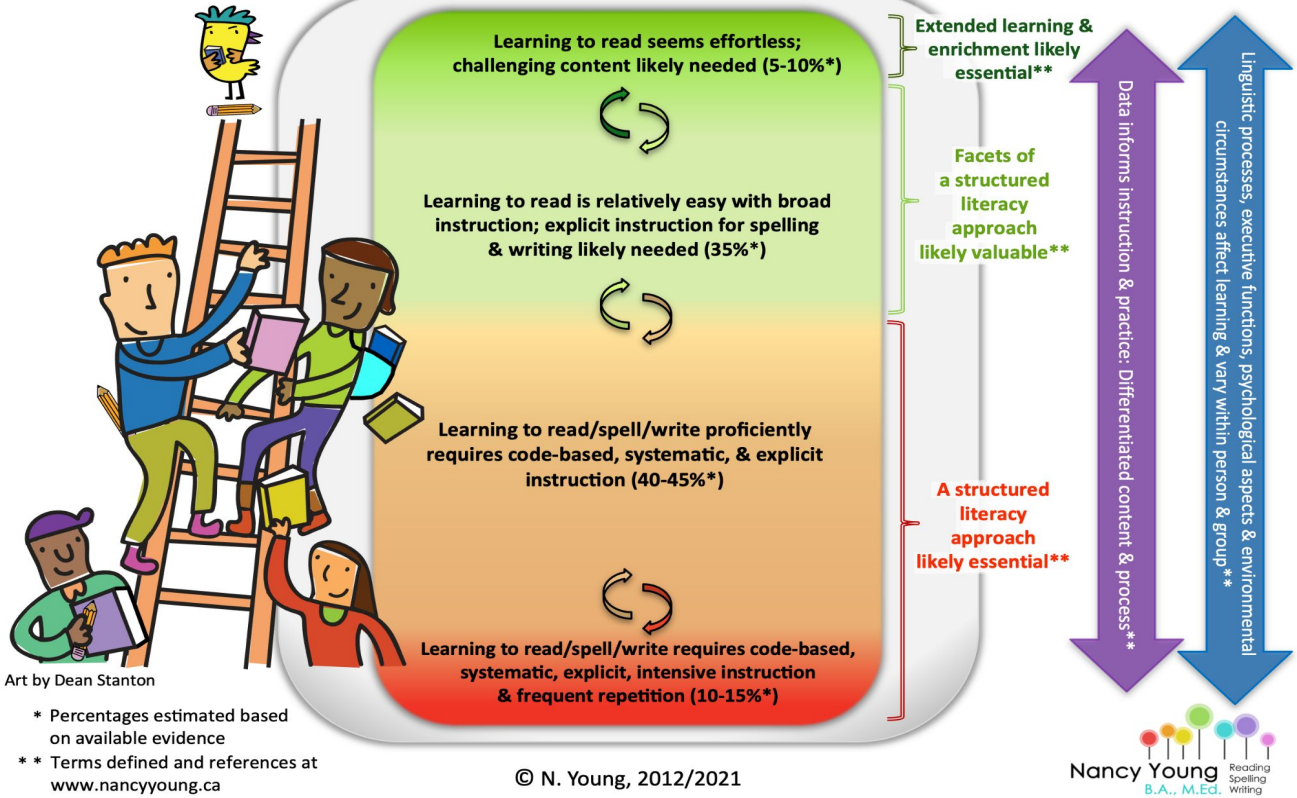
The Ladder of Reading & Writing



Used with Nancy Young's permission; check out her blog here [Code Talk - A blog by Nancy Young]

Nine Myths About Dyslexia Debunked

- Letter reversals or writing letters upside down *are not* a sign of dyslexia.
- Dyslexia is *not* a visual problem.
- Students with Dyslexia *are not* lazy.
- People who have dyslexia *are* able read.
- There *are* indicators of dyslexia before a child enters school.
- Dyslexia *does not* mainly affect boys.
- Dyslexia *does not* disappear with age/*is not* outgrown.
- Dyslexia is *not* rare.
- People with dyslexia *can and do* succeed in life.

Dyslexia Myths — Gaab Lab

Dyslexia basics

- Dyslexia affects people from different cultural, ethnic, and socioeconomic backgrounds nearly equally.
- Dyslexia is heritable; it runs in families.
- Dyslexia often occurs in combination with other conditions (e.g., ADHD, oral language impairment). May have a history of delayed speech or language development.
- Dyslexia exists on a continuum from mild to severe.
- Emotional consequences

Dyslexia Basics

Understanding Dyslexia

- The majority of individuals with dyslexia have significant difficulty in one or more of the three aspects of **phonological processing** of language:
  - phonological memory
  - phonological awareness (especially phonemic awareness)
  - retrieval of phonological information (i.e., speed of naming)

  (See next slide.)

- Some individuals with dyslexia have difficulty in **orthographic processing**.

  (See slide 19.)

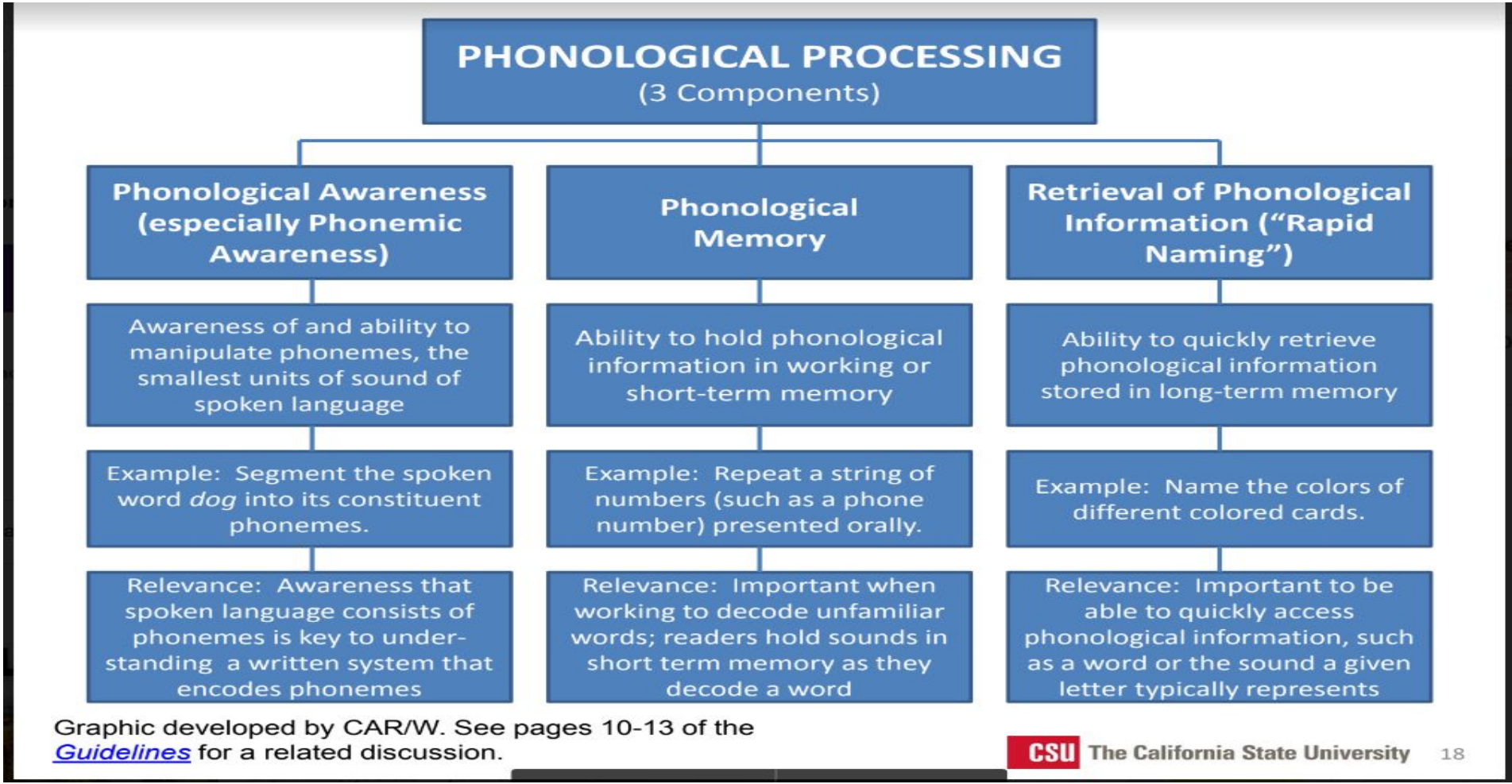
Orthographic Processing

The *Guidelines* (p. 52) define orthographic processing as follows:

Orthography is the writing system of a language (i.e., spelling) and includes conventions, punctuation, and capitalization. Knowledge of orthography is stored in memory in the form of rules and representations of words or parts of words—and used to read and spell words.

Orthographic processing contributes to the ability to read words.

Source: CDE. (2017). *California Dyslexia Guidelines*. Sacramento: CDE.



Graphic developed by CAR/W. See pages 10-13 of the *Guidelines* for a related discussion.

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Subtypes of Dyslexia

Dysphonetic Dyslexia

- Difficulty sounding out words in a phonological manner
- Most common type of dyslexia
- California Education Code and the International Dyslexia Association focus on this subtype.

Surface Dyslexia

- Difficulty with rapid and automatic recognition of words in print.
- Students with surface dyslexia can master phonics but cannot read words that are spelled differently than they sound.
- Over reliance on sound-spelling correspondence (grind-grinned)

Mixed Dyslexia

- Most severe form of dyslexia
- A combination of both subtypes

Feifer Assessment of Reading, 2015

What is Phonemic Awareness?

Phonemes are individual speech sounds that are combined to create words in a language system.

Phonemic awareness is the ability to notice, think about, and work with the individual sounds in words.

English Learners

The *Guidelines* note:

- English learners are often identified as having dyslexia much later, if ever, in comparison to their peers. This delays or denies them the kinds of support likely to make a difference.

- Identification is complicated due to several factors (e.g., variability in prior language experience, lack of normed measures and qualified practitioners).

Source: CDE. (2017). *California Dyslexia Guidelines*. Sacramento: CDE. (p. 33-36)

English Learners

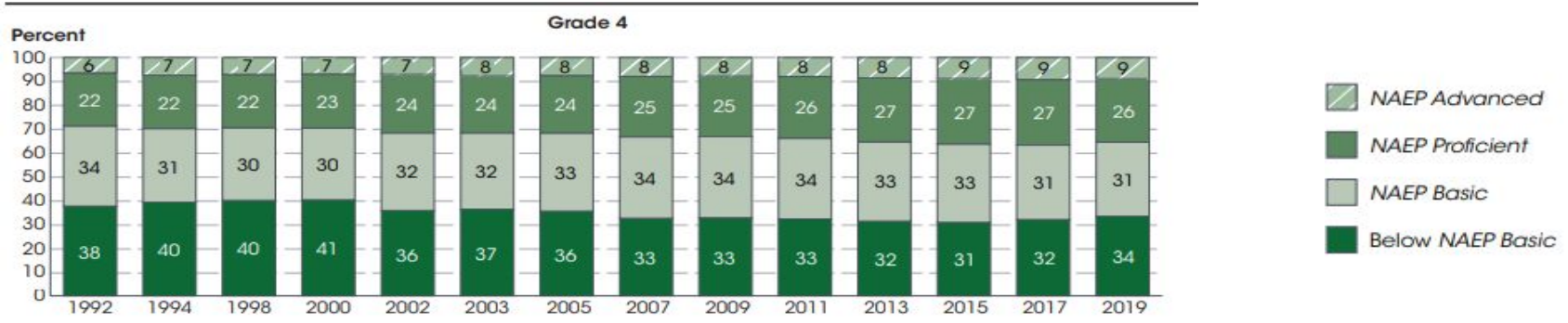
- Assessments should occur in the student's native language or both the native language and English by individuals competent in the languages.
- Challenges faced by English learners who are learning to read in English should not be confused with challenges caused by dyslexia.

See pages 33-37 of the *Guidelines* for a discussion.

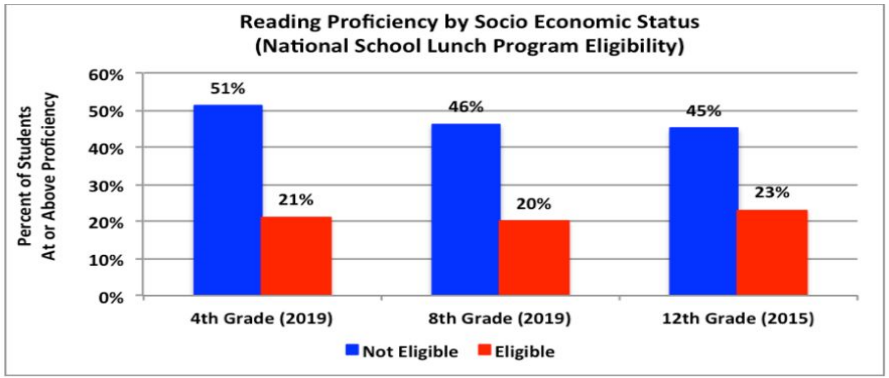
Source: CDE. (2017). *California Dyslexia Guidelines*. Sacramento: CDE. (p. 33-37)

DYSLEXIA LEGISLATION

NAEP Results 1992-2019



[Reading Performance]

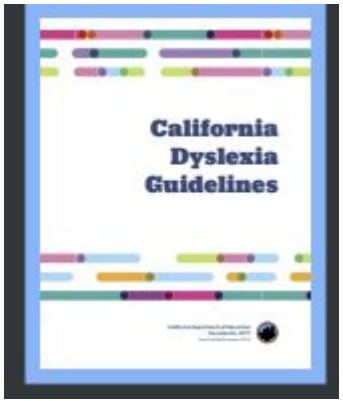


[What the 2019 National Assessment of Education Progress (NAEP) Results Tell Us About Equity in K-12 - Wing Institute news section]

Assembly Bill 1369

The adoption of California Assembly Bill 1369 in 2015 added two sections to California's Education Code to support students with dyslexia.

Bill Text - AB-1369 Special education: dyslexia.



The California Dyslexia Guidelines were written in response to the passage of AB 1369.
California Dyslexia Guidelines - Announcements & Current Issues (CA Dept of Education)

Current Activity: AB 1369

Given the phonological basis of dyslexia, AB 1369 required the addition of Section 56334 to CA's *Education Code*. It states that "phonological processing" shall be included in the description of "basic psychological processes" identified in the definition of specific learning disabilities in Section 3030 of Title 5 of CA's *Education Code* to read as follows:

"The basic psychological processes include attention, visual processing, auditory processing, **phonological processing**, sensory-motor skills, cognitive abilities including association, conceptualization and expression." (bolding added)

Use of the term “Dyslexia” in Documentation

In October 2015, the federal Office of Special Education and Rehabilitative Services (OSERS) published a Dear Colleague letter offering guidance to state and local agencies on the “unique educational needs of children with dyslexia, dyscalculia, and dysgraphia” (OSERS 2015). Although these conditions fall under the special education eligibility criteria of specific learning disabilities, the purpose of this letter was “to clarify that there is nothing in the IDEA that would prohibit the use of the terms dyslexia, dyscalculia, and dysgraphia in IDEA evaluation, eligibility determinations, or IEP documents.”

Section 504 of the Rehabilitation Act of 1973 protects students with disabilities from discrimination based on disability. A student who does not qualify for an IEP, including a student with dyslexia, may nevertheless be entitled to protection under Section 504. For

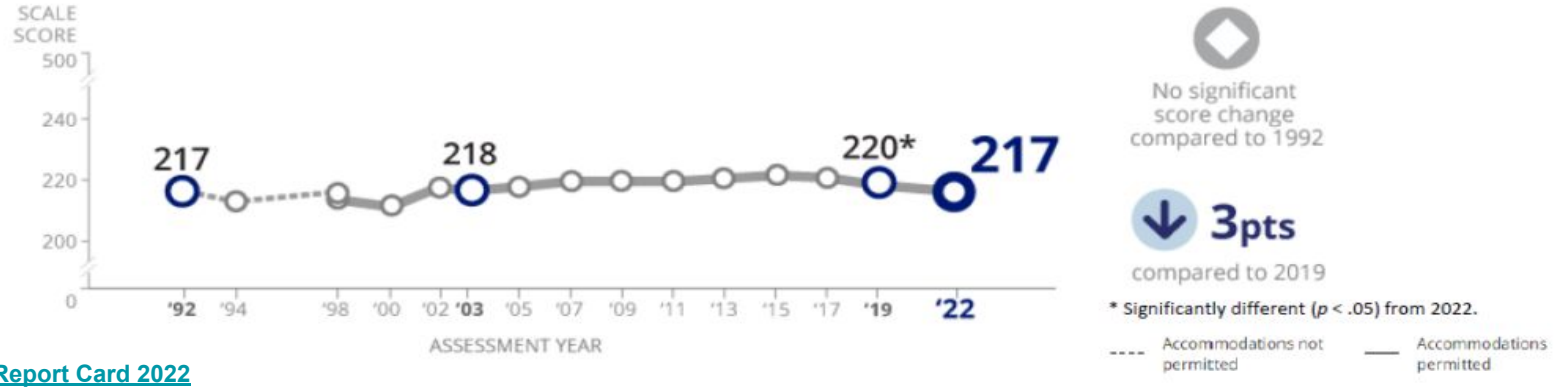
California Dyslexia Guidelines, California Department of Education, Sacramento, 2017, p. 61 and 62

NAEP Results 2022

Comparing 2019 to 2022

- Larger score declines for lower-performing students than higher performers (no change at 90th percentile)
- Thirty-seven percent of students performed below *NAEP Basic*; larger compared to 2019
- Score declines for American Indian/Alaska Native, Black, Hispanic, and White students
- No score change for students with disabilities
- No score change for Catholic school students
- Score declines for most states/jurisdictions (30) and few TUDA districts (9)

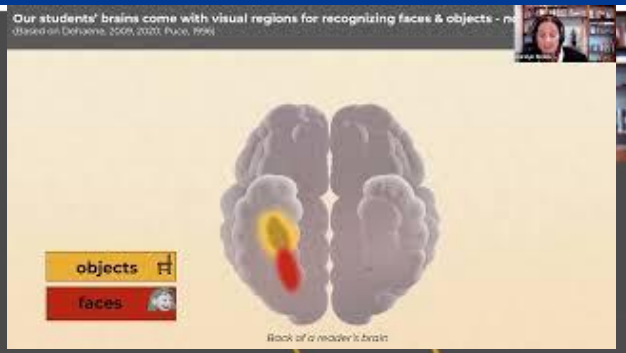
Trend in fourth-grade reading average scores



The Nations Report Card 2022

Break

Start from the perspective of our children and how their brains learn



Advancing the Science of Reading in the Early Years June 2022

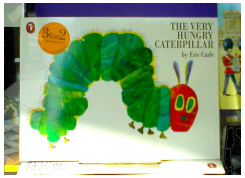
What is your mind doing when it is reading?

Í ljósi tunglsins lá lítið egg á laufblaði.

Einn sunnudagsmorguninn kom hlý sólin upp og út úr egginu kom pínulítil og mjög svöng maðkur.

Hann fór að leita að mat.

Á mánudaginn borðaði hann í gegnum eitt epli.



In the light of the moon a little egg lay on a leaf.

One Sunday morning the warm sun came up and-pop-out of the egg came a tiny and very hungry caterpillar.

He started to look for some food.

On Monday he ate through one apple. But he was still hungry.

He started to look for some food.

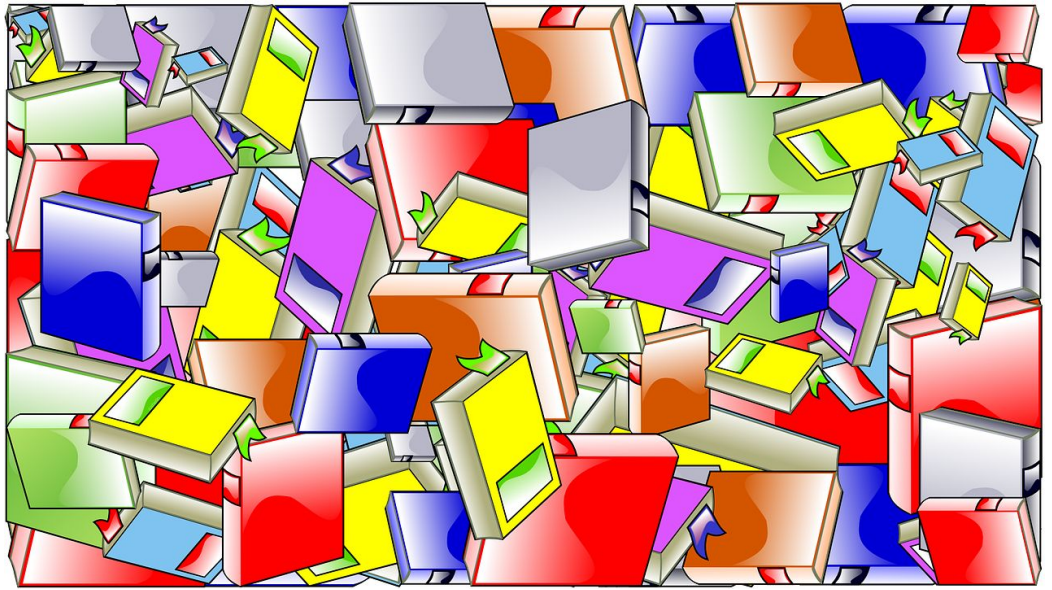
Big idea

“We are not wired for written code, we are wired for spoken language.” (Strom, 2022).

The Alphabetic Principle

Sounds are represented by letters; letters represent sounds. There are systematic and predictable relationships between written letters and spoken sounds.

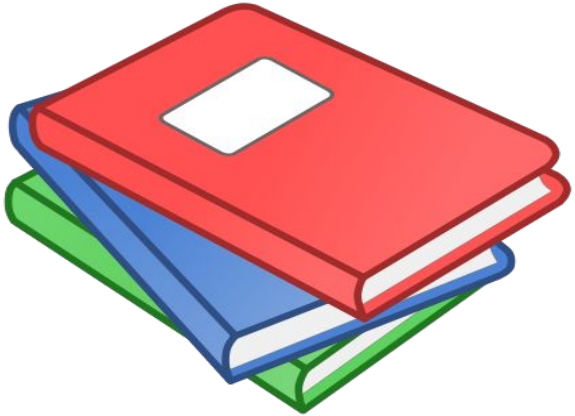
The Alphabetic Principle | Reading Rockets



Digging into the Science of Reading

What is the Science of Reading (SoR)?

A comprehensive collection of research completed over many years by experts in the fields of education, psychology, neuroscience, language development, and more regarding how we learn to read.



The Science of Reading Resources

What is the Science of Reading

Nancy Young

The Science of Reading - Teacher Professional Learning | Literacy, Math | MTSS

What is the Science of Reading? | Structured Literacy | IMSE Journal

Advancing Science of Reading in the Early Years - K–5 Literacy Program & Curriculum | Amplify CKLA Dr. Carolyn Strom June 2022 unedited version

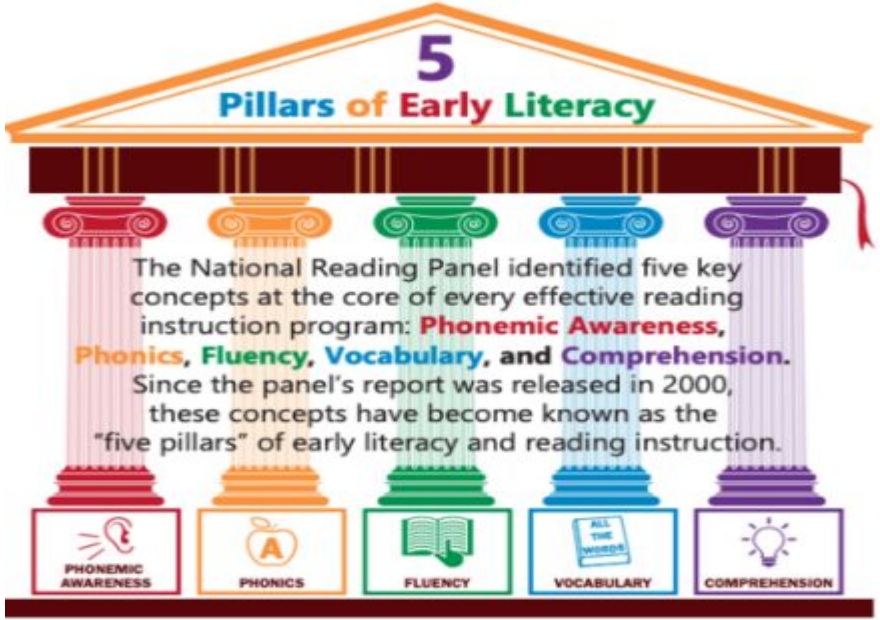
Gaab Lab Dr. Nadine Gabb

How the Brain Learns to Read Stanislas Dehaene

The Simple View of Reading

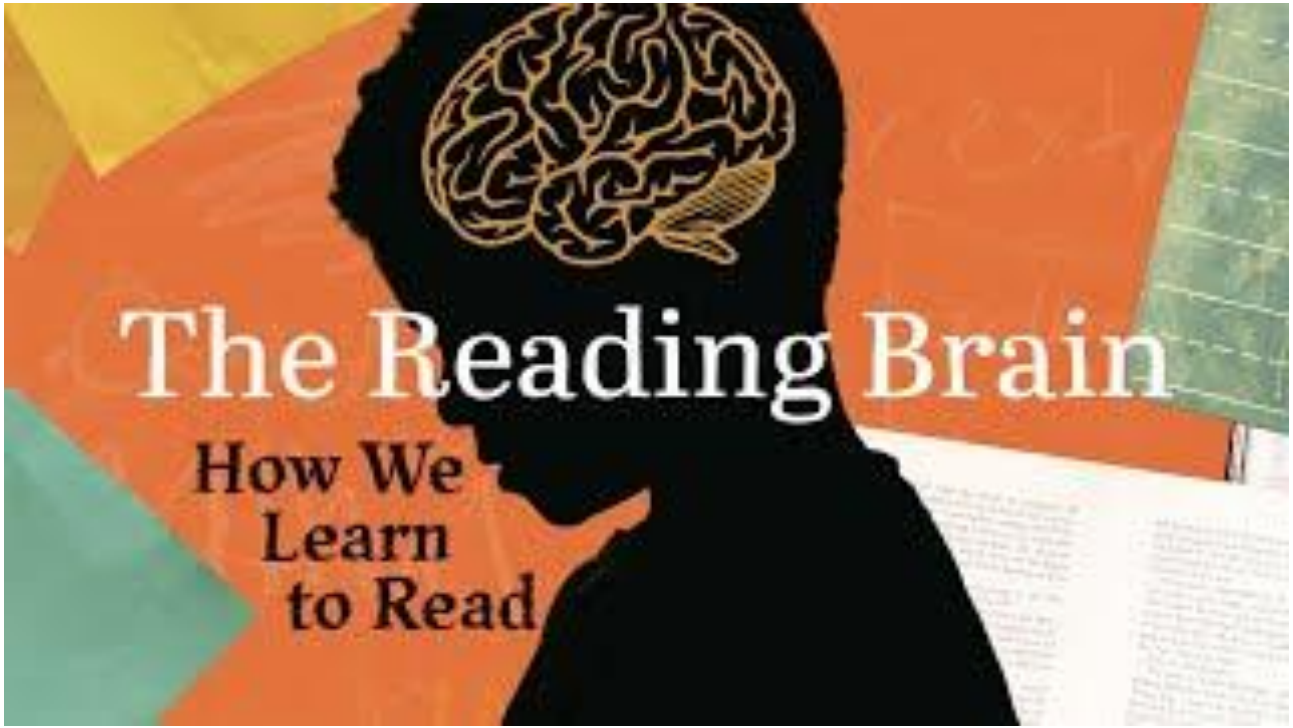
Figure 1.9 Reading Rope (Scarborough, 2001)

National Reading Panel Findings



[National Reading Panel - Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading]

The Reading Brain-How We Learn to Read

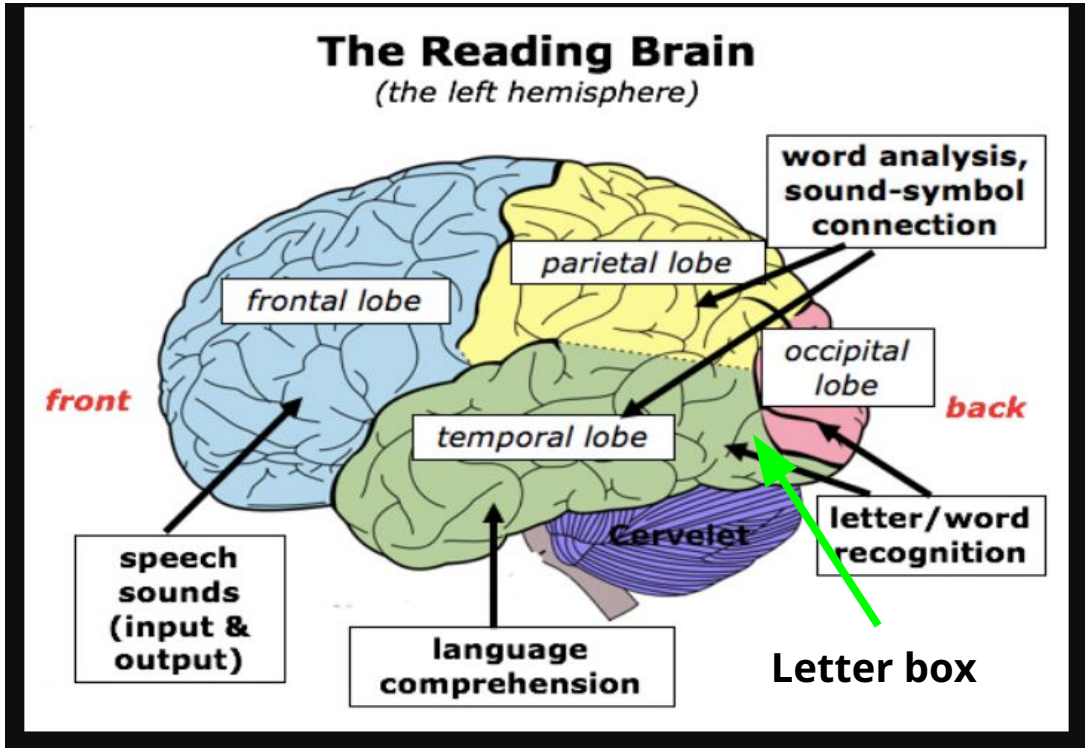


EEG and fMRI

EEG

fMRI

The Reading Brain



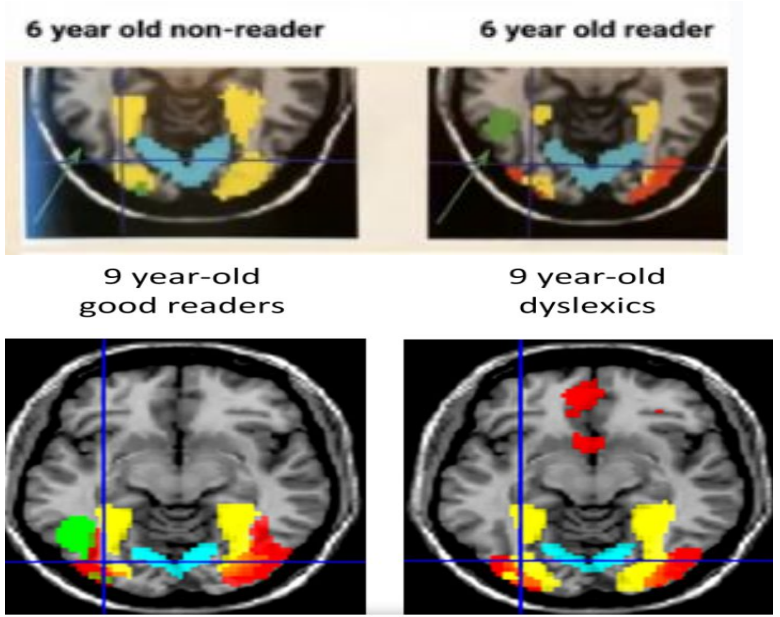
How the Brain Learns to Read Dehaene 10-25-2013

Big idea

“A reading brain is different from a non-reading brain, and we can actually see it” (Strom, 2022).

“Skilled readers are made not born” (Strom 2022)

- We are born being able to recognize objects and faces.
- The visual word form area or letterbox allows readers to recognize words without much effort..
- The letterbox does not exist in non readers or at birth.
- It takes years to build through explicit, systematic phonics instruction..



Dehaene, S. (2013). Inside the Letterbox: How Literacy Transforms the Human Brain. *Cerebrum: the Dana Forum on Brain Science, 2013*.

Advancing the Science of Reading

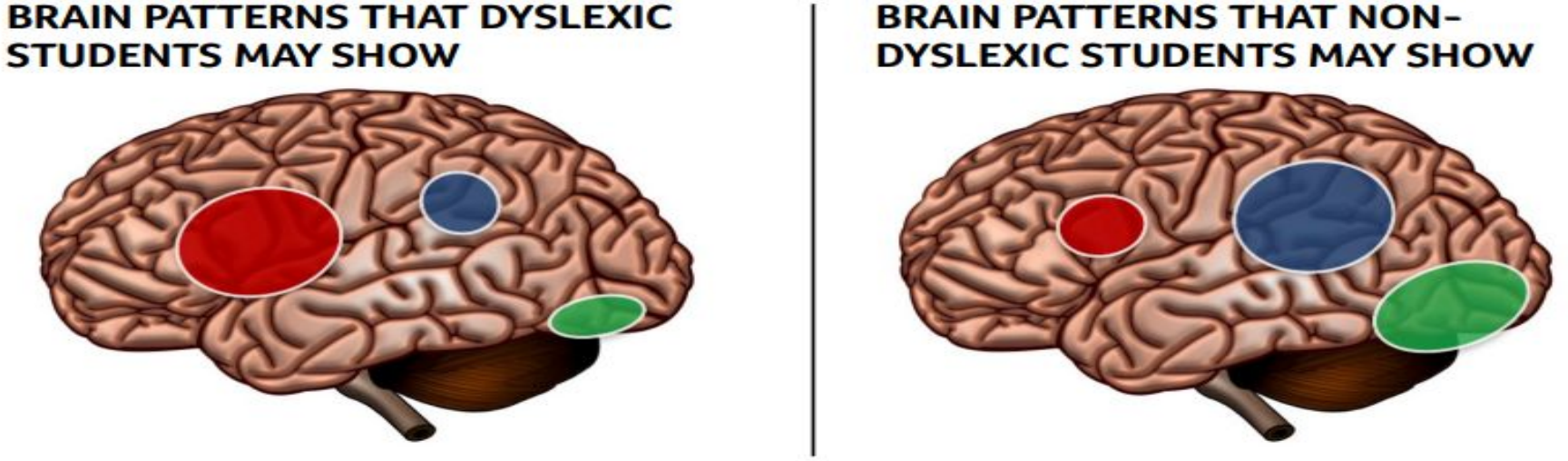
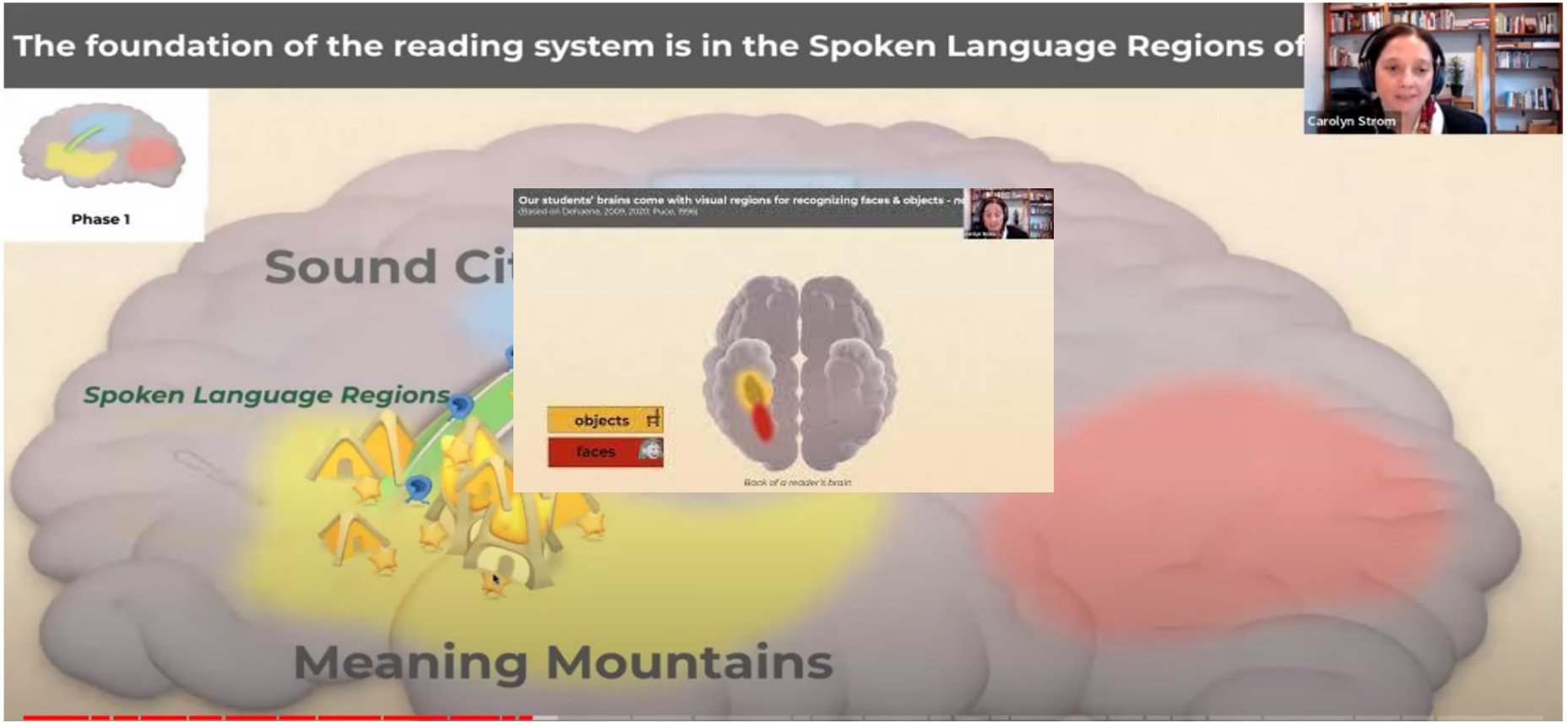


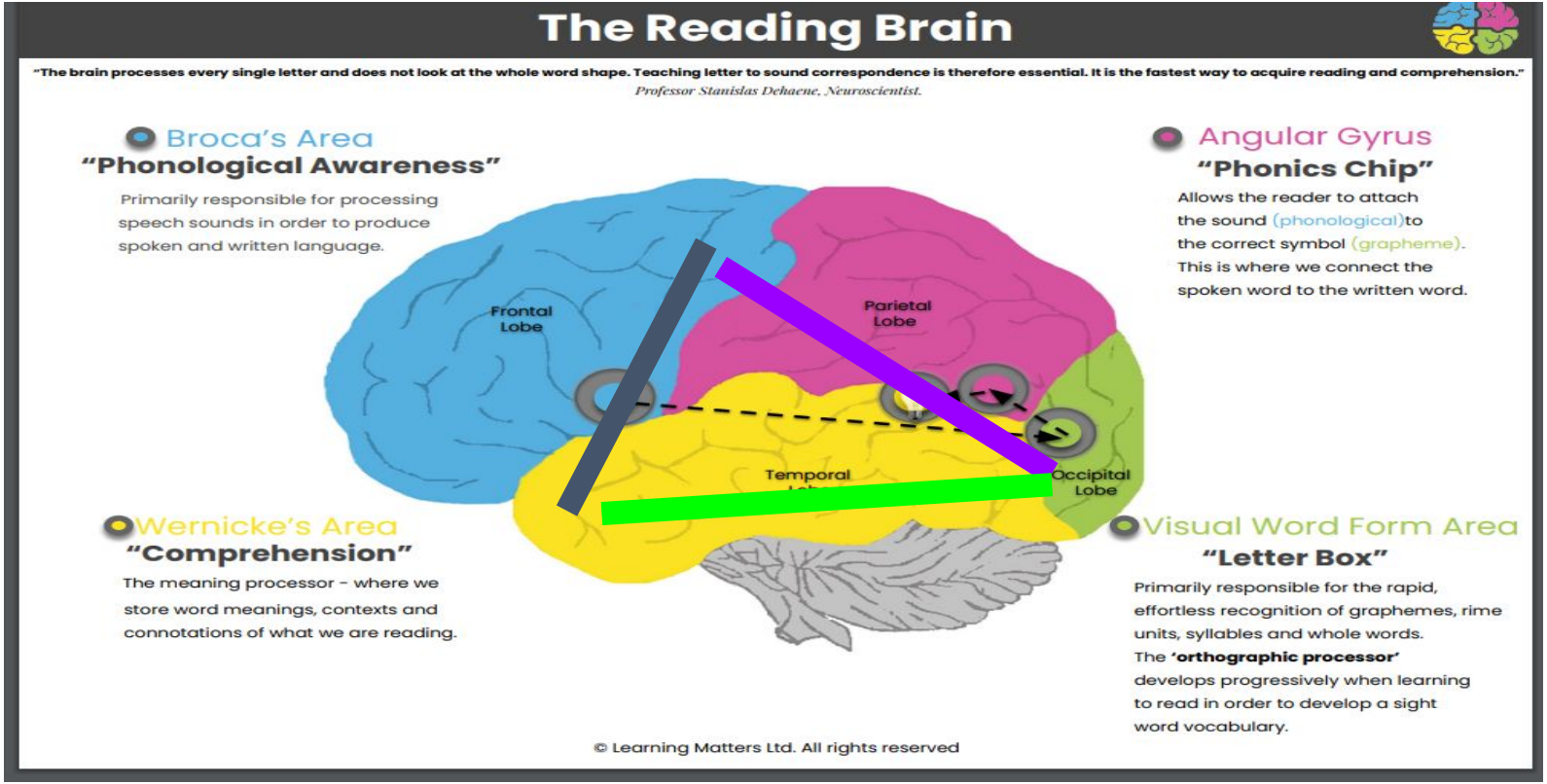
Figure 2.1. Key brain structures that are often impacted in dyslexia. Developed by and used with permission from Fumiko Hoeft.

[California Dyslexia Guidelines pg. 6]

The foundation of the reading system is in the Spoken Language Regions of



“Humans are wired to learn to speak. We are NOT wired to learn to read, we have to build the neural pathways.” (Learning Matters, 2023)



Learning Matters

How do we begin to connect these areas of the brain?

1. Develop *sound sensitivity* (i.e., phonemic awareness and segmentation)
2. Retrain neurons used to recognize objects and faces to identify specific letters.
3. Create a mapping between individual letters and speech sounds.

Sound sensitivity

Mapping speech sounds to letters

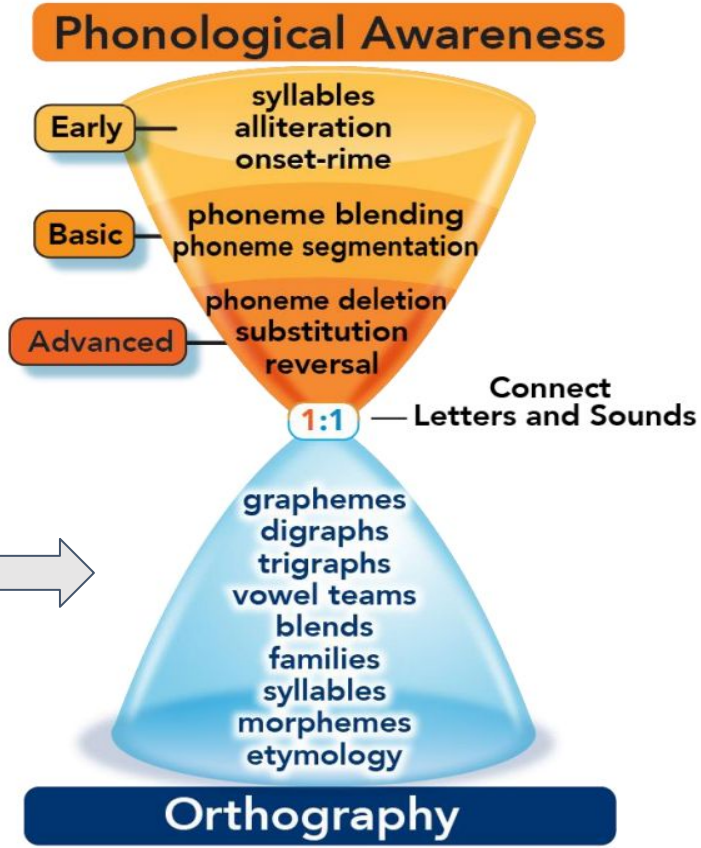
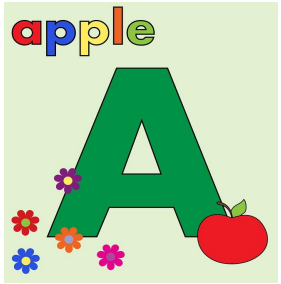


Figure 2.5 The Hourglass Figure, Completed (Courtesy of Carol A. Tolman)

Big idea

“Learning to read is not a visual memorization process. It’s a process where we have to convert letters into sounds. We build strong mappings between individual letters and speech sounds. Mapping is the key.”
(Strom, 2022)



Mirror Invariance

b **d** **p** **q**

Advancing the Science of Reading in the Early Years, Dr. Strom June 2022

Learning to read involves "retrain[ing] neurons used to recognize objects and faces to identify specific letters. Reversals [indicate] the child is in the process of *unlearning* mirror invariance and overcoming this aspect of their vision system" (Strom, 2022).

Break

Jigsaw Activity and Breakout Room

Read the assigned section of the article:

Neurobiology of Dyslexia

Break Out Room 1	Beginning - Neurobiology and Reading (pgs. 176 - 179).
Break Out Room 2	The Reading Brain in Typical Readers - The Reading Brain in Readers with Dyslexia (pgs. 179 - 181).
Break Out Room 3	The Reading Brain and Reading Intervention - Articulation-Based Approaches (pgs. 181 - 183)
Break Out Room 4	Complexities Associated with Neurobiological Reading Research - Conclusion (pgs 183-186)
Break Out Room 5	
Break Out Room 6	

Housekeeping - Compensation

- Each week, claim your time in your NU timekeeping portal under the category “Professional Development”.
- We will verify your time keeping attendance of synchronous and asynchronous participation.
- Link to the recorded webinar will be sent to your NU email within 24 hours after each webinar.
- Reach out to Dr. Bonnie Plummer if you have questions. bplummer@nu.ed

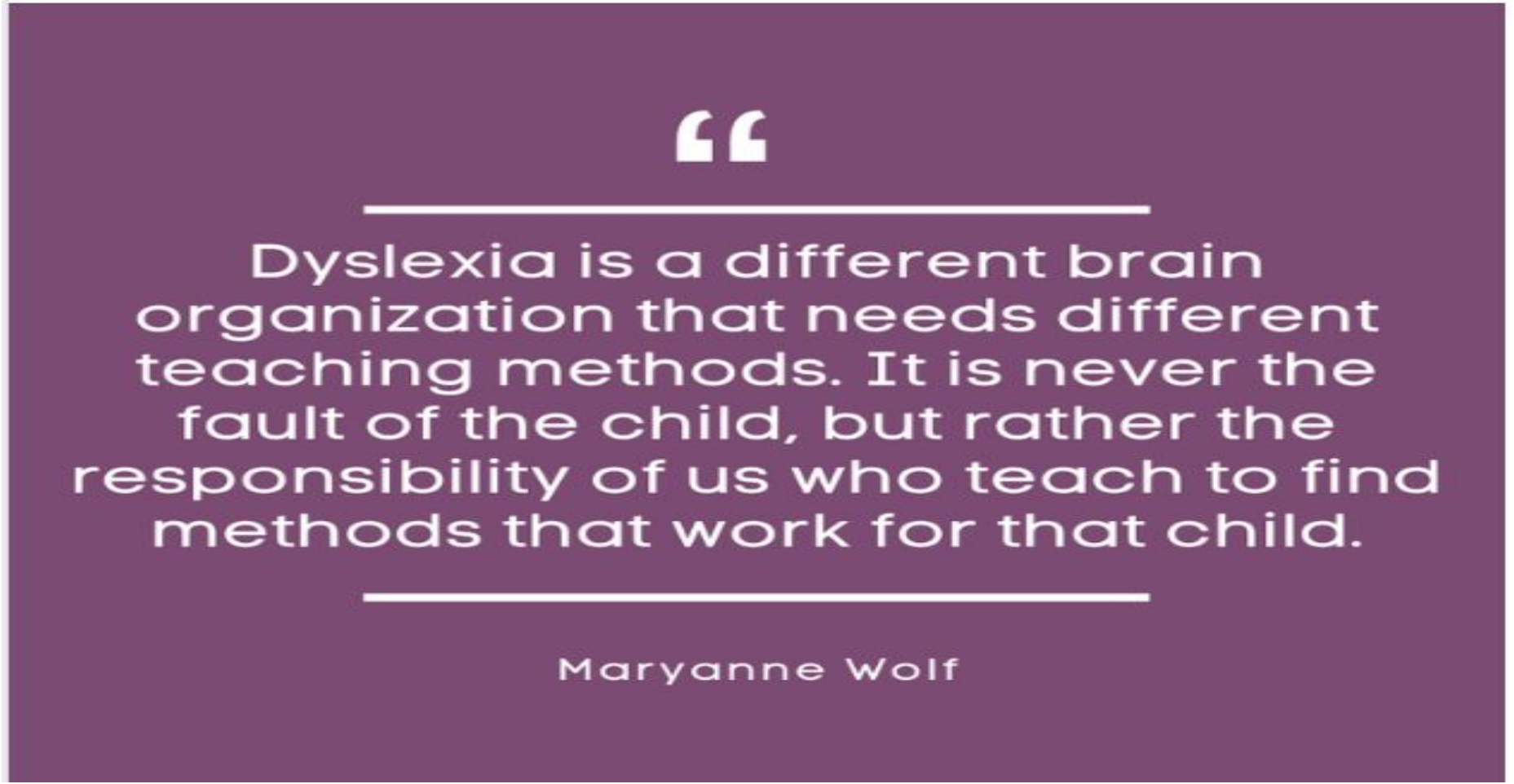
Check for Understanding/Exit Ticket

- What did you learn?
- What stood out to you?
- How can you use this information on the science of reading and dyslexia with your candidates?
- Please summarize what you learned during the group activity reviewing the article by Kerns, Neurobiology of Dyslexia.

Google Form

Padlet

Padlet for Modules 1-4


“
Dyslexia is a different brain organization that needs different teaching methods. It is never the fault of the child, but rather the responsibility of us who teach to find methods that work for that child.
Maryanne Wolf