

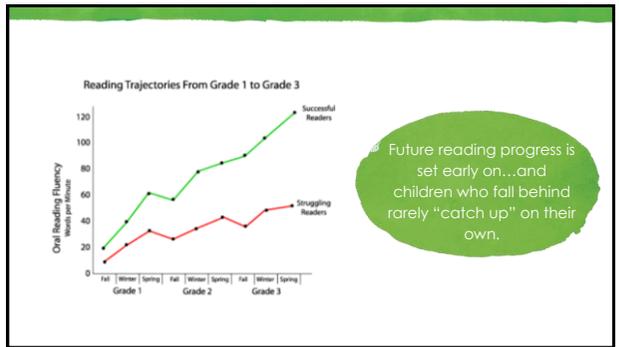
The Superkids
Reading Program

Building the Beginning Reader's Brain

Presented by: Stacey Leitzel



ZB Zaner-Bloser
A HighMinds Company



"About 10 million children will encounter reading problems in the crucial first three years of school."
—National Reading Panel Progress Report, 2000

The Self-Perpetuating Cycle of Reading Difficulties

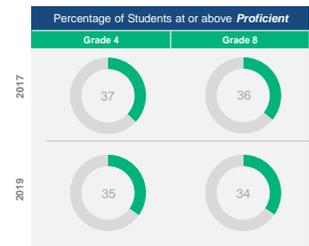


- Difficulty in decoding
- Lack of fluency
- Avoidance of reading
- Less reading practice
- Declining vocabulary growth
- Limited academic language and content knowledge
- Declining comprehension
- Lack of motivation

What % of children with reading comprehension difficulties in grades 1–3 **also** have **problems in decoding and/or vocabulary**?

- 1 = 30%
- 2 = 50%
- ➔ 3 = 99%

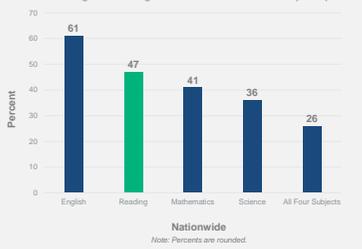
Spencer, Quinn, and Wagner, 2014



Compared to 2017, there was a two-point decrease at grade 4 and grade 8 in the 2019 percentage of students at or above proficient.

Public and nonpublic schools: Reading, National Assessment of Educational Progress, 2019

Percent of 2017 ACT-Tested High School Graduates Meeting ACT College Readiness Benchmarks by Subject



Less than half of our nation's high school students meet the benchmark level in Reading on the ACT.

ACT Profile Report, 2017

The effects of illiteracy and the cost of remediation programs cost our nation billions of dollars annually.

How Successful Are Intervention Programs?

Although many remedial programs may show success at improving reading skill, many times these effects tend to dissipate over time.

—Quirk, M., & Schwanenflugel, P., 2004

After research-based instruction, the percentage of first graders below 30th percentile **can be reduced to 4–6%.**

Foorman, Breier, & Fletcher, 2003; Mathes, et al., 2005; Torgesen, 2004 & 2005

Building the Beginning Reader's Brain

- ★ Strong Neural Connections
- ★ Systematic & Explicit Phonics Instruction
- ★ Cumulatively Decodable Text

Preventing Reading Failure: What We Know

The brain is not "hard wired" for reading. The neural connection needed for reading must be built through **successful instructional experiences**.

—Hruby & Goswami, 2011

Brain Imaging Studies

MRI measures brain **STRUCTURE**
fMRI measures brain **FUNCTION**

1

fMRI measures blood supply to different parts of brain.

2

When neurons are firing, more oxygenated blood flows to that area.

3

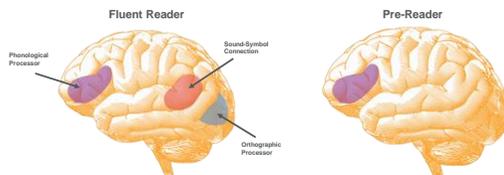
Iron in blood produces stronger magnetic signal, which can be detected.



Image source: Children's National, GE Healthcare

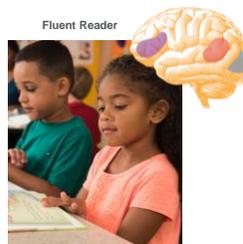
Brain Imaging Studies

"Within his brain, the child is literally building the neural circuitry that links the sounds of spoken words, the phonemes, to the print code, the letters that represent these sounds" (Shaywitz, 2003, p. 177).

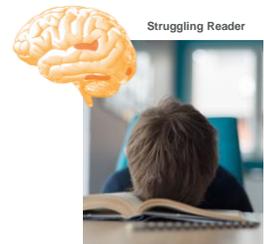


Brain Imaging Studies

Fluent Reader



Struggling Reader



Brain Imaging Studies

Left Hemisphere

Right Hemisphere

Look like readers

Sound like readers

Act like readers

"Memorize the pattern."
"Look at the picture."
"Guess at the word."

These strategies build word forms in the right hemisphere...an area not well-suited for reading.

"Freuding"

"Environmentally-influenced" Dyslexia

"These persistently poor readers have a rudimentary system in place, but it's not connected well. They weren't able to develop and connect it right because they haven't had that early stimulation."
—Shaywitz, 2002

"Approximately two-thirds of poor readers seemed to have the neurological systems for reading **intact**; however those systems **have not been properly activated.**"
—Shaywitz, 2003

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Why Is Phonics So Critical?

English is a phonetic language.

English has 26 letters, 44 phonemes, and 74 phonograms.

Despite the number of phonograms, if students understand the phonograms and the spelling rules that govern them, they can unlock the mystery of 98% of the words in the English language.

Eide, *Uncovering the Logic of English*, 2012



If a child memorizes ten words, the child can read ten words.

But if the child learns the **sounds** of ten letters, the child can read:

- 350** three-sound words
- 4,320** four-sound words
- 21,650** five-sound words

Dr. Martin Kozloff (2002)

What Do We Need to Know and Teach?

- All the phonemes of the English language
- Phoneme-grapheme representation
- Letter formation
- Morphology (meaningful units of the language; roots and affixes)
- Syllable patterns

Phonics and Word Recognition

Effective Phonics Instruction Includes Sufficient Practice in Decodable Texts

“As an instructional strategy, the teaching and the text cannot be separated.”



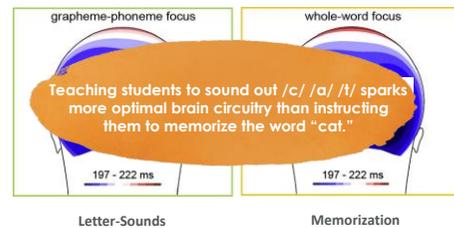
(Mesmer, 2001, p. 136)

What type of instruction do beginning readers need?

What Do Beginning Readers and Writers Need to Do?

- ✦ **Decode** = Link sounds to the printed letters, blending them together, and saying the whole word
- ✦ **Encode** = Translate speech sounds into the letters that represent those sounds
- ✦ **Construct meaning**

Teaching Method Influences Brain Activity



Yancheva, Y., Wise, J., & McCandless, B. (2015). Hemispheric specialization for visual words is shaped by attention to sublexical units during initial learning. *Brain & Language*, 145-146, 23-33.

"...using phonic-based methods is a **better use of limited instructional time** than using meaning-based methods, **both for learning to read aloud and comprehend written words accurately.**"

Taylor, J.S.H., Davis, M.H., Rastle, K. (2017). Comparing and validating methods of reading instruction using behavioral and neural findings in an artificial orthography. *Journal of Experimental Psychology*, 144(6), 826-838.

"**The results were striking**; people who had focused on the meanings of the new words were **much less accurate in reading aloud and comprehension** than those who had used **phonics**, and our MRI scans revealed that their brains had to work harder to decipher what they were reading."

Taylor, J.S.H., Davis, M.H., Rastle, K. (2017). Comparing and validating methods of reading instruction using behavioral and neural findings in an artificial orthography. *Journal of Experimental Psychology*, 144(6), 826-838.



Should children memorize all Dolch words by sight?

had
must
get
went

Which Dolch words at the Kindergarten level can children decode once they know the **consonant sounds** and **short vowels**?

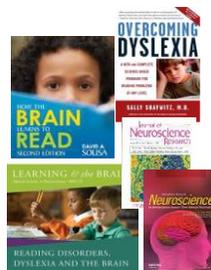
Dolch Words

is	has	not	into
did	his	on	well
a	hot	ran	went
at	the	run	will
got	cut	ten	to
it	no	am	ask
its	us	him	black
sit	best	must	drink
fast	big	for	pick
if	but	help	like
off	of	jump	just
I	red	an	said
get	an	stop	six
let	can	up	yes
tell	and	upon	you
had	in	cup	was
		seven	

Too many students are not developing the automatic decoding skills needed for fluent reading.

"While a rote-based type of learning involving memorization of sight words can get the student to a certain point, eventually there is too much to memorize and the system fails."
—Shaywitz et al., 2002

Neuroscience



Educational Research



EXPLICIT & SYSTEMATIC Phonics Instruction is CRITICAL for Learning to Read

- ★ 3 decades of research funded by National Institutes of Health
- ★ 10 large scale longitudinal studies & 1,500+ smaller-scale studies
- ★ 10,000,000+ children studied
- ★ 2,500+ articles & 50+ books

National Reading Panel, 2000; Shaywitz, 2003; Sweet, 2015

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The Simple View of Reading

D x LC = RC

Decoding (word recognition) × Language comprehension = Reading comprehension

Working Memory

Less fluent reader

More fluent reader

Decoding (word recognition)

Language comprehension

The Many Strands That Are Woven into Skilled Reading (Scarborough, 2001)

Language Comprehension

- Background Knowledge
- Vocabulary Knowledge
- Language Structures
- Verbal Reasoning
- Literacy Knowledge

Decoding (word recognition)

- Phonological Awareness
- Decoding (and Spelling)
- Sight Recognition

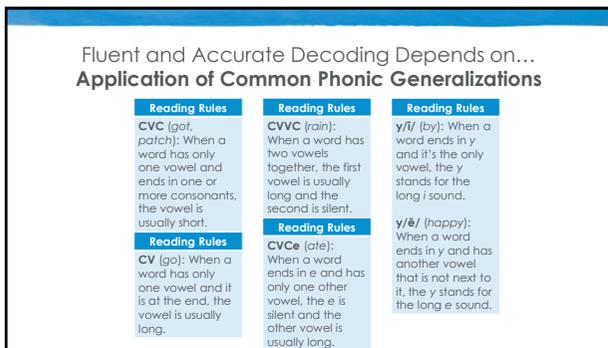
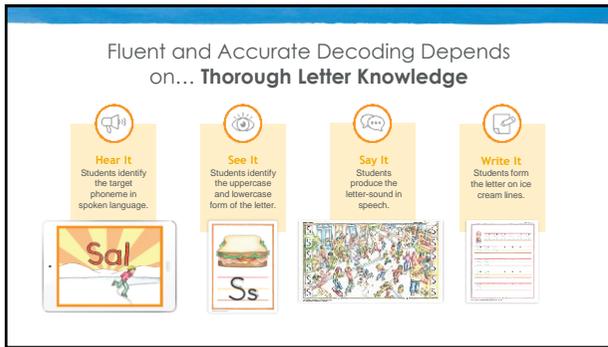
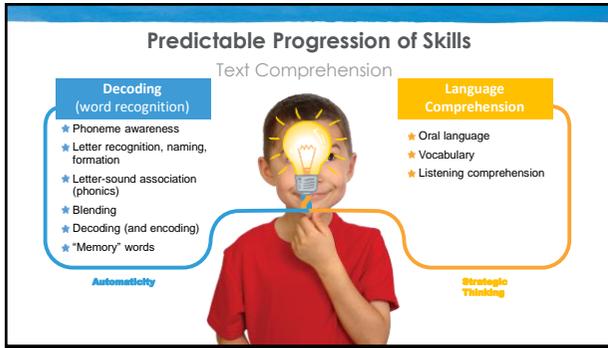
Skilled Reading: Fluent execution and coordination of word recognition and text comprehension

Reading comprehension

As referenced in TEA's Reading Practices video
Used with permission of Hollis Scarborough

Reading in the Brain
THE SCIENCE AND COLOGY OF A HUMAN ABILITY
Stanislas Dehaene
AUTHOR OF THE NUMBER SENSE

"It is simply not true that there are hundreds of ways to learn to read... when it comes to reading, we all have roughly the same brain that imposes the same constraints and the same learning sequence."
—Dehaene, 2009, p. 218



What kinds of texts do beginning readers need?

“**Decodability** is a critical characteristic of early reading text... it increases the likelihood that students will use a decoding strategy and results in **immediate benefits particularly with regard to accuracy.**”

—Cheatham & Allor, 2012



“Practice materials should include stories that contain words using the specific letter-sound correspondences the children are learning.”

—Sousa, 2014

What makes decodable text *decodable*?

- ★ High proportion of words with phonetically regular relationships between letters and sounds
- ★ Close match between the letter-sound relationships represent in text and those that the reader has been taught

“...the words and sentences introduced in class must only include graphemes and phonemes that have already been taught.”

—Dehaene, 2010

(Mesmer, 2001)

“The **lesson-to-text match** is pivotal to the successful use of decodable text.”

—Mesmer, 2001, p. 136

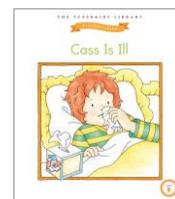
“Cumulatively Decodable” Text

c o g a d s

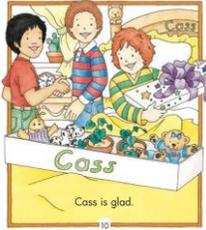


The words children read must contain letter-sound information they have been taught.

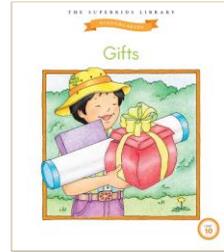
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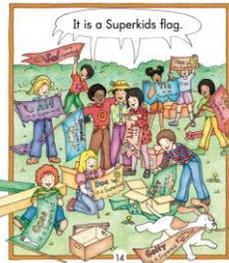
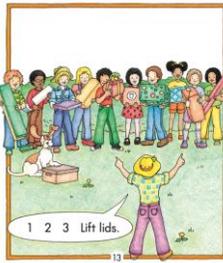
c o g a d s l i



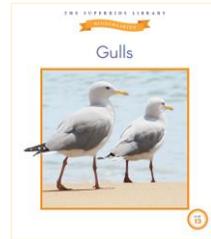
c o g a d s l i t f



c o g a d s l i t f



c o g a d s l i t f e h u



The gull adds fluff.

4



The gull has eggs.

5



The gull sits still.

6

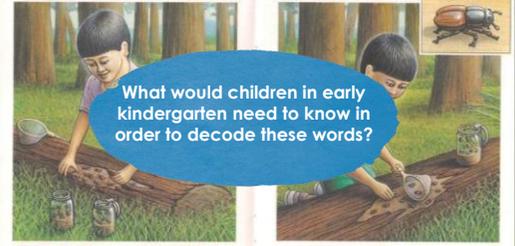


The gulls fuss.

7

Reading cumulatively decodable text...

- ★ gives children practice applying the letter associations they are learning.
- ★ helps children learn to depend on decoding as their primary reading strategy.
- ★ helps children develop the automaticity needed for fluent reading.



What would children in early kindergarten need to know in order to decode these words?

I like to find things.

I like to find beetles.

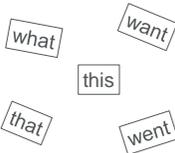
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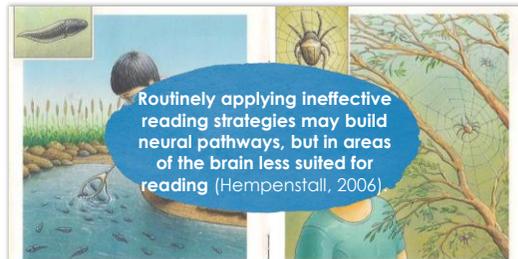
What do I do with this word?

Teaching children to guess at words that they do not recognize immediately is never acceptable.

—Sweet, 2015



Guessing is not a reliable, sustainable decoding strategy!



Routinely applying ineffective reading strategies may build neural pathways, but in areas of the brain less suited for reading (Hempenstall, 2006).

I like to find tadpoles.

I like to find spiders.

"As an instructional strategy, the teaching and the text cannot be separated."

—Mesmer, 2001

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Thank You!

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