

# The Knowledge Gap: What It Is and How to Narrow It

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WNY SCIENCE OF READING CONFERENCE

NOVEMBER 5, 2022

# We've been hearing a lot lately about the Science of Reading ...

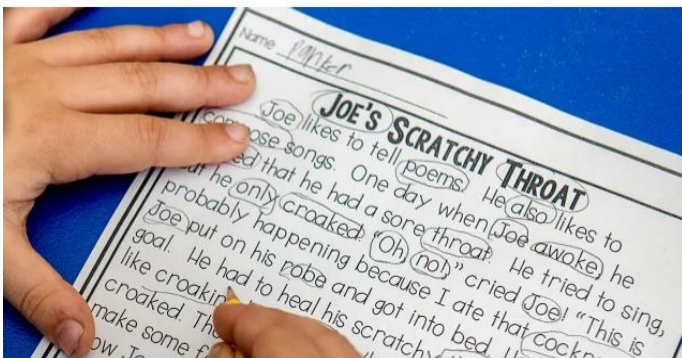
Education Week, 10.2.19

READING & LITERACY EXPLAINER

## How Do Kids Learn to Read? What the Science Says

Time Magazine, 8.11.22

Inside the Massive Effort to Change the Way Kids Are Taught to Read



NY Times, 2.15.20

## An Old and Contested Solution to Boost Reading Scores: Phonics

As test scores lag, there's a growing debate between proponents of the "science of reading," which emphasizes phonics, and traditional educators who prefer to instill a love of literature.

NY Times, 5.22.22

## In the Fight Over How to Teach Reading, This Guru Makes a Major Retreat

Lucy Calkins, a leading literacy expert, has rewritten her curriculum to include a fuller embrace of phonics and the science of reading. Critics may not be appeased.

NY Times, 10.6.22

## Sounding Out a Better Way to Teach Reading

Schools are returning to phonics and other evidence-based literacy methods, and already there are signs that the switch is paying off in improved scores.

# Emily Hanford's Terrific Audio Documentaries

## DOCUMENTARIES



### What the Words Say

Children of color are less likely to get help



### At a Loss for Words

What's wrong with how schools teach reading



### Hard Words

Why aren't our kids being taught to read?



### Hard to Read

How American schools fail kids with dyslexia

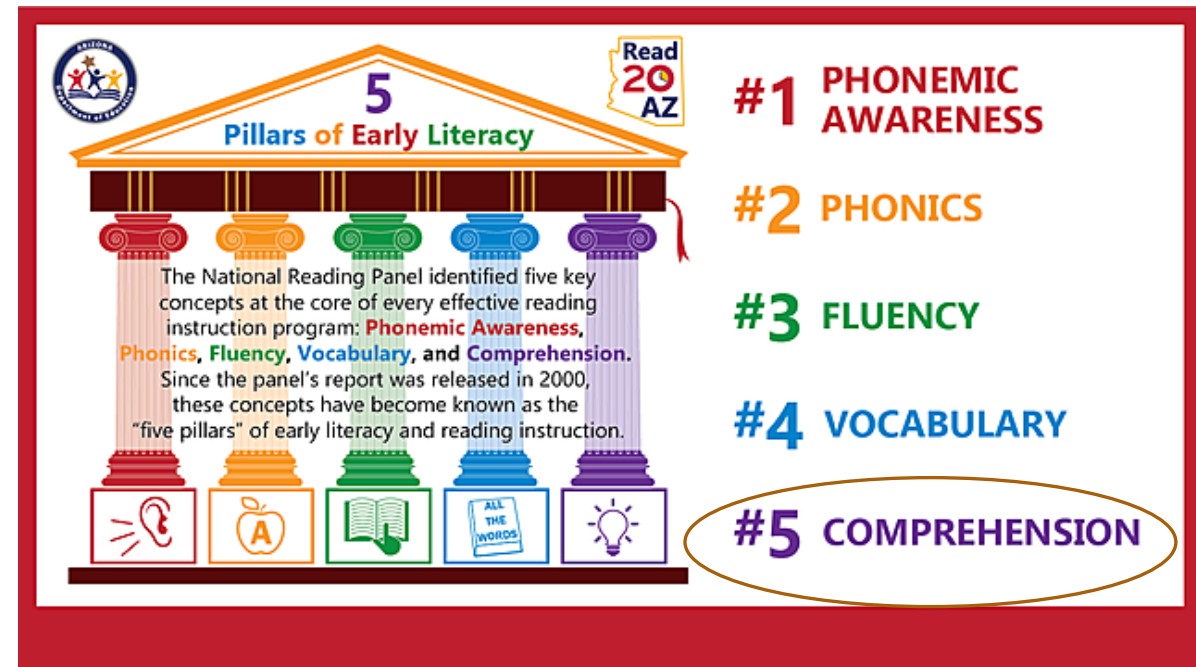
## NEW PODCAST



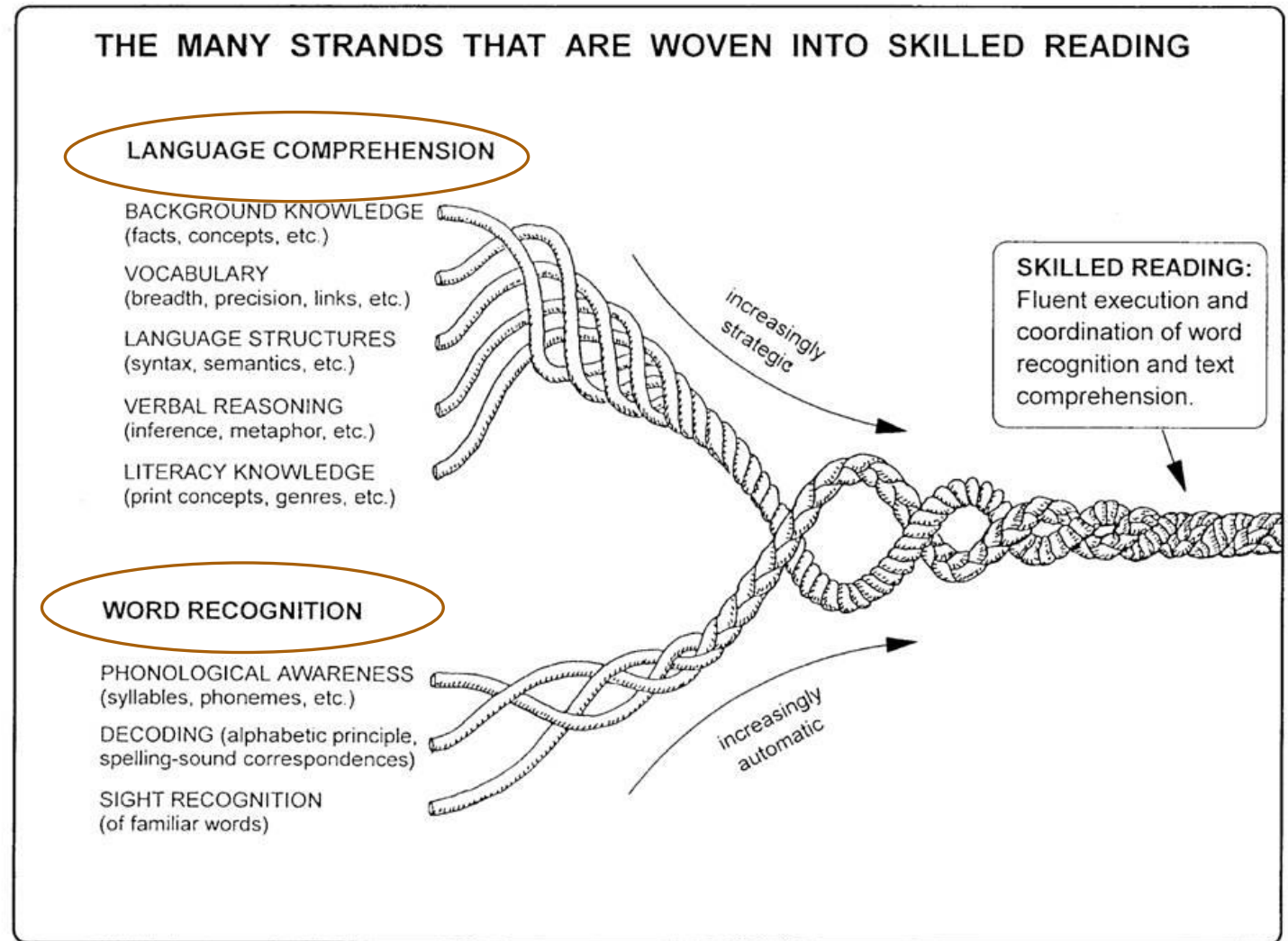
Is there anything missing?

# SOR infographics do mention comprehension ...

## The Simple View of Reading



# A more complex infographic: the “Reading Rope”



Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. Neuman & D. Dickinson (Eds.), *Handbook for research in early literacy* (pp. 97–110). New York, NY: Guilford Press.



Is there anything *still*  
missing?

We'll come back to that.




# The Standard Approach to Reading Comprehension, Part 1

## COMPREHENSION


### *strategies vs. skills*

- Using Schema
- Predicting
- Inferring
- Questioning
- Determining Importance
- Visualizing
- Synthesizing

- Main Idea & Details
- Author's Purpose
- Determining Theme
- Cause & Effect
- Summarize/Retell
- Sequence of Events
- Compare & Contrast
- Story Structure
- Classify & Categorize
- Fact & Opinion
- Drawing Conclusions
- Point of View
- Identifying Genre
- Describing Plot
- Making Predictions
- Figurative Language



READ TO COMPREHEND



### Progress Monitoring by Instructional Text Reading Level

GRADE	MONTHS OF THE SCHOOL YEAR									
	1	2	3	4	5	6	7	8	9	10
K	–	–	–	A	A/B	B	B	C	C	C
1	C/D	D	E	E/F	F	G	G/H	H	I	I
2	I/J	J	J	J/K	K	K/L	L	L	M	M
3	M/N	N	N	N	O	O	O	P	P	P
4	P/Q	Q	Q	Q	R	R	R	S	S	S
5	S/T	T	T	T	U	U	U	V	V	V
6	V/W	W	W	W	X	X	X	X	Y	Y
7	Y	Y	Y	Y	Y/Z	Z	Z	Z	Z	Z
8	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
9-12	Z	Z	Z	Z+	Z+	Z+	Z+	Z+	Z+	Z+

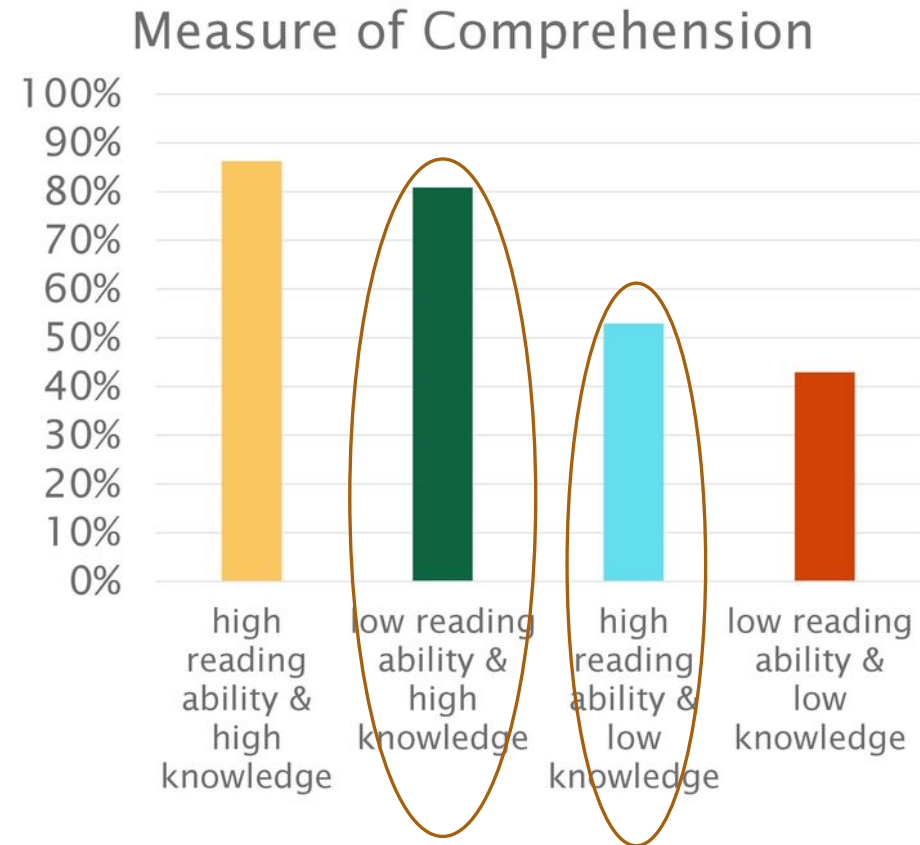


# The Standard Approach, Part 2: Leveled Reading



## Find the Main Idea

Much depended on the two overnight batsmen. But this duo perished either side of lunch—the latter a little unfortunate to be adjudged leg-before—and with Andrew Symonds, too, being shown the dreaded finger off an inside edge, the inevitable beckoned, bar the pyrotechnics of Michael Clarke and the ninth wicket.



The main factor in comprehension—skills, or knowledge of the topic?

The Baseball Study (Recht and Leslie, 1988)

This study and many others show:

- Comprehension “skills” aren’t skills like riding a bike—they don’t just get better with practice.
- There’s no such thing as a fixed “reading level.”

# We draw on background knowledge to understand *everything* we read.

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There's a strong correlation between:

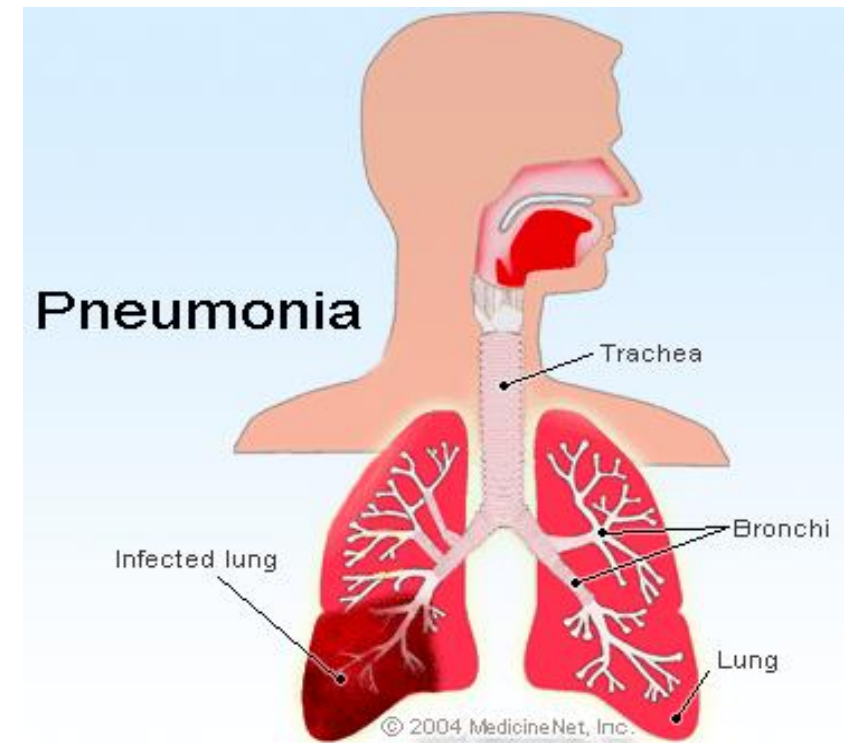
1. General academic knowledge (e.g., "In what part of the body does pneumonia occur?")

AND

2. General reading comprehension

Which suggests that ...

To boost reading comprehension, kids need to acquire as much academic knowledge and vocabulary as possible.



What  
knowledge do  
you draw on  
to understand  
a newspaper  
article?

Two appeals by the president, in his private capacity and represented by private lawyers, have reached the Supreme Court in the past week. One, *Trump v. Vance*, is a formal appeal from a ruling by the federal appeals court in New York upholding the validity of a grand jury subpoena obtained by the Manhattan district attorney, Cyrus Vance, and served on the president's accountants for his personal and business tax records.

If you're  
unfamiliar  
with terms  
relating to the  
law ...

Two [REDACTED] by the president, in his private capacity and represented by private lawyers, have reached the [REDACTED] [REDACTED] in the past week. One, *Trump v. Vance*, is a formal [REDACTED] from a ruling by the [REDACTED] in New York upholding the validity of a [REDACTED] obtained by the Manhattan [REDACTED], Cyrus Vance, and served on the president's accountants for his personal and business tax records.



If you're unfamiliar with  
general academic  
vocabulary and complex  
syntax ...

How do you  
acquire THAT  
knowledge?

Through  
knowledge of  
TOPICS.

# How do you acquire THAT knowledge?

Through  
knowledge of  
TOPICS.

Two [REDACTED] by the president, in his private [REDACTED] and [REDACTED] by private lawyers, have reached the [REDACTED] t in the past week. One, *Trump v. Vance*, is a [REDACTED]

# Syntax and Reading Comprehension

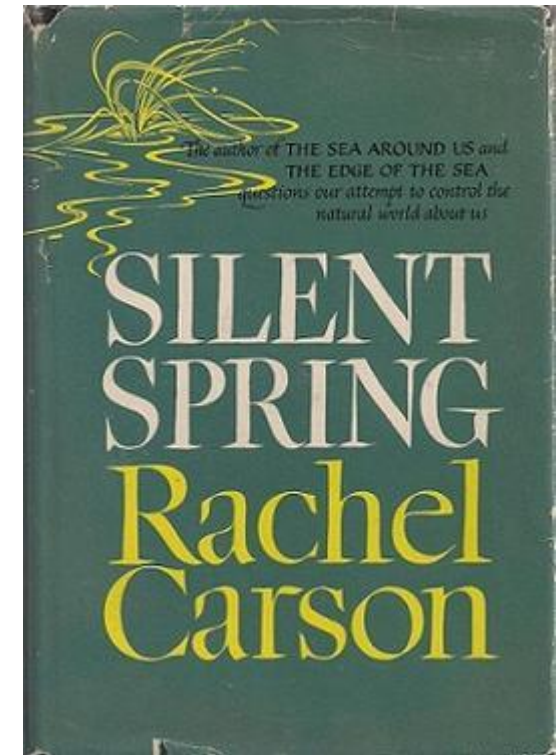
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“Rachel Carson, who was a scientist, writer, and ecologist, grew up in the rural river town of Springdale, Pennsylvania.”

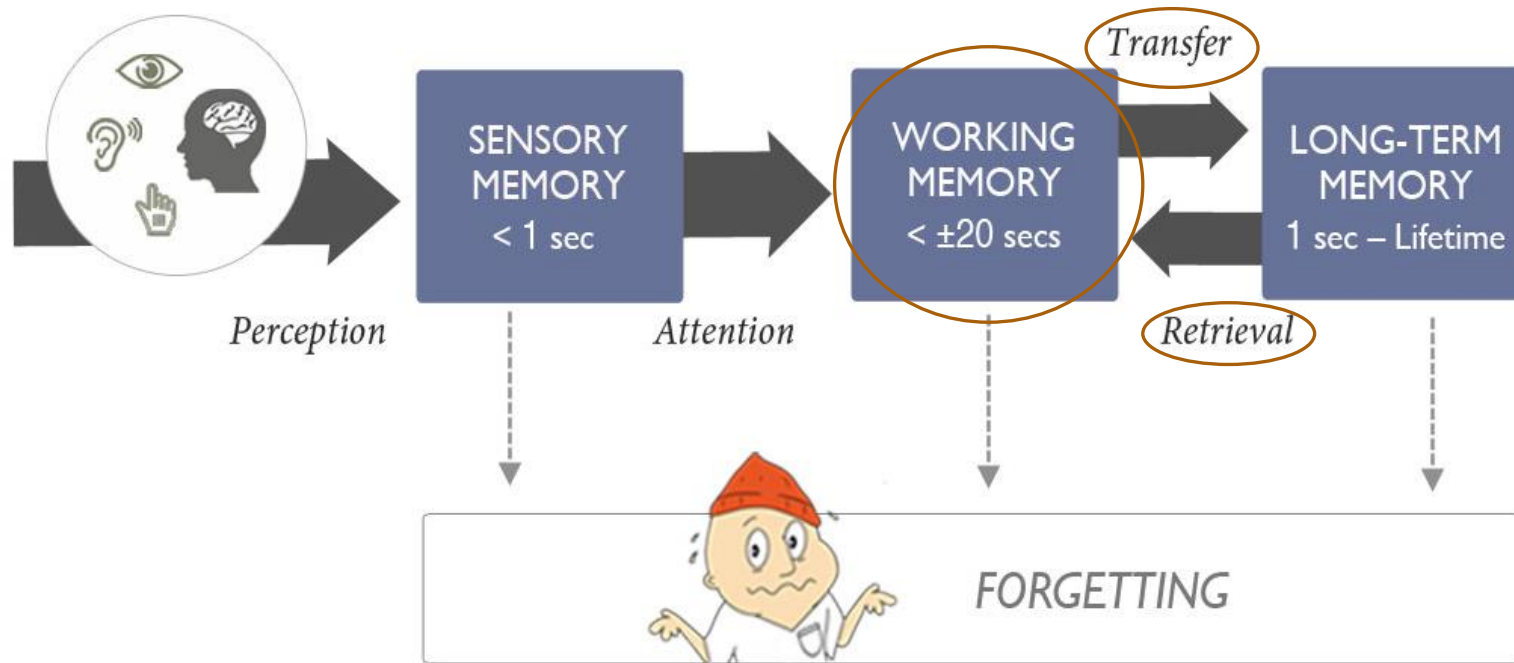
Researcher: “What do you know about Rachel Carson now?”

Student: “They grew up together in the same place.”

Source: Scott and Balthazar, *Perspect Lang Lit*. 2013 Summer; 39(3): 18–30.



# Why knowledge helps with comprehension



“Cognitive load” = the burden placed on working memory

# How knowledge affects scores on reading tests

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# Passage from Third Grade PARCC Test

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In one of the most remote places in the world, the Canadian Arctic, a people have survived over a thousand years. They are the Inuit. For the Inuit, the Arctic is a place teeming with life. Depending on how far north they live, the Inuit find everything from caribou herds and polar bears to beluga whales.



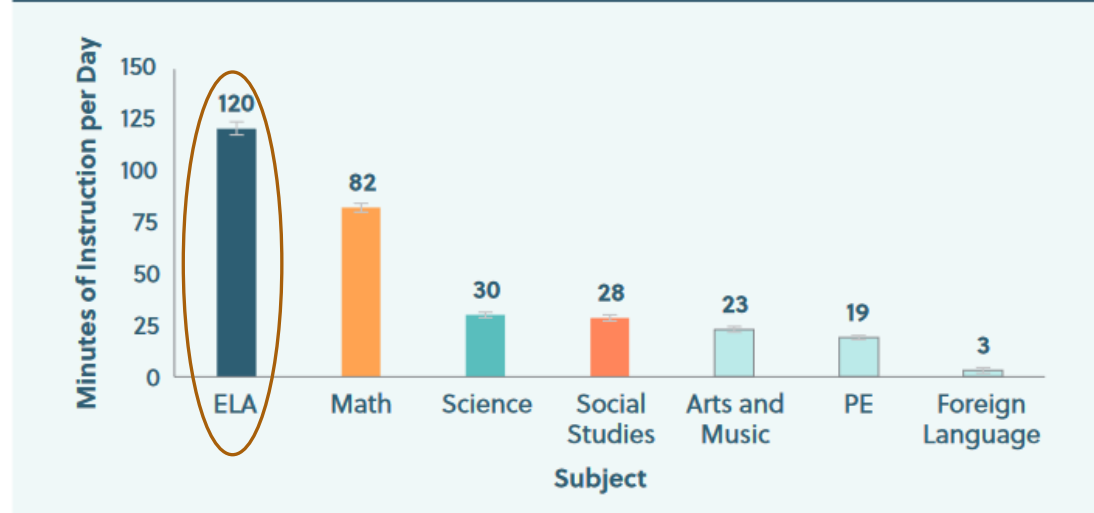
In one of the most [REDACTED] places in the world,  
the [REDACTED], a people have [REDACTED] over  
a [REDACTED] years. They are the [REDACTED]. For the  
[REDACTED], the [REDACTED] is a place [REDACTED] with life.  
Depending on how far north they live, the [REDACTED]  
find everything from [REDACTED] [REDACTED] and [REDACTED]  
[REDACTED] to [REDACTED].

# The Elementary Curriculum

How much time do elementary students spend each day on ...

- ELA?
- Math?
- Science?
- Social Studies?
- Arts?

Figure 2. Students spend an average of two hours per day on ELA instruction.



*Note: The figure contains pooled averages of grades 1 through 5. The mean total instructional time is 302 minutes per day. Analytic sample includes 6,829 students. "Arts and music" includes art, music, dance, and theater. Error bars represent 95 percent confidence intervals.*

Source: Adam Tyner and Sarah Kabourek. Social Studies Instruction and Reading Comprehension: Evidence from the Early Childhood Longitudinal Study. Washington D.C.: Thomas B. Fordham Institute (September 2020). (Based on data for students who started K in 2010-11.)

This approach to teaching reading has a negative impact on ALL children, but its impact falls hardest on:

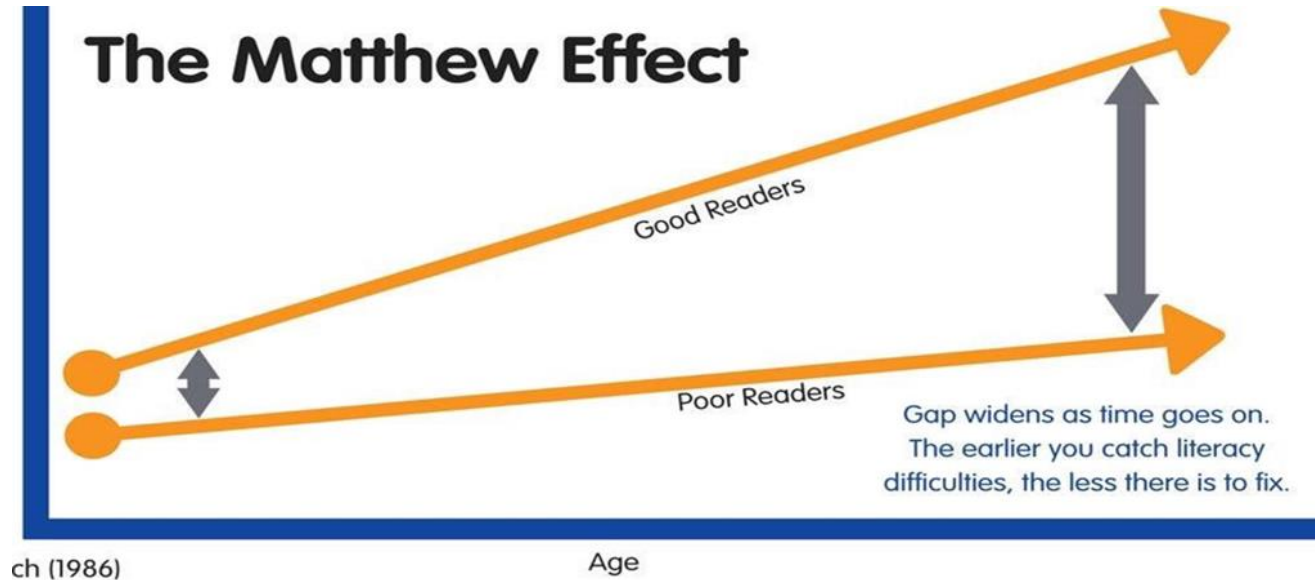
- Kids who struggle with decoding
- Kids with less academic knowledge and vocabulary
- Kids who fall into both categories



Knowledge also  
helps you retain  
new information.



Gaps between “good” and “poor” readers grow over time:

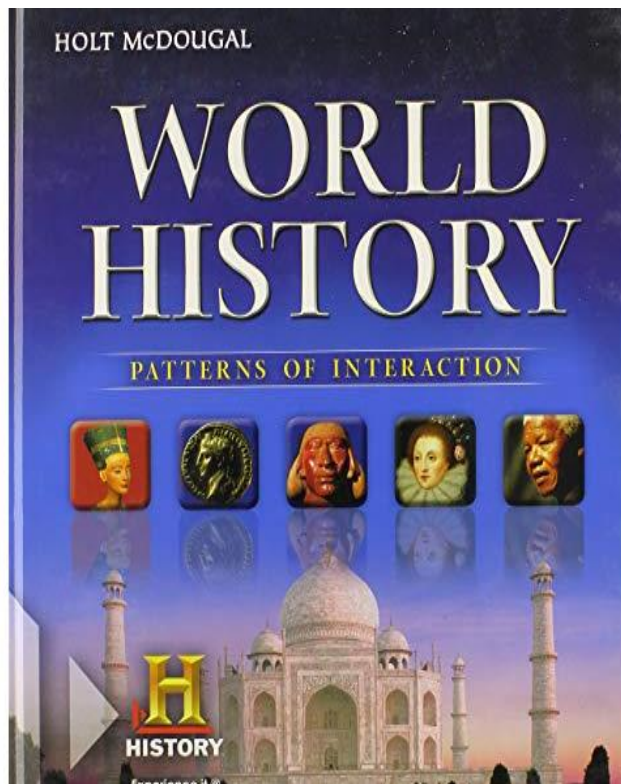


A problem: It can *look* like the “skills and strategies” approach is working at lower grade levels ...

But the approach can backfire when students reach upper grades.

Building knowledge will be MOST effective if it starts early—WHILE students are acquiring foundational skills.





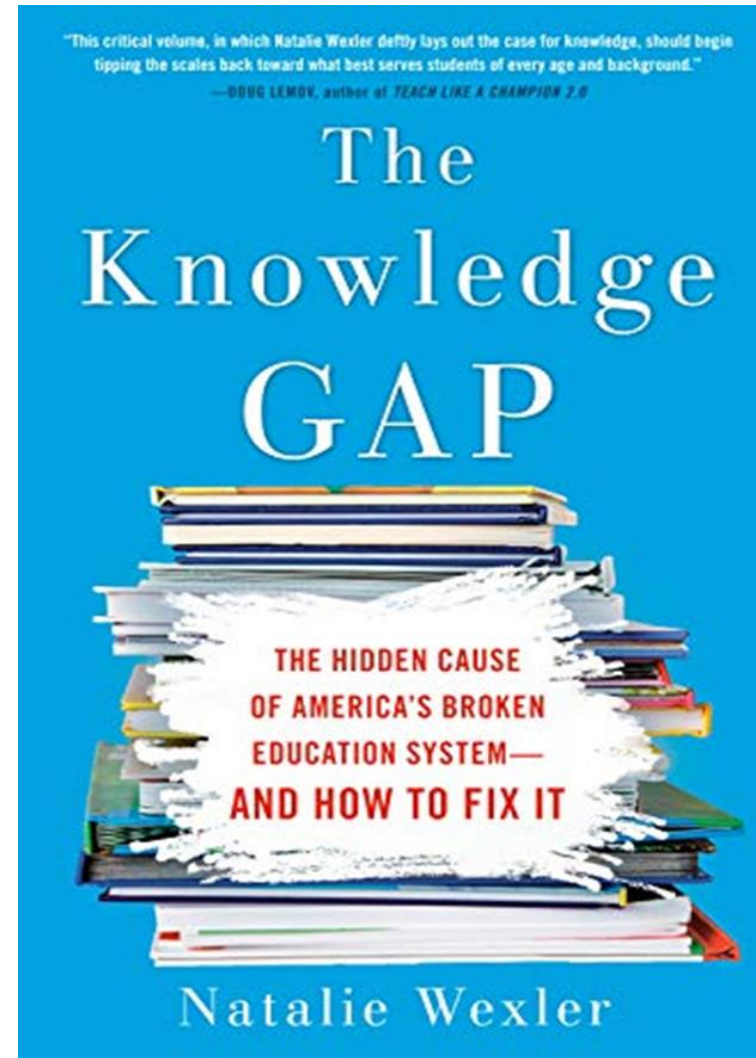
Part of released item from the SAT:

- 25 The nature of impeachment: a narrowly channeled exception to the separation of powers maxim. The Federal Convention of 1787 said that. It limited impeachment to high crimes and misdemeanors, and discounted and opposed the term “maladministration.” “It is to be used only for great misdemeanors,” so it was said in the North Carolina ratification convention. And in the Virginia ratification convention:
- 30 “We do not trust our liberty to a particular branch. We need one branch to check the other.”

A related gap:

The difference between what we assume high school students know and what many do know

With remote  
and hybrid  
learning ...  
the situation  
has become  
more urgent  
than ever.





Where can we  
go from here?

# What can individual teachers do to narrow the knowledge gap?

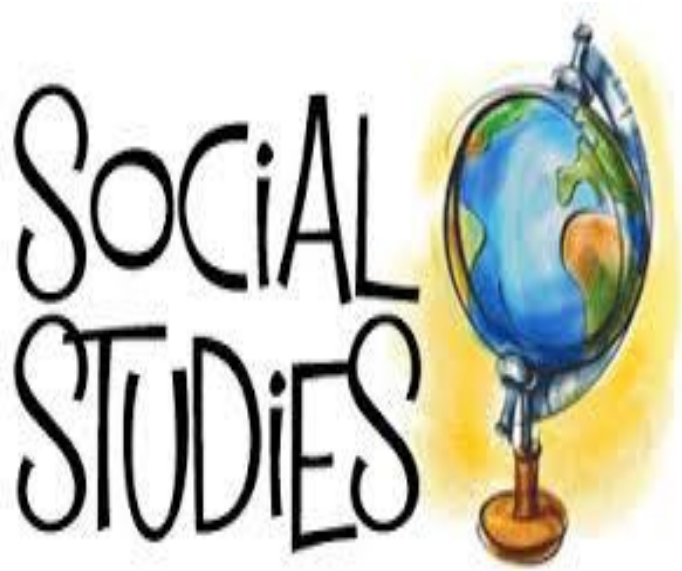
1. Organize read-alouds by topic, not skill
2. Ask questions that put content in the foreground
3. Organize classroom libraries by topic
4. Be skeptical about reading levels
5. Spend lots of time on meaty social studies & science topics





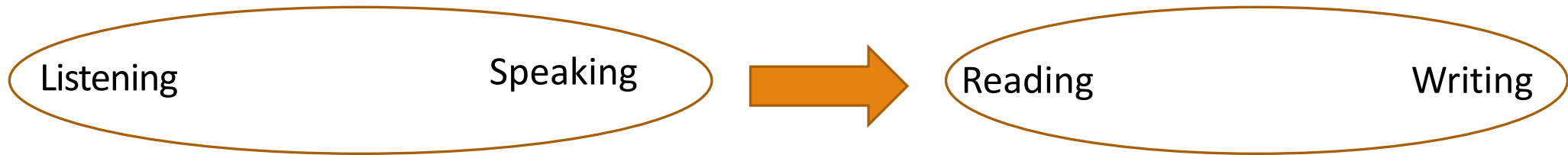
# What can administrators and policymakers do?

Adopt a content-focused elementary literacy curriculum  
that goes deeply into topics in ...





# How a knowledge-building curriculum can modulate cognitive load and boost student learning



An effective curriculum will:

- (1) focus on content & spend at least 2-3 weeks on a single topic
- (2) give all students access to the same complex text (through read-alouds & discussion)
- (3) engage students in listening, speaking, reading and writing about the SAME content.

To find knowledge-building curricula, check out the  
Knowledge Matters Campaign,  
<https://knowledgematterscampaign.org/>

## **ELA programs that excel in building knowledge**

In our estimation, six English language arts curricula currently meet the criteria for knowledge-building detailed here. (We know of at least one more on the horizon.)

While these curricula share common virtues and are all solidly grounded in what matters most for literacy, each has a unique and compelling identity. They present students with substantive, rich content and lack “fluff.” They support access for all students. They motivate and engage students through their content and design. They help all students achieve at high levels. And teachers get ever better at their craft by using them.

Learn what characterizes each curriculum – and gives all of these materials an advantage over programs that are organized around strategies and skills.

ARC CORE

BOOKWORMS

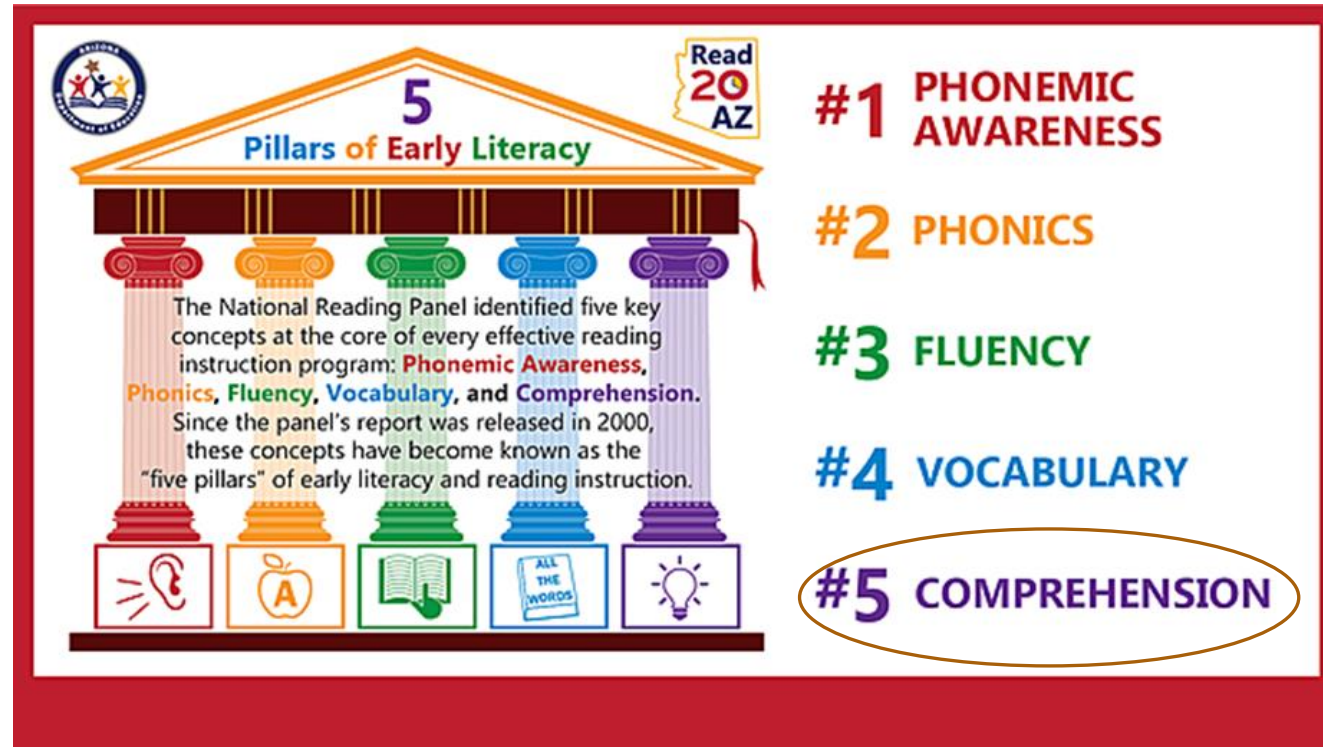
CORE KNOWLEDGE/AMPLIFY

EL EDUCATION

FISHTANK ELA

WIT & WISDOM

Let's revisit those reading infographics ...



- Gives the impression that comprehension should be taught as a skill, like phonics
- Omits any mention of the role of background knowledge in comprehension

# The Simple View of Reading

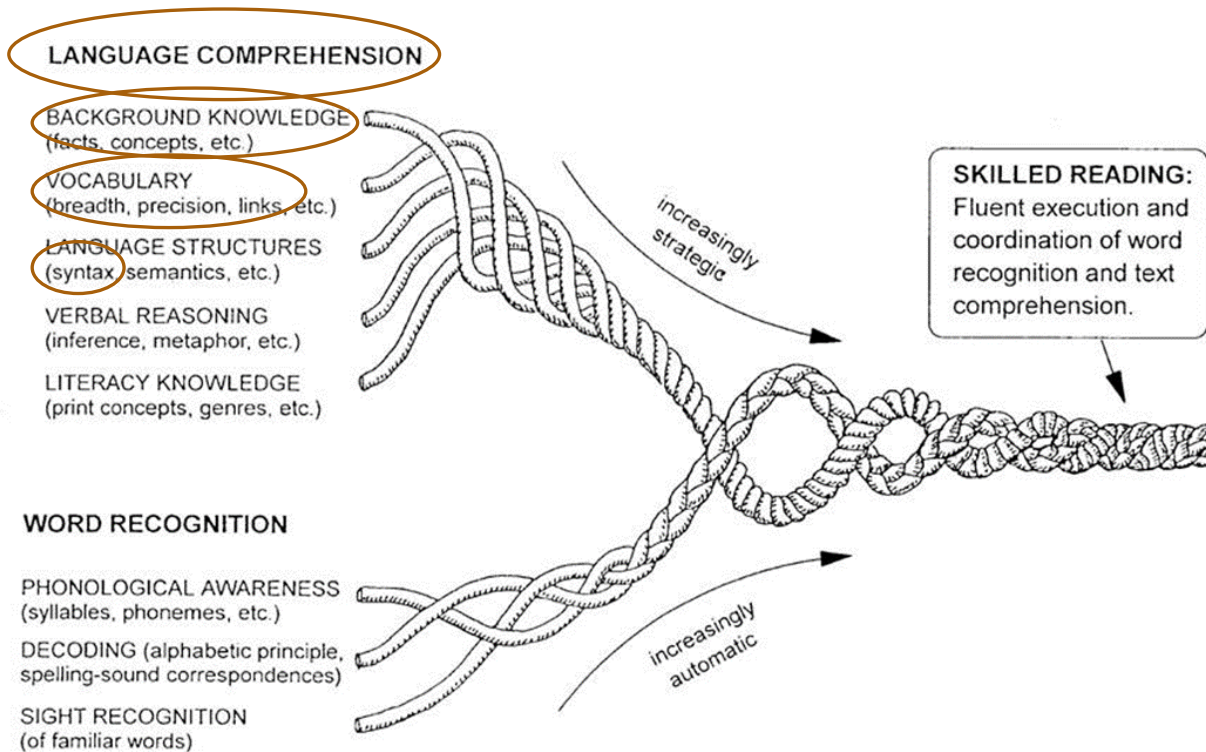


Reading comprehension requires more than understanding SPOKEN language.

Why?

Written language is more *complex* than spoken language.

## THE MANY STRANDS THAT ARE WOVEN INTO SKILLED READING

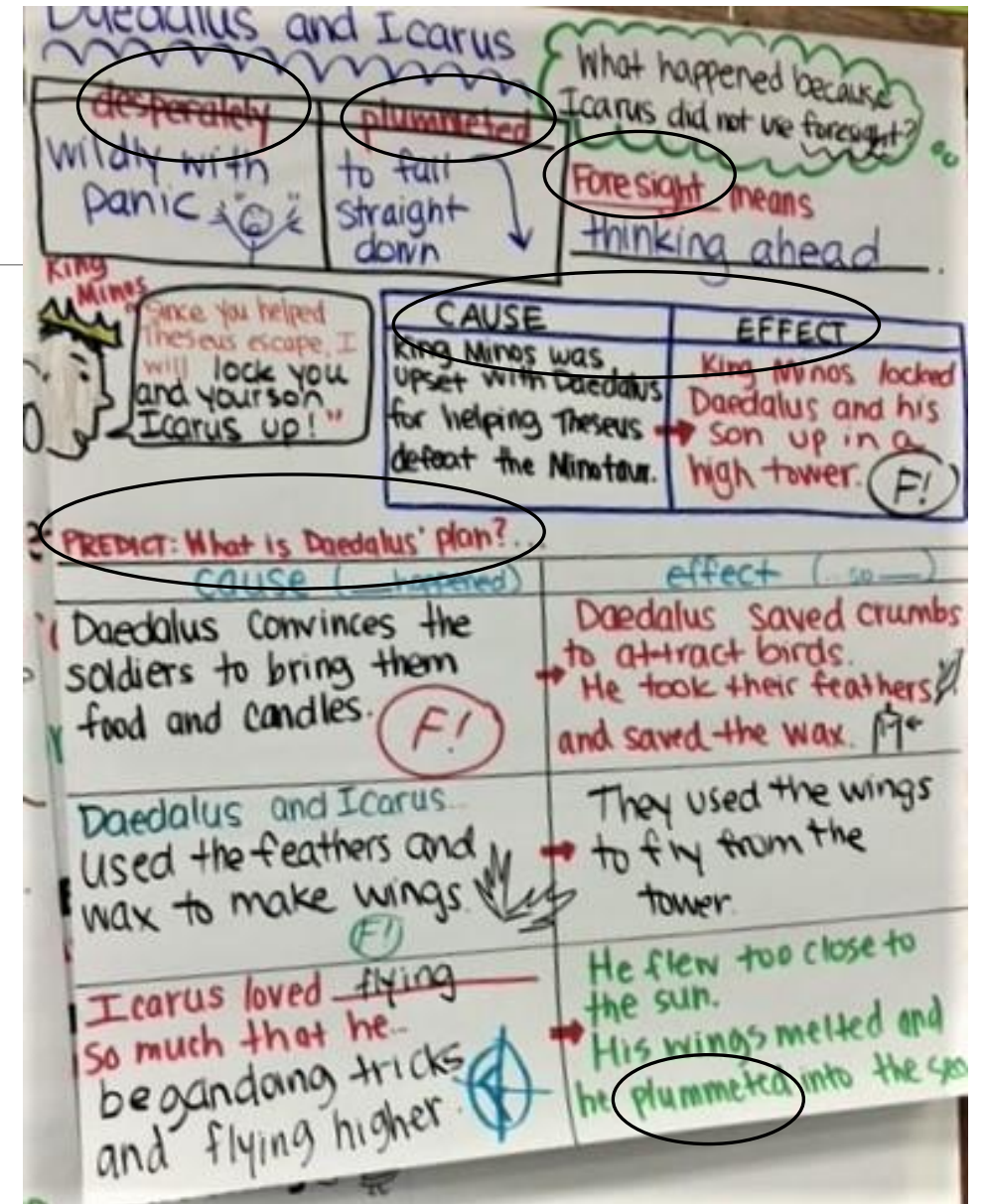
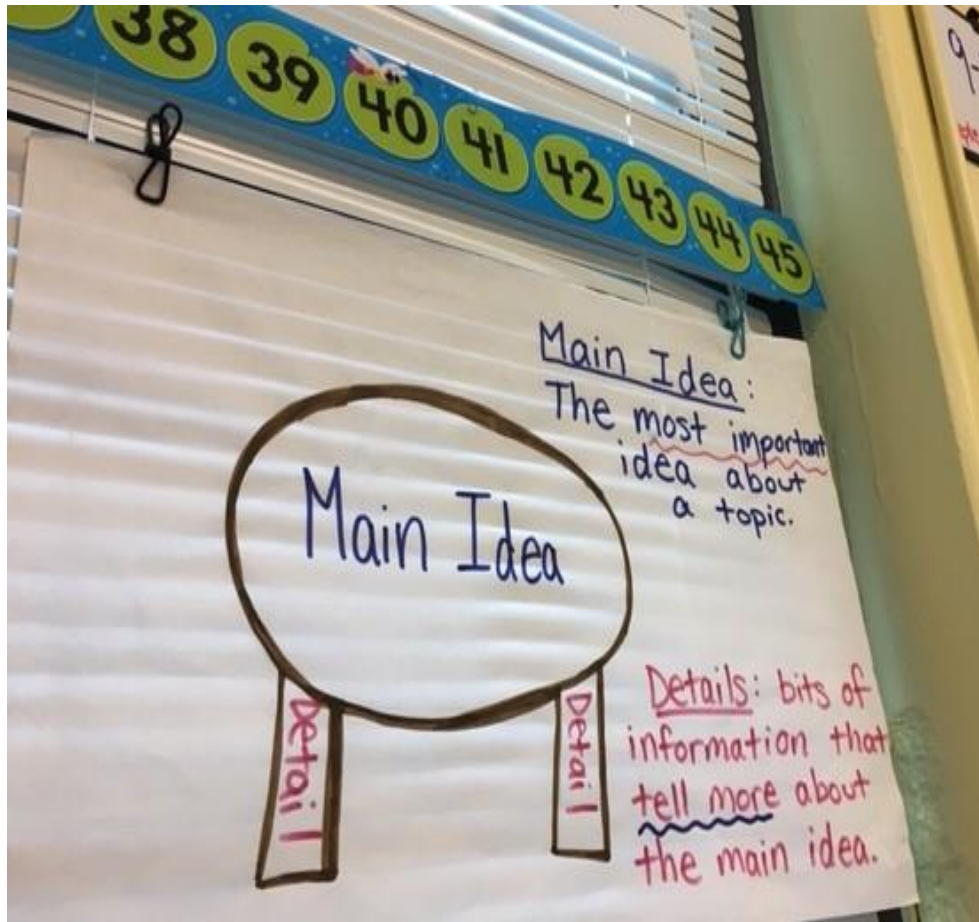


Possible misinterpretations:

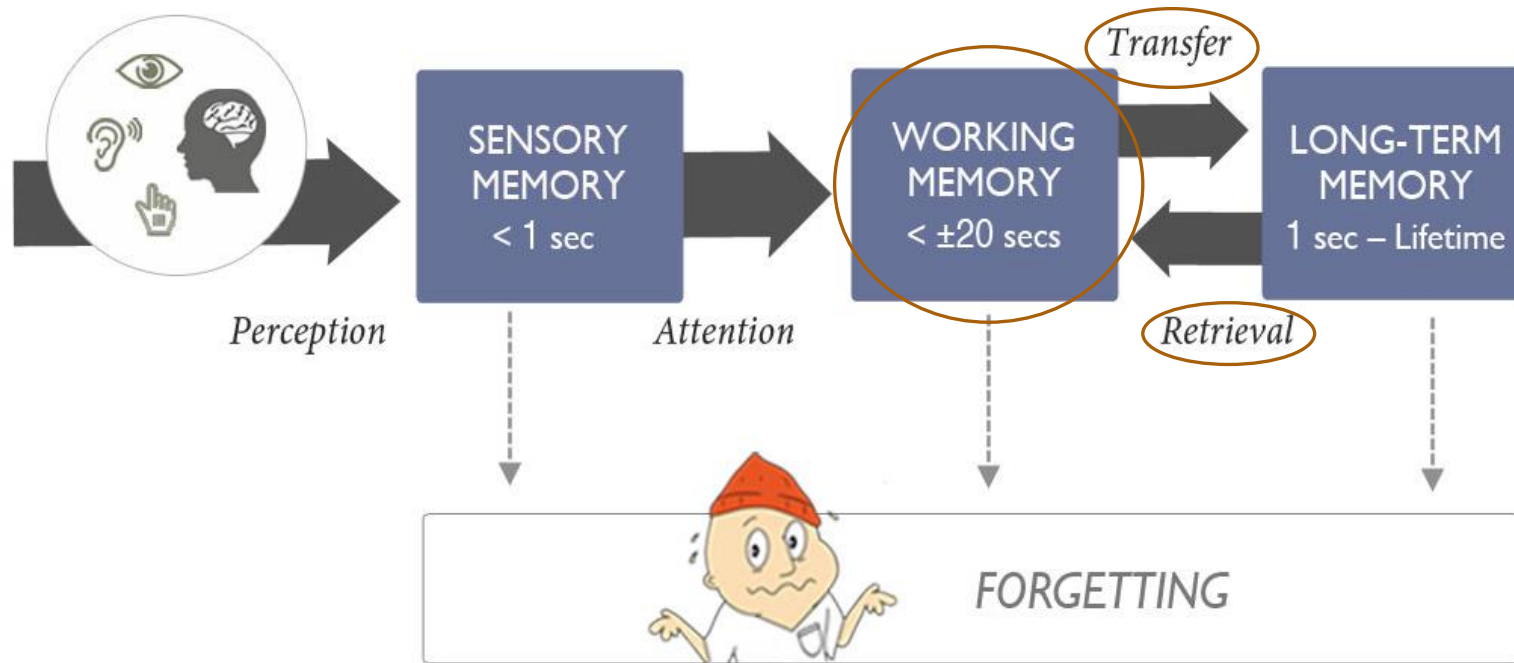
- “Background Knowledge” and “Vocabulary” aren’t really separate.
- Kids may not have relevant background knowledge to “activate.”
- Quick injections of background knowledge won’t stick.
- The best way to teach syntax is through *writing* instruction.



# A tale of two classrooms



# Writing can be a powerful lever for building knowledge



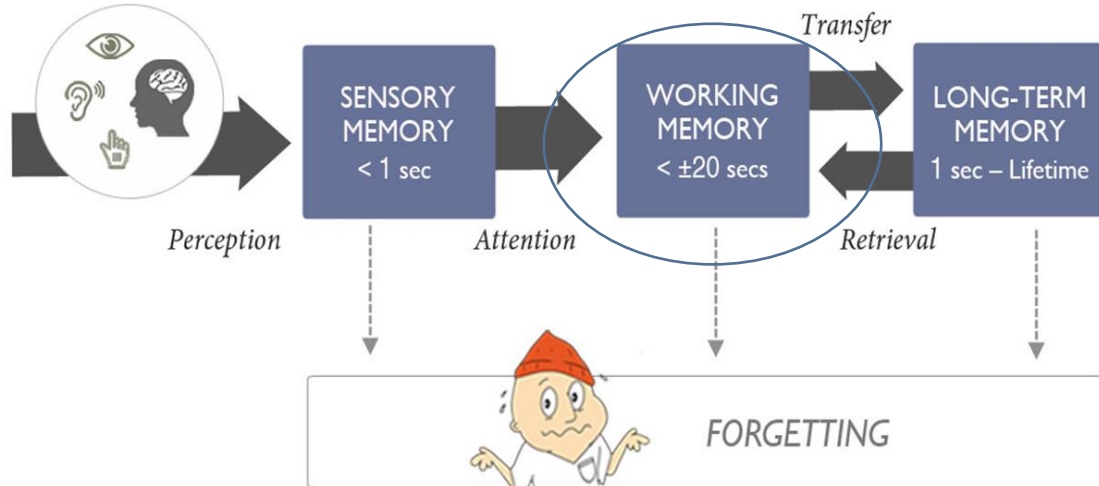
Writing helps with both “transfer” and “retrieval.”



Writing can  
help  
compensate for  
missing  
“Velcro”—even  
at higher grade  
levels.



But it's also the hardest thing we ask students to do.



“Cognitive load” = the burden placed on working memory

Inexperienced writers may be juggling:

- Letter formation
- Spelling
- Word choice
- Organization
- Content
- The peculiar syntax & vocabulary of written language
- All of this creates “cognitive load”—and stress

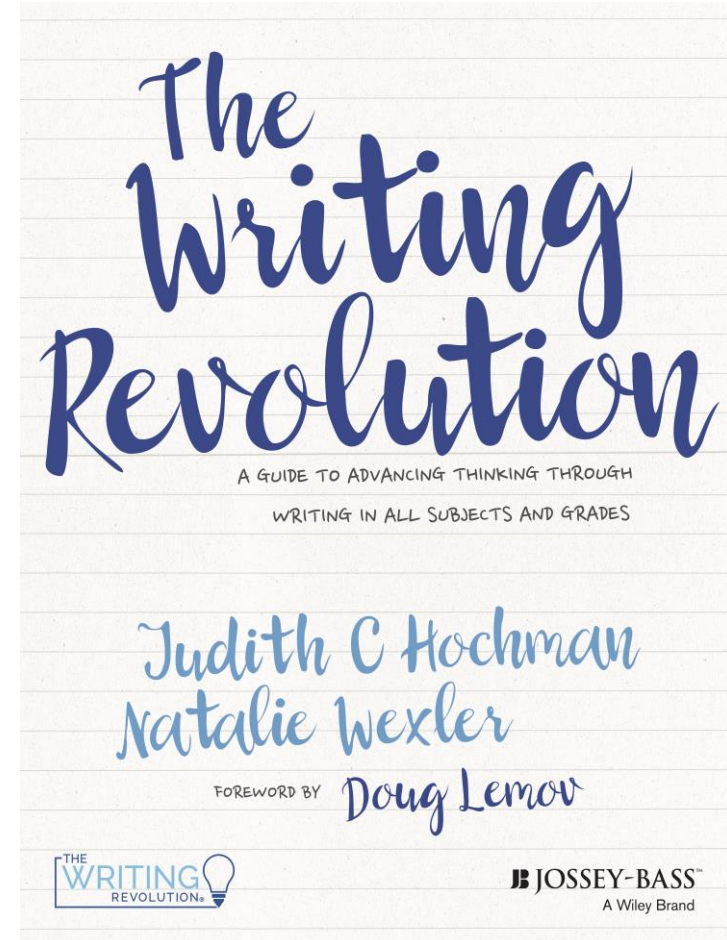
Writing instruction has enormous potential power.

BUT we have:

1. Underestimated how hard it is
2. Tried to teach it in isolation from content

To unlock the power of writing, we need to:

1. Modulate cognitive load
2. Teach grammar/conventions in the context of students' own writing
3. Embed writing activities in the content of the curriculum



# Conjunctions: Because, But, and So

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Dorothy Vaughan was a computer at NASA because

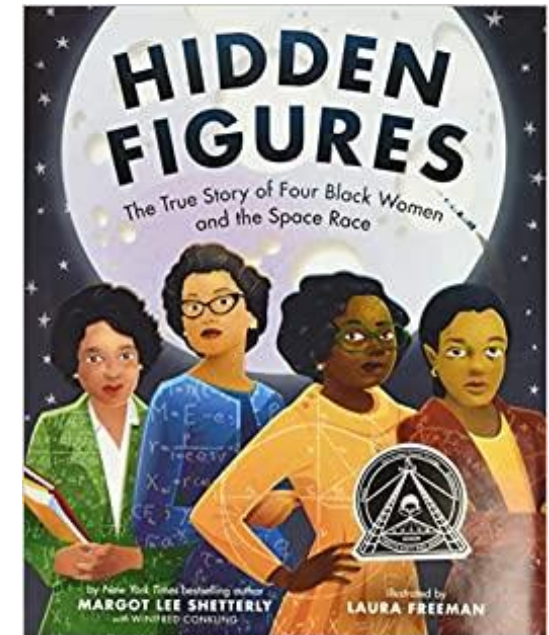
\_\_\_\_\_.

Dorothy Vaughan was a computer at NASA, but

\_\_\_\_\_.

Dorothy Vaughan was a computer at NASA, so

\_\_\_\_\_.



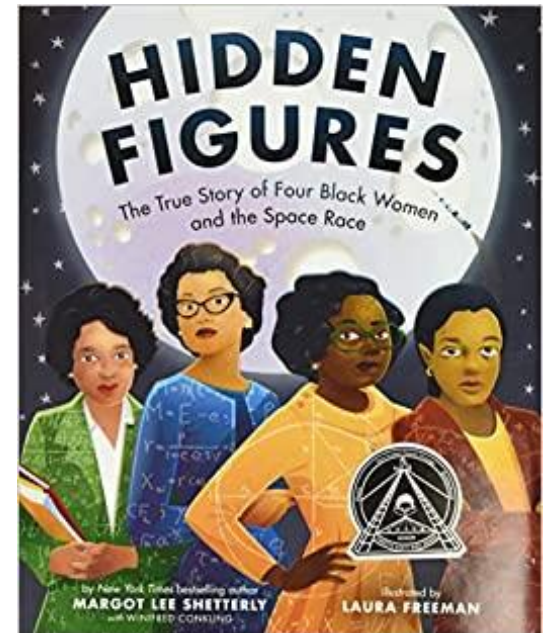
# Possible Responses

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Dorothy Vaughan was a computer at NASA because she was very good at math.

Dorothy Vaughan was a computer at NASA, but she was not allowed to use the whites-only bathrooms there.

Dorothy Vaughan was a computer at NASA, so she worked on experiments to make planes safer.



Writing can build knowledge across the curriculum—e.g., in math

---

Fractions are like decimals because they are all parts of wholes.

Fractions are like decimals, but they are written differently.

Fractions are like decimals, so they can be used interchangeably.

$$0.25 = \frac{1}{4}$$



# Sentence-level activities can boost writing skill, reading comprehension AND build knowledge—simultaneously.

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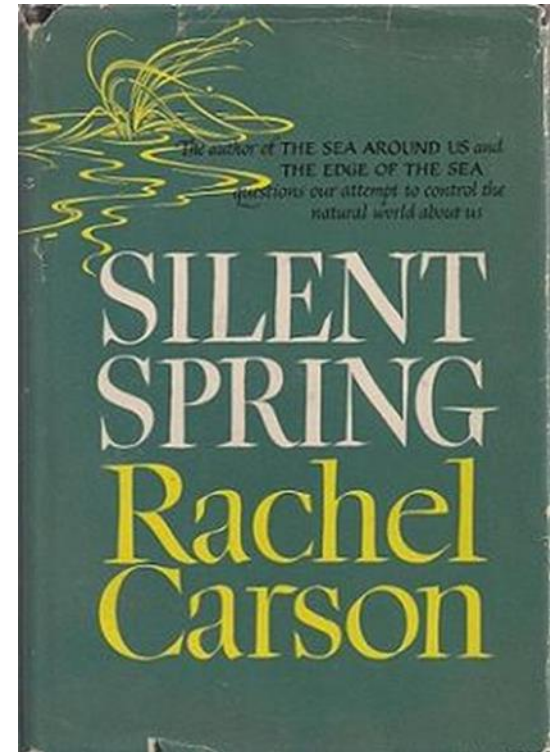
“Rachel Carson, who was a scientist, writer, and ecologist, grew up in the rural river town of Springdale, Pennsylvania.”

Student: “They grew up together in Pennsylvania.”

The solution:

- Teach students what an appositive is (a phrase describing a noun), using familiar content.
- After students have learned about Rachel Carson, give them this sentence to complete:

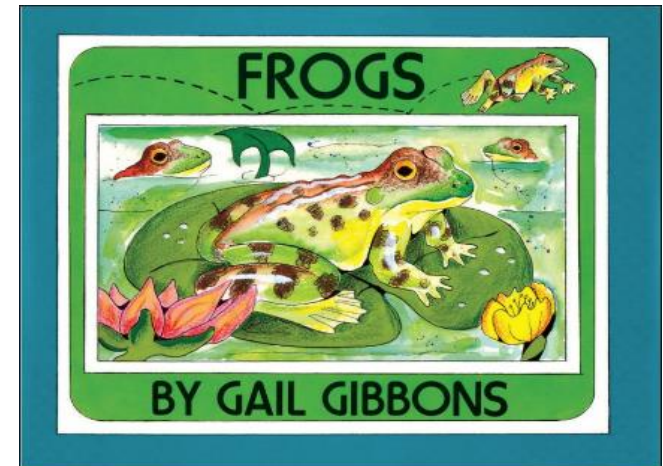
Rachel Carson, \_\_\_\_\_, grew up in Springdale, Pennsylvania.



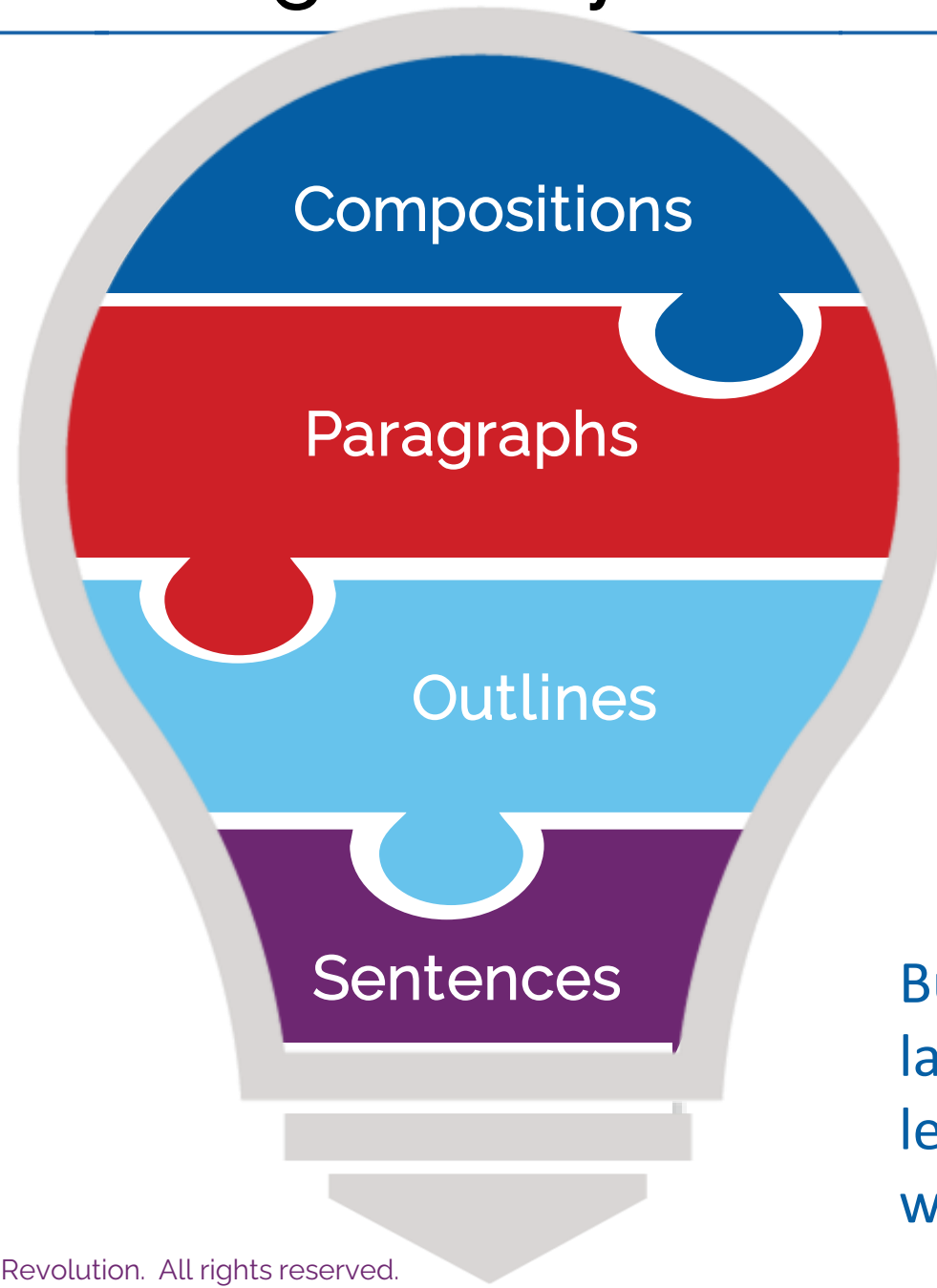
Activities can be scaffolded for young children—or English language learners of any age.

Before frog embryos hatch	they eat insects and worms
When tadpoles hatch	they eat their egg yolks
After tadpoles become frogs	they breathe through their gills

Before frog embryos hatch, they eat their egg yolks.
When tadpoles hatch, they breathe through their gills.
After tadpoles become frogs, they eat insects and worms.



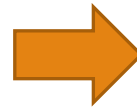
# This method goes beyond sentences



But sentence-level work  
lays the foundation for  
lengthier independent  
writing.

# Single-Paragraph Outline → Paragraph

- T.S. Martin Luther King Jr., a civil rights leader, fought peacefully to end segregation in America.
1. Dec. 1955/ King selected by NAACP= a civil rights organization → lead bus boycott in Montgomery, Alabama
  2. NAACP filed lawsuit/ segregation on city bus unconstitutional → 11/13/1956 U.S. Supreme Court ruled bus segregation illegal
  3. 8/28/1963 led "March on Washington" + "I Have a Dream" speech
  4. received 1964 Nobel Peace Prize/ assassinated on 4/4/1968
- C.S. Although Martin Luther King never saw segregation end, his dream came true and his legacy is honored every third January in the United States.



Martin Luther King Jr., a civil rights leader, fought peacefully to end segregation in America. In December of 1955, King was selected by the National Association for the Advancement of Colored People (NAACP), a civil rights organization, to lead a bus boycott in Montgomery, Alabama. In addition, the NAACP filed a lawsuit arguing segregation on a city bus was unconstitutional. As a result, on November 13, 1956, the U.S. Supreme Court ruled bus segregation was illegal. On August 28, 1963, King led a demonstration known as the "March on Washington" and gave his famous "I Have a Dream" speech. Furthermore, he received the 1964 Nobel Peace Prize. Sadly, King was assassinated on April 4, 1968. Although Martin Luther King never saw segregation end, his dream came true and his legacy is honored every third January in the United States.

How sentence-level activities lay the groundwork for longer writing—while building knowledge

Name Oggy Date \_\_\_\_\_

Write follow-up sentences using the transition words.

1. The colonists were angry that they had to follow English laws and pay taxes to England. Therefore, the colonists boycotted English goods.

2. Leaders of the American colonies held meetings in Philadelphia. As a result, they decided they did not need a king to rule them.

3. Thomas Jefferson was a talented writer. Therefore, the colonists wanted him to write the Declaration of Independence.

4. On July 4, 1776, the leaders signed the Declaration of Independence. Consequently, the thirteen colonies became the United States of America.



# The better way to teach comprehension strategies: explicit writing instruction

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- Finding the main idea and supporting details
- Making inferences
- Comparing and contrasting
- Etc.

Why is it better?

- The content is necessarily in the foreground.
- You can tell if students are “getting it.”
- You’re reaching EVERY student.





Effective writing instruction can turbocharge any content-rich curriculum.

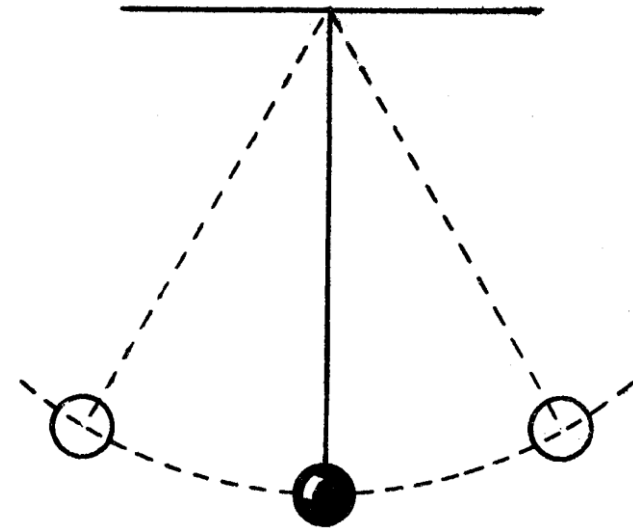


But if the curriculum is focused on comprehension skills, it won't work.

# If we don't build foundational skills and knowledge simultaneously ...

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The pendulum may swing away from phonics again.



# Do we need a new term?

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Science of Reading

Science of Literacy?

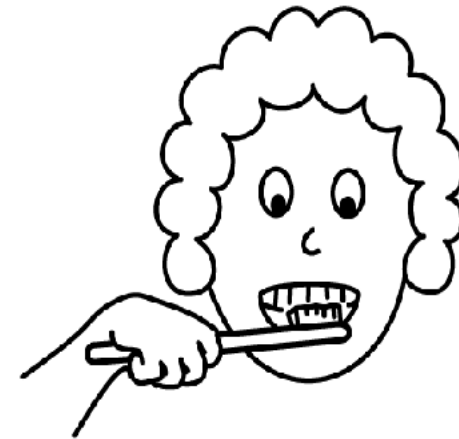
Science of Learning?



Curriculum is  
the place to  
start ... but it's  
not enough.

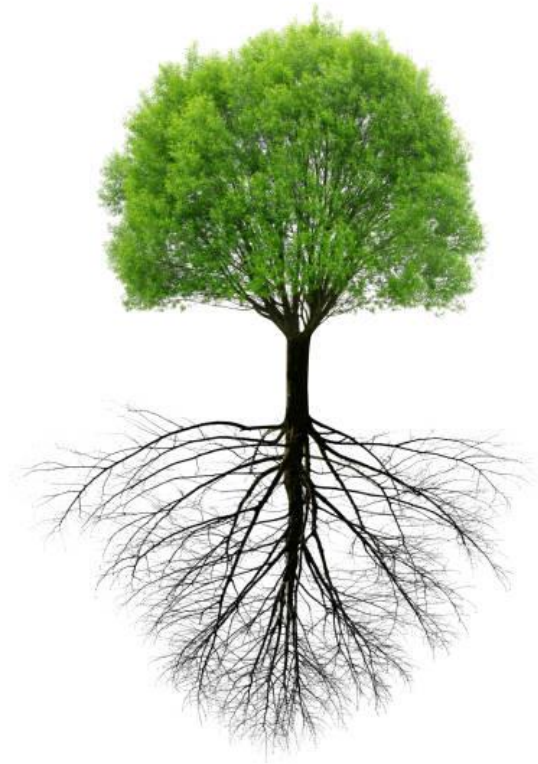


# Possible obstacles to change

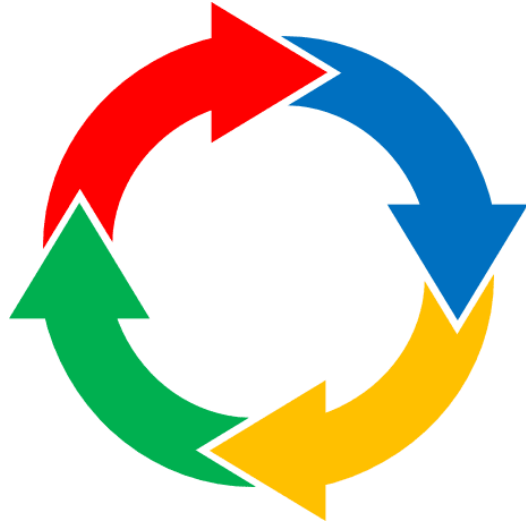


# To Be Effective, PD Should Be Rooted in the Content of the Curriculum ...

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Be ongoing and cyclical ...

And enable teachers to understand not just HOW to change their practice but also WHY it's important.



# Things are beginning to change ...

**BETWEEN THE LINES: CHAPTER FIVE**

## **Why Kentucky's reading crisis can't be solved by phonics alone**

As some Kentucky school districts go all in on phonics, they are quick to realize there's much more to making kids proficient readers.

**Mandy McLaren** Louisville Courier Journal  
Published 5:02 AM EDT Oct. 19, 2022 | Updated 5:06 PM EDT Oct. 19, 2022

"I think for so long we thought that (our students) couldn't understand these things, so we didn't teach these things to them," [a third-grade teacher] said.

But three years into the new reading approach, [she] and her colleagues say they have proof to the contrary.

"They like being challenged," said a second-grade teacher.  
"It's their favorite part of the day."



# The Power of Knowledge- Building Curriculum

# To sum up ...

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- The “science of reading” must mean more than “phonics” —*and* more than phonics + comprehension “skills.”
- Schools need to adopt a **knowledge-building curriculum** that begins in kindergarten and **integrates listening, speaking, reading, and writing**.
- Writing should be **taught explicitly**, beginning at the sentence level.
- Educators need **ongoing support grounded in the specific content** of the curriculum.
- A knowledge-building approach, combined with effective foundational skills instruction, can enable ALL children to reach their full potential and meet or **exceed** high expectations.
- Contact me through [nataliewexler.com](http://nataliewexler.com).
- Follow me on Twitter (@natwexler).
- Subscribe to Minding the Gap on Substack.
- Thank you!

