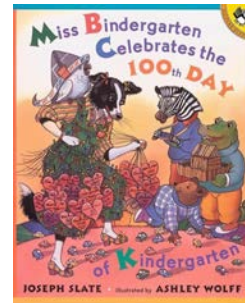


The Science of Reading: Beyond Decoding to Volume and a Love of Reading

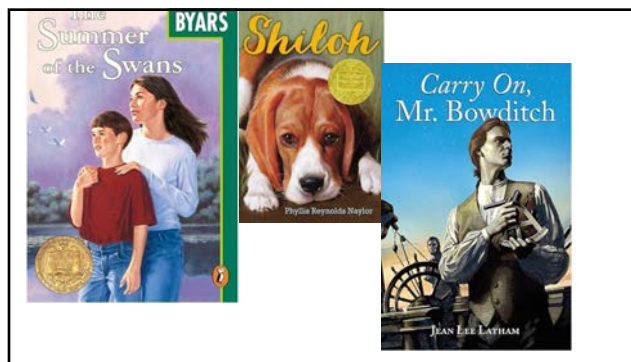
Elfrieda (Freddy) H. Hiebert
TextProject

1



32
X Days of
West
Virginia
Reading

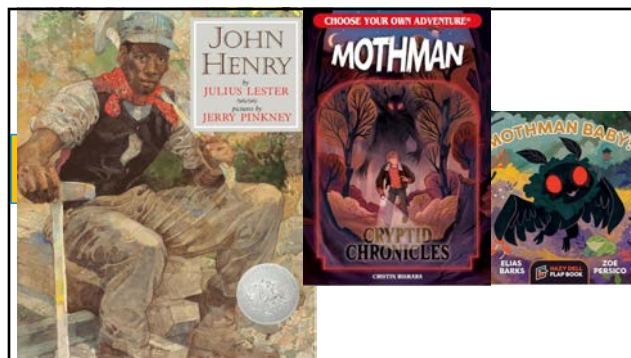
2



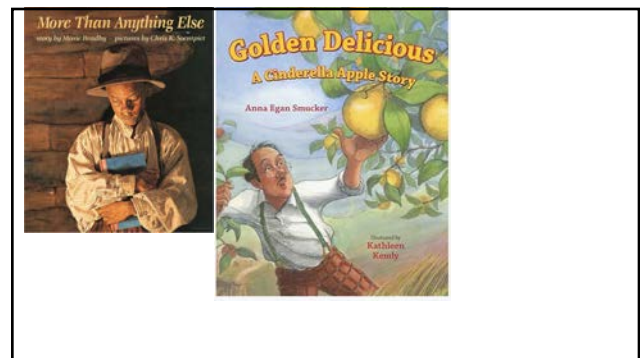
3



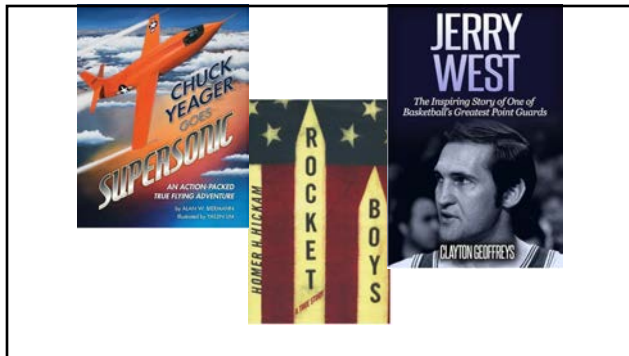
4



5



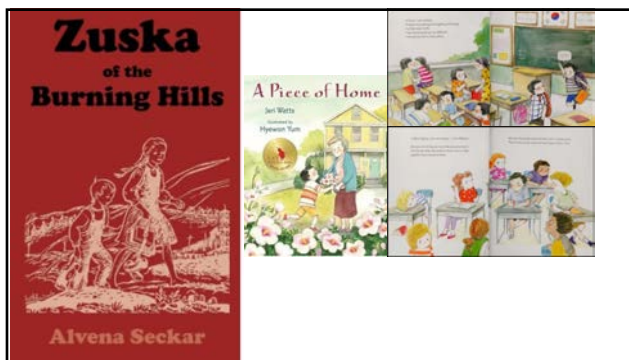
6



7



8



9



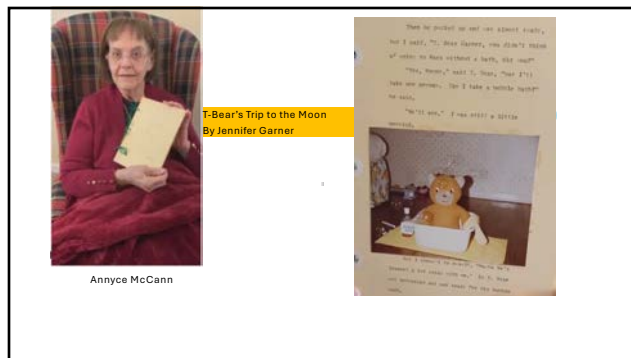
10



11



12



13



14

Today's Game Plan
The Science of Reading:
Beyond Decoding to Volume and a Love of Reading

1. Science of Reading Sources for:
 - a. Reading Interest
 - b. Reading Volume
2. How can we increase students' foundational reading—word recognition and fluency with comprehension?
3. How can we increase silent reading proficiency in general?

15

Academics > Programs and Initiatives > Ready, Read, Write, West Virginia > What is the Science of Reading?

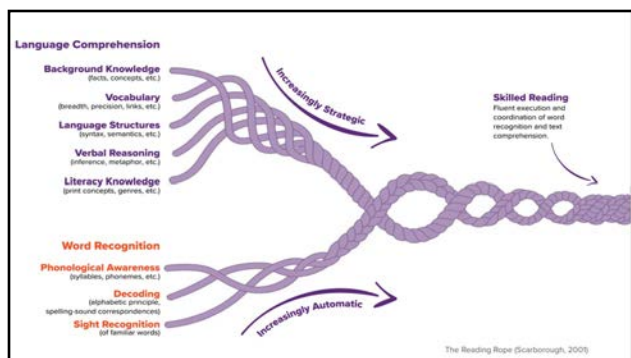
What Is the Science of Reading?

What do we mean when we say science of reading?

“It is the body of scientific research over the last several decades that proves how the brain learns to become a skilled reader and writer. When we say something is aligned with the Science of Reading, we mean that it is aligned with the research that has proven to be effective.”

Retrieved from: <https://wvde.us/academics/programs-initiatives/ready-read-write-west-virginia/what-science-reading>

16



17

1a. SCIENCE OF READING:

What can we learn from the science of reading about how reading interest influences word recognition and fluency?

18

Meta-analyses of Effects of Interest/Motivation on Learning			
Study	Participants/Context	Key Findings	Implications for Teachers
Guthrie et al. (2007)	Elementary & middle school classroom instruction	Moderate to strong positive effects on reading comprehension & fluency	Offer students choices on texts; connect reading to real-world interests; use collaborative activities
Schiefele et al. (2012)	Longitudinal studies with older readers	Interest leads to enduring reading motivation; intrinsic motivation correlates with better comprehension	Use engaging, topic-relevant texts; foster curiosity & personal connection to reading content
Toste et al. (2020)	132 correlational studies (690,000 students, K-12)	Strongest link between beliefs about self as a reader ($r = .28$) & intrinsic motivation ($r = .32$).	Support students, especially struggling readers, to see themselves as capable readers by providing texts of interest; creating choice in reading; & highlighting growth.

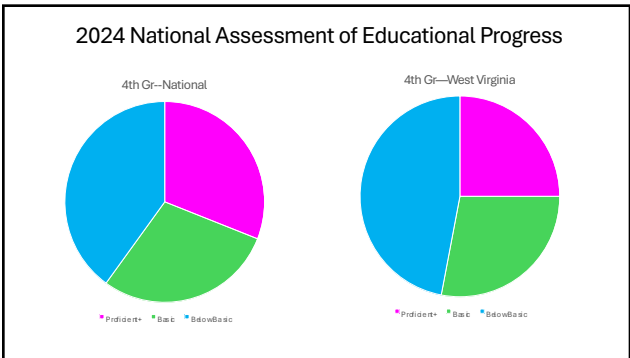
19

Meta-analyses of Effects of Interest/Motivation on Learning			
Study	Participants/Context	Key Findings	Implications for Teachers
Guthrie et al. (2007)	Elementary & middle school classroom instruction	Moderate to strong positive effects on reading comprehension & fluency	Offer students choices on texts; connect reading to real-world interests; use collaborative activities
Schiefele et al. (2012)	Longitudinal studies with older readers	Interest leads to enduring reading motivation; intrinsic motivation correlates with better comprehension	Use engaging, topic-relevant texts; foster curiosity & personal connection to reading content
Toste et al. (2020)	132 correlational studies (690,000 students, K-12)	Strongest link between beliefs about self as a reader ($r = .28$) & intrinsic motivation ($r = .32$).	Support students, especially struggling readers, to see themselves as capable readers by providing texts of interest; creating choice in reading; & highlighting growth.

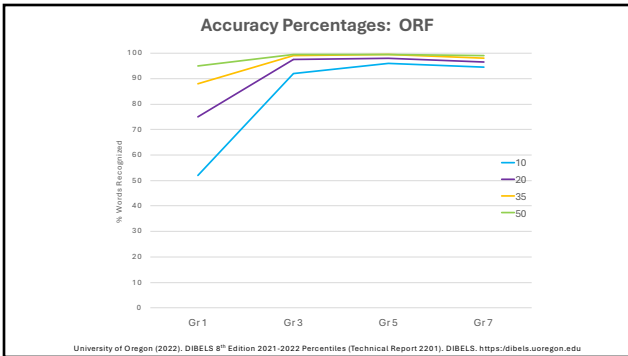
20

1b. What can we learn from the science of reading about how reading volume influences word recognition and fluency?

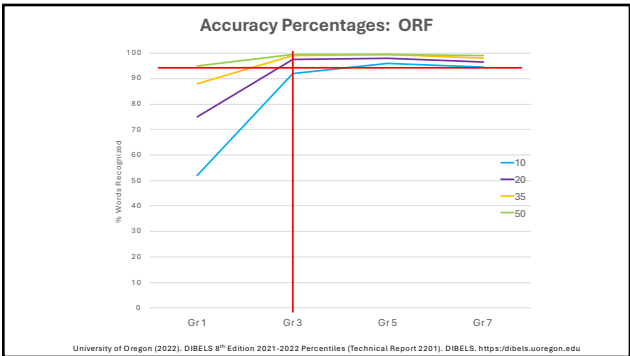
21



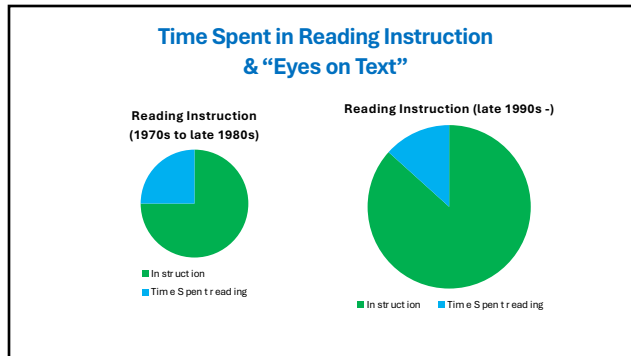
22



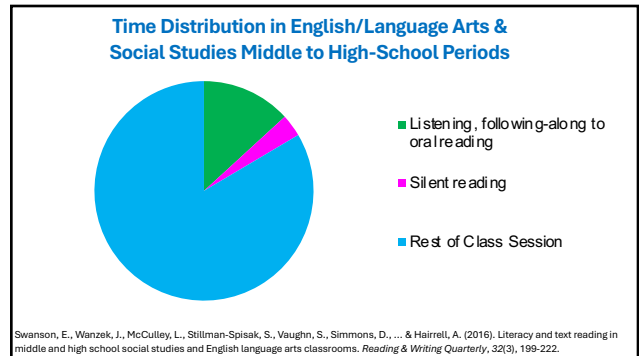
23



24



25



26

Reading Volume from a Cognitive-Scientific Perspective

“Readers become orthographic experts by absorbing a lot of data, which is one reason why the sheer amount and variety of texts that children read is important...**Major statistical patterns emerge as the child encounters a larger sample of words....** We don’t study orthographic patterns in order to be able to read; we gain orthographic expertise by reading.” (p. 92)

27

Top Triad: 95 – 66P¹
X = 143 WCPM; 100% Accuracy

We eat lots of fresh vegetables at our house. Mom is an excellent cook and she has lots of recipes for making them taste delicious. Sometimes they are expensive to buy at the store so Dad suggested we grow our own.

Dad asked all the members of my family what our favorite vegetables were. I said carrots, broccoli, and beans. My mother likes tomatoes the best. Dad said he wanted to grow green onions, spinach, potatoes, and corn.

We went to the hardware store and bought seeds and little broccoli and tomato plants. We all helped prepare the garden in our backyard. We all helped prepare the garden in our backyard. We turned over the dirt with shovels. Then we used a hoe to make little ditches for planting the vegetable seeds. We dug deeper holes for the broccoli and tomatoes.

¹University of Oregon, Center on Teaching and Learning. (2022). *DIBELS® 8th Edition 2021–2022 percentiles (Technical Report 2021)*. Author.

28

Middle Triad: 65 to 36P
X = 110 WCPM, 99% Accuracy

We eat lots of fresh vegetables at our house. Mom is an excellent cook and she has lots of **recipes** for making them taste delicious. Sometimes they are expensive to buy at the store so Dad suggested we grow our own.

Dad asked all the members of my family what our favorite vegetables were. I said carrots, broccoli, and beans. My mother likes tomatoes the best. Dad said he wanted to grow green onions, spinach, potatoes, and corn.

We went to the hardware store and bought seeds and little broccoli and tomato plants. We all helped prepare the garden in our backyard. We turned over the dirt with shovels. Then we

29

Bottom Triad--35thP
96 WCPM; 97% Accuracy

We eat lots of fresh vegetables at our house. Mom is an excellent cook and she has lots of **recipes** for making them taste delicious. Sometimes they are expensive to buy at the store so Dad suggested we grow our own.

Dad asked all the members of my family what our favorite vegetables were. I said carrots, **broccoli**, and beans. My mother likes tomatoes the best. Dad said he wanted to grow green onions, spinach, potatoes, and corn.

We went to the **hardware** store and bought seeds and little broccoli and tomato plants. We all helped prepare the garden in our backyard. We all helped

30

Bottom Triad—15thP:
72 WCPM, 94% accuracy

We eat lots of fresh **vegetables** at our house. Mom is an excellent cook and she has lots of **recipes** for making them taste **delicious**. Sometimes they are expensive to buy at the store so Dad **suggested** we grow our own.

Dad asked all the members of my family what our favorite vegetables were. I said carrots, **broccoli**, and beans. My mother likes tomatoes the best. Dad said he wanted to grow green onions, **spinach**, and potatoes

31

An Illustration of Reading Volume

If students at the 35thP & 15thP¹ read these amounts daily,

	7 min. of daily reading		12 min. of daily reading	
	35 th P	15 th P	35 th P	15 th P
Gr. 1	31,500	13,860	54,000	23,760
Gr. 2	85,940	54,188	186,300	108,360
Gr. 3	114,660	85,680	232,380	146,880
TOTAL	232,100	153,728	472,860	279,000

¹Data based on Hasbrouck, L. & Tindal, G. (2017). An update to compiled ORF norms (Technical Report No. 1702). University of Oregon, Behavioral Research and Teaching & Cox, K. E., & Guthrie, J. T. (2001). Motivational and cognitive contributions to students' amount of reading. *Contemporary Educational Psychology*, 26(1), 118-131.

32

Predictions of How Often Students Have Encountered Words Based on Reading Volume

	# times/ 1 million	7 min. of daily reading		12 min. of daily reading	
		35 th P	15 th P	35 th P	15 th P
broccoli	0.8052	.20	.10	.40	.20
recipe	5	1.0	.75	2	1
delicious	10	2.0	1.25	5	3

3rd Gr. 35th P
3rd Gr. 15th P

• Mom is an excellent cook and she has lots of **recipes** for making them taste **delicious**.

• I said carrots, **broccoli** and beans.

33

1. What can we learn from the science of reading about how reading interest and reading volume influence reading proficiency?

Answers?

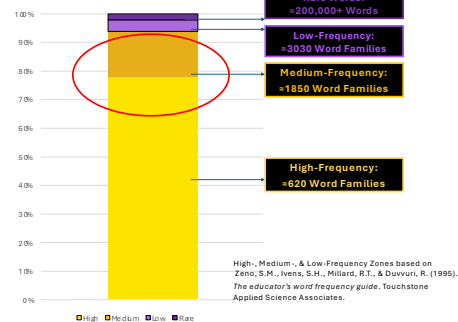


34

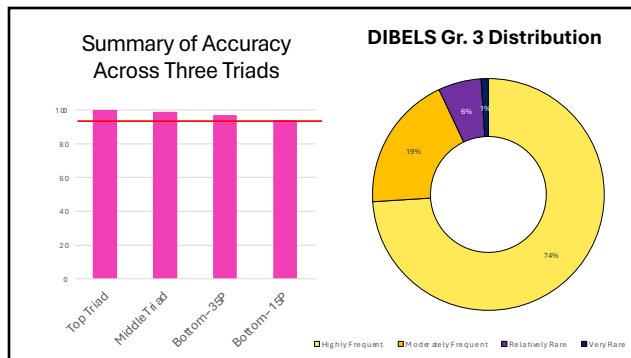
2. How can we increase students' foundational reading—word recognition and fluency with comprehension—while building background knowledge & interest in reading?

35

Distribution of Words in English



36



37

What is the likelihood that current text diet will change word recognition of bottom triad?

Typical Third-Grade Diet: 3.5.1

Sarah came in the spring. She came through green grass fields that bloomed with Indian paintbrush, red and orange, and blue-eyed grass. Papa got up early for the long day trip to the train and back. He brushed his hair so slick and shiny that Caleb laughed. He wore a clean blue shirt, and a belt instead of suspenders. He fed and watered the horses, talking to them as he hitched them up to the wagon. Old Bess, calm and kind; Jack, wild eyed, reaching over to nip Bess on the neck. "Clear day, Bess," said Papa, rubbing her nose.

38

Grade 3.5.2

There are few migrations as dramatic and frightening as when the desert locusts are moving across Africa. These insects are actually young grasshoppers, and grasshoppers usually do not travel. But sometimes too many grasshopper eggs are laid in one small area, and when the grasshoppers are born, there isn't enough food. The grasshoppers now have only one choice for survival: to migrate in search of vegetation. And so these grasshoppers will begin changing. Their bodies will turn from light green to dark yellow or red. Their antennae will grow short rather than long. And when they rise up to fly together

39

Grade 3.5.3

In the days when the sun, the moon, and the stars guided birds with seeds in their bellies to these islands, when ocean waves brought driftwood teeming with life, when storms brought frightened birds in the clouds and insects on the wind, the Hawaiian Islands grew green and lush. The streams and lagoons rippled with fish. And the forests flashed with the feathers of birds and the rainbow wings of insects. The Hawaiian Islands welcomed all life that made the long, long journey to its shores, and some two thousand years ago, they embraced the first people to come.

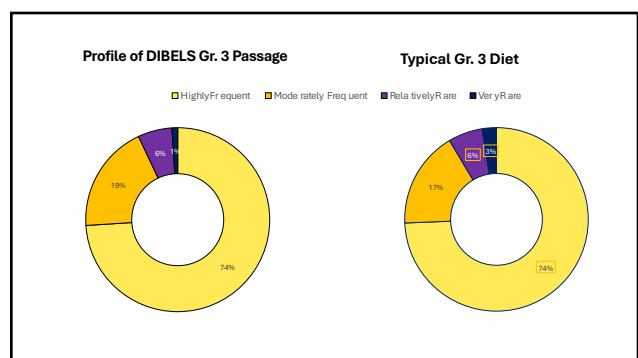
40

Grade 3.5.4

The temperature was freezing. Icy winds roared by. A group of people huddled in the darkness on a rocky ridge. In moments, they would begin the final stage of a dangerous journey. They were climbing to the top of Mount Everest, the world's highest mountain.

Among the climbers was Temba Tsheri Sherpa. Just two weeks before, Temba had celebrated his 16th birthday. Now he was trying to survive in one of the world's most extreme places. Making it to the top of Everest was Temba's dream. He would be the youngest person ever to reach the summit, which is 29,035 feet (8,850 meters) high.

41

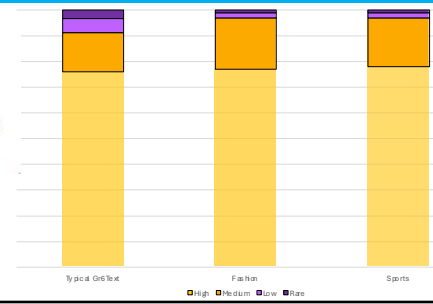


42

Support for fluency, vocabulary, and comprehension: Scaffolded Texts

43

Scaffolded Texts: Grades 2 to 6+ [open access @textproject.org]



44

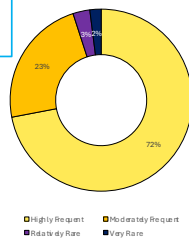


45



46

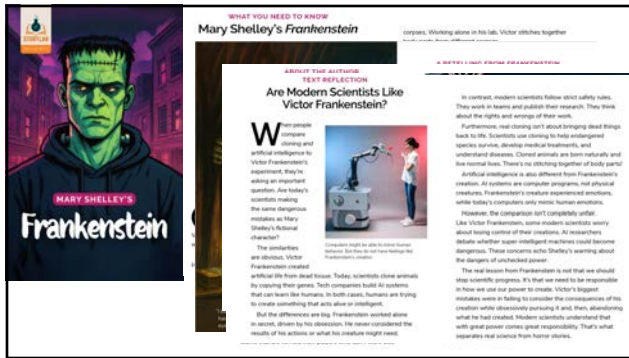
Scaffolded Texts: Adolescents



47



48



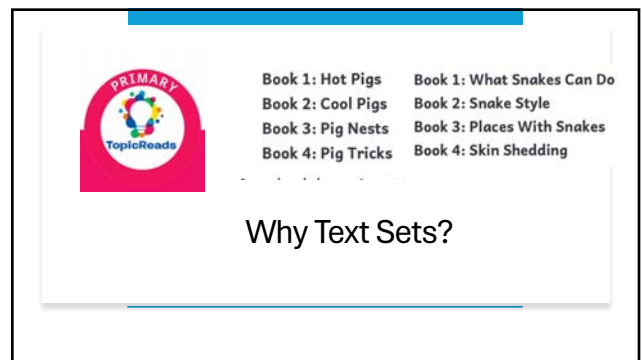
49



50



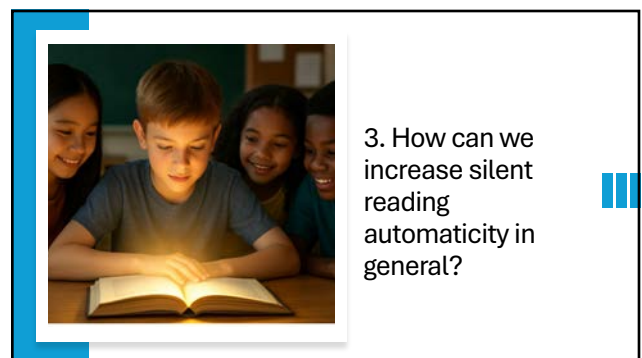
51



52



53



54

Important Caveat

Increasing the volume of reading should not be interpreted as “free-range reading.”

55

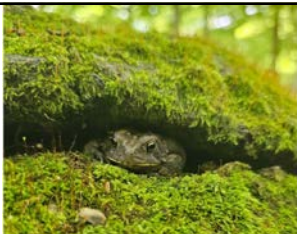


1

Students begin every English/Language Arts class by reading a short text

56

1,000 free text resources at TextProject for Reading Kickstart



Where Frogs and Toads Live
Frogs and toads have different homes. Most frogs must live very close to water like ponds, streams, or rivers. Then they also leave water quickly, so they need to stay near water to keep from drying out. Frogs often sit on the pads in ponds or on rocks near water.

One kind of frog, the tree frog, has learned to live high above ground in trees. These frogs get the water they need from rain, dew, and small pools that collect in tree holes.

Toads can survive much farther from water. This is because their thick, bumpy skin holds water better. You might find toads in gardens, under rocks, in leaf piles, or even near house foundations. During hot weather, toads dig shallow holes in cool, damp soil to cool down.

57

Students Keep Records of What They've Learned

Frogs and Toads

HOW THEY LOOK

Frogs:

- Smooth, wet skin
- Single eardrums
- Long, thin bodies
- Long, strong legs

Toads:

- Dry, bumpy skin
- Brown/green/brown
- Short, round bodies
- Short, stubby legs

WHERE THEY LIVE

Frogs:

- Near water (ponds, streams)
- On the pads
- Close to trees
- Near water to stay wet

Toads:

- Far from water
- In gardens
- Under rocks
- In leaf piles
- Anywhere they can stay

HOW THEY MOVE

Frogs:

- Powerful jumpers
- Can jump very far
- Long legs help them leap
- Change their shape

Toads:

- Walk slowly
- Make short hops
- Move to holes
- Bending necks to better their breathing

LIFE CYCLE (Both Frogs and Toads)

1. Egg in water → 2. Tadpole with tail → 3. Growing stage → 4. Adult with lungs

58

Students Set Goals

3

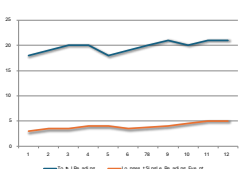
Step 3: Always keep record of knowledge gained

Goal: Increase the amount of reading 10% per trimester

Step 2: Students set goal

• Trimester goal: 15 minutes/day, with one 5-minute event

Step 1: Get baseline data—Time spent reading & longest single silent reading event



59

Students become experts with integrated home reading

4

Genre/Theme	Shared Text	Books to Read at Home
Third Grade	American Tall Tales (Mary Pope Osborne)	- Casey Jones: The story of a brave engineer (G. Rounds) - The Morning the Sun Refused to Rise: An original Paul Bunyan Tale (G. Rounds) - Baloney (J. Scieszka) - I Was Born about 10,000 Years Ago: A tall tale (S. Kellogg) - John Henry: An American legend (E. J. Keats) - Sally Ann Thunder Ann Whirlwind Crockett (S. Kellogg) - Dona Flor: A tall tale about a giant woman with a great big heart (P. Mora) - Thunder Rose (J. Nolan)
Second Grade	Discovering Nature	- Fireflies (J. Brinkloe) - Owl Moon (J. Vroman) - Come on, Rain! (K. Hesse) - When I Was Young In The Mountains (C. Rylant) - Night in the Country (C. Rylant) - Crab Moon (B. Horowitz) - The Seashore Book (C. Zolotow) - Whose Tracks are these? (J. Nall) - Over in the Forest (M. Barnes) - A Drop of Water (W. Wick) - Water Dance (T. Locker)

60

Students learn strategies for reading through teacher modeling

5

Talking Points For Teachers

Teacher Talk Before Students Read a Chunk of Text

- With third graders reading *Schools of Long Ago*: "You're going to read the first three pages by yourself to find out the kinds of schools of long ago. Remember: keep track of words about which you weren't sure and are important to understanding."
- With middle graders about to read a portion of *Black Ships before Troy*: "Greeks turn to cunning to win the war. Read to identify evidence in the text that demonstrates what the Greeks meant by cunning."

61

Students learn how language works

6

Use illustrations to demonstrate:

- About 92 - 94% of words in texts are from a small group.
- 1 -2 of other words are likely proper names. If you can't pronounce the name, make one up.
- Of the other rare words, many are ones you use in conversations.

62

Big Moon Tortillas
(Gr. 3 Narrative)

The head of Marta Enos was filled with the knowing of fresh tortillas. Oh, that sweet, crisp, little bit burnt smell! It went to Marta's stomach, which rumbled and growled, and then on down to her feet, making her toes twitch towards the cookhouse.

The legs of Marta Enos would not wait another minute. They were in such a hurry to run to the cookhouse that they knocked over Marta's table, and that is when a disaster happened. The homework papers with their neat writing and beautiful drawings went out the window onto the breath of the fussing wind.

63

Beatrix Looks at Lichens
(Gr. 6 Narrative)

At first glance, lichen on a tree looks like a gray green, mossy stain. But a peek under the microscope reveals something extraordinary. It's not one living thing, but two—a partnership of very different life forms.

Lichens may look like plants, but they're not even half plant. Every lichen is a tiny team made up of a fungus and some algae or bacteria. Back in the 1880s, most people did not believe the German scientist who first suggested this. But one person who did agree was Beatrix Potter, the writer and artist who created Peter Rabbit.

64

The Good Earth
(Gr.10 Narrative)

The New Year approached and in every house in the village there were preparations. Wang Lung went into the town to the candlemaker's shop and he bought squares of red paper on which were brushed in gilt ink the letter for happiness and some with the letter for riches, and these squares he pasted upon his farm utensils to bring him luck in the new year. Upon his plow and upon the ox's yoke and upon the two buckets in which he carried his fertilizer and his water, upon each of these he pasted a square.

65

3. How can we increase silent reading proficiency in general?

Answers?

66

Today's Game Plan *The Science of Reading: Beyond Decoding to Volume and a Love of Reading*

1. Science of Reading Sources for:
 - a. Reading Interest
 - b. Reading Volume
2. How can we increase students' foundational reading—word recognition and fluency with comprehension?
3. How can we increase silent reading proficiency in general?

67



68

Summary of efficacy of Scaffolded Texts on Automaticity and Comprehension

- Albay, M. (2017). The benefits of graded reading. *International Journal of Social Sciences & Educational Studies*, 3(4), 177-180.
- Guthrie, J. T., Hsu, A. L. W., Wigfield, A., Tonks, S. M., Humenick, N. M., & Little, E. (2007). Reading motivation and reading comprehension growth in the later elementary years. *Contemporary educational psychology*, 32(3), 282-313.
- Hadley, G., & Charles, M. (2017). Enhancing extensive reading with data-driven learning. *Language Learning & Technology*, 21(3), 131-152.
- Hiebert, E. H., & Fisher, C. W. (2005). A review of the National Reading Panel's studies on fluency: The role of text. *The Elementary School Journal*, 105(5), 443-460.
- Huxley, A. B. P. (2006). *A text-based intervention of reading fluency, comprehension, and content knowledge* (Unpublished dissertation). University of Michigan.
- Jeon, E., & Day, R. R. (2016). The effectiveness of ER on reading proficiency: A meta-analysis. *Reading in a Foreign Language*, 28, 246-265.
- Madden, N. A., Netzel, A. M., & Storey, A. (2023). *Tutoring with ThemeReads: Early outcomes of an adaptation of a proven literacy tutoring model for middle grades students* Report to the Abell and Shetter Foundations. Johns Hopkins University.
- Masrai, A. (2019). Vocabulary and reading comprehension revisited: Evidence for high-, mid-, and low-frequency vocabulary knowledge. *SAGE Open*, 9(2), 2158244019845182.
- Nakanishi, T. (2015). A meta-analysis of extensive reading research. *TESOL Quarterly*, 49, 6-37.
- Reed, D. K., Zimmermann, L. M., Reager, A. J., & Aloe, A. M. (2019). The effects of varied practice on the oral reading fluency of fourth-grade students. *Journal of School Psychology*, 77, 24-35.
- Schieffele, U., Schaffner, E., Möller, J., & Wigfield, A. (2012). Dimensions of reading motivation and their relation to reading behavior and competence. *Reading research quarterly*, 47(4), 427-463.
- Schmitt, N., Jiang, X., & Grabe, W. (2011). The percentage of words known in a text and reading comprehension. *The Modern Language Journal*, 95(1), 26-43.
- Toste, J. R., Didion, L., Peng, P., Filderman, M. J., & McClelland, A. M. (2020). A meta-analytic review of the relations between motivation and reading achievement for K-12 students. *Review of Educational Research*, 90(3), 420-456.
- Totcu, A., & Coady, J. (2004). Successful learning of frequent vocabulary through CALL also benefits reading comprehension and speed. *Computer Assisted Language Learning*, 17(5), 473-495.
- Trainin, G., Hayden, H. E., Wilson, K., & Erickson, J. (2016). Examining the impact of QuickReads' technology and print formats on fluency, comprehension, and vocabulary development for elementary students. *Journal of Research on Educational Effectiveness*, 9(sup1), 93-116.
- Vadasy, P. F., & Sanders, E. A. (2006). Benefits of repeated reading intervention for low-achieving fourth- and fifth-grade students. *Remedial and Special Education*, 29(4), 235-249.

69

Sincerest thank you for your
time & commitment to our
students and their future!



hiebert@textproject.org

70