

What We Know Works: Curriculum (Science of Reading series, Part 2)

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There is much research as to what beginning readers need to learn in order to become proficient. Let's consider these introductory sentences from a passage on a mid-first-grade oral reading assessment:

It was a cold, snowy day. Abby had invited two friends over to play the card game Go Fish.ⁱ

How do first-graders tend to fare with this passage? In a recent studyⁱⁱ, we found that students in the top quartile could already read this story proficiently. Students in the next quartile could read most words but not multisyllabic words such as *invited*. Students from the bottom half of the distribution could read frequently-occurring single-syllable words.

Beyond a shadow of a doubt, students need to recognize the words. But recognizing words goes beyond simply pronouncing words. Children need to connect what they read with the words they speak. If the word *invited* isn't in children's oral language, they may make the associated sounds but won't truly recognize the word.

How do students acquire the ability to read words with the automaticity that allows them to access the meanings of words they know? Research on word recognition, or the science of reading, is massive. Publications describing and summarizing this research number in the thousands. To highlight a few critical conclusions from this work:

1. Readers need to be automatic in connecting the sounds in oral language to the letters that represent them.

Starting with the first-grade studiesⁱⁱⁱ, there have been numerous summaries of research and national reports that have reached an unequivocal conclusion: Being able to recognize and apply systematic and predictable relationships between letters and sounds is fundamental to reading proficiently.

This does not mean that word recognition is the only proficiency. If reading is not used to learn and think, the effects of an advantageous start wane. But proficiency in reading English will not happen if students do not become adept at connecting sounds and letters. Many letters and letter combinations are associated with the phonemes for vowels—at least 127 in Fry's (2004)^{iv} analysis. And these letters and letter combinations don't appear an equal number of times in English words. In Fry's analysis, 78% of the vowels in 17,310 words had at least one of 7 patterns (*at least* meaning that he studied both monosyllabic and multisyllabic words, so some words had more than one vowel).



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I'm not suggesting that only 7 sound-letter patterns should be taught. In fact, we don't yet know how many of the more than 100 patterns for vowels must be taught. But there is absolutely no question that children do need experiences that aid them in understanding the alphabetic principle. (In Part III of this series, I will highlight these key experiences.)

2. Proficient readers need to expect variability, especially in sound-letter patterns for vowels. They must be able to roll with the quirks of written English. The deep orthography of English means that readers can encounter a variety of relationships between letters and sounds, even in the same sentence, as we see in the excerpt about Abby and the game Go Fish, where multiple different sounds are associated with the letter *a*: *was, a, day, Abby, had, play, card, game*. Two words have a short vowel (*Abby, had*); three have *a* as a long vowel but in two unique patterns (*day, play, and game*); two words have the *schwa* (*a, was*); and, finally, the *a* in *card* has a unique sound influenced by the consonant *r*.

Students who expect that the letter *a* will always be associated with a single sound will have a difficult time navigating this passage. Instruction focusing on long vowels would neglect five words, while instruction focused on short vowels would leave out six words.

In the Hiebert et al. study^v, students in the bottom quartile were able to recognize *was, play, and had*. Because these are highly frequent words, students were likely using some type of memory retrieval. Memory retrieval is part of reading, but it is limited; the students had not made the extension that *play* and *day* had the same pattern.

Good readers expect that every occurrence of a vowel may function differently. They draw on familiar patterns and make generalizations—for example, the *A* in *Abby* functions like the *a* in *had*.

3. Readers also become proficient with units beyond individual grapheme-phoneme correspondences. These units are important. There are onset and rimes (e.g., *day, play*); inflected endings (*friends, invited*); root words with affixes (e.g., *snowy*); and multisyllabic words (e.g., *Abby, invited*).

Even in the middle of grade one, as shown in the assessment excerpt, students are expected to be adept with a variety of different units.

Here I have addressed only several of the proficiencies that underlie proficient reading. There are additional skills, including foundational skills such as phonemic segmentation and blending, that are essential for recognizing words. What this brief overview does highlight, though, is that conclusive evidence exists to show what beginning readers need to learn to become proficient. Continue reading this series for information on what research tells us about evidence-based reading instruction.



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- ⁱ Good III, R. H., & Kaminski, R. A. (2011). Dynamic indicators of basic early literacy skills (Next ed.). Dynamic Measurement Group.
- ⁱⁱ Hiebert, E.H., Y. Toyama, & R. Irey (in press). Features of known and unknown words by first graders of different proficiency levels in winter and spring. *Education Sciences*.
- ⁱⁱⁱ Bond, G. L., & Dykstra, R. (1967). The cooperative research program in first-grade reading instruction. *Reading Research Quarterly*, 2(4), 5-142.
- ^{iv} Fry, E. (2004). Phonics: A large phoneme-grapheme frequency count revised. *Journal of Literacy Research*, 36(1), 85-98.
- ^v Hiebert et al. (in press)



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