Foundations A-Z

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Research Guide

Research-Based, Intentional Foundational Skills Instruction

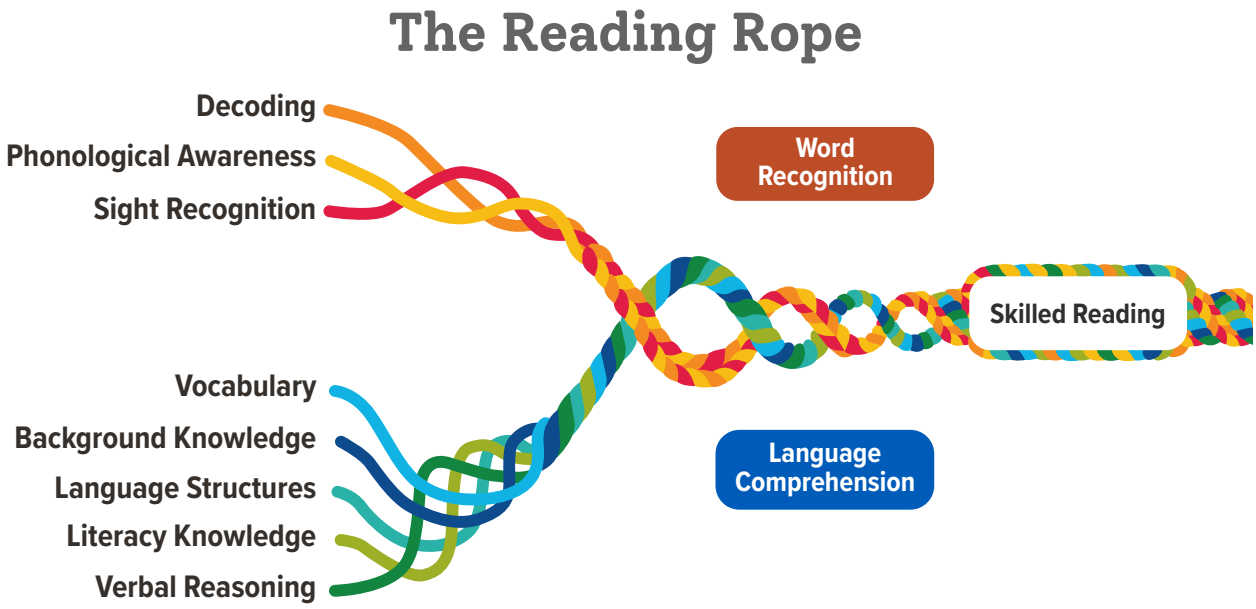
Introduction

Every elementary teacher has witnessed the excitement and wonder of the young child who has just discovered that they can decode a word and "read." Often, this first ah-ha moment is followed in quick succession by other successful attempts to connect sound to letters; these young readers have "cracked the code" and are off, decoding words and lifting meaning from text. This moment might seem like magic—a sudden *poof* and they are readers. Yet, researchers and experienced teachers know that this moment has been made possible by skills and knowledge that this child has been acquiring for some time. Awareness of these foundational skills also allows the teacher and researchers insight into what is happening for the children who have not yet cracked the code and who may be becoming frustrated.

Skilled Reading

To read skillfully, a child must learn to engage in two distinct and simultaneous processes: word recognition and language comprehension. Both interact with one another during reading, yet each is supported by a unique set of understandings (see Figure 1, Scarborough 2001). Word recognition requires decoding skills, including alphabet knowledge, phonological awareness, phoneme-grapheme associations, and sight recognition. Together, these skills account for considerable differences in decoding accuracy and fluency during reading acquisition (Adams 1990; Lonigan et al. 2008; NICHD ECCRN 2005; Storch & Whitehurst 2002). Decoding skills are generally learned "early and entirely" because they are finite (e.g., twenty-six letters and forty-four phonemes).

When engaged in word recognition, the reader also constructs meaning (reading comprehension). Language comprehension skills include vocabulary, background knowledge, language structures, literacy knowledge, and reasoning skills. Together, these skills support reading comprehension during the later, more conventional phases of reading (beginning in the third grade) when deep stores of background knowledge, oral language skill, and genre knowledge are required to understand increasingly complex texts (Duke et al. 2004; Juel 2006; NICHD ECCRN 2005; Storch & Whitehurst 2002). In contrast to foundational skills, to keep up with the increasing demands of texts that students are required to read and comprehend, oral language and background knowledge must develop continuously.



Modified from 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. New York, NY: Guilford Press

Figure 1. The interrelationship of evolving literacy skills is more clearly shown in *Scarborough's Reading Rope* (2001).

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In the early phases of reading development, the reader's primary focus is word recognition as many words will require decoding. Comprehension is limited during these phases, because much of the reader's attention is devoted to translating letters into sounds, blending these sounds into recognizable words or word approximations (Adams 1990; LaBerge & Samuels 1974; Perfetti 1985), and then connecting them to words in memory (phonological recoding; Share 1995). With reading practice, however, specific grapheme-phoneme (letter-sound) relationships and some orthographic patterns (mental representation of word parts and patterns) are strengthened until they become over-learned (sight recognition). As a consequence, many words are recognized automatically (sight words; Ehri 1995; Share 1995). With automaticity in word recognition, comprehension improves because the reader is able to devote more attention to understanding the text (LaBerge & Samuels 1974). The interrelations of word recognition and language comprehension become more tightly woven as the reader becomes increasingly proficient.

Predictors of Reading Achievement

Longitudinal research has identified variations in the timing of the impact of word recognition and language comprehension on reading achievement during the early (kindergarten through second grade) and later reading phases (third grade and beyond).

Word recognition skills are foundational skills because they serve as the early foundation for subsequent literacy learning. When measured in preschool and kindergarten, foundational skills such as alphabet knowledge and phonological awareness predict word recognition skill in the first and second grades (NICHD 2005, Storch & Whitehurst, 2002) when decoding is the major reading challenge. Put simply, children with higher skill levels are more likely to learn to read compared to children with lower skill levels. Foundational skills are essential as readers progress because without them, they are more likely to struggle with unfamiliar and multisyllabic words they encounter in more complex texts. The more specific role of these foundational skills is outlined below:

- Alphabet knowledge. Alphabet knowledge includes letter-name knowledge, both upper and lowercase, letter-sound associations, and the alphabetic principle (letters represent sounds in spoken words). Automaticity in identifying letters and sounds (naming speed) is also an important component in alphabet knowledge (Shannahan & Lonigan 2008) and critical for rapidly decoding words.
- Phonological awareness. Phonological awareness (PA), particularly at the phoneme level, has a direct role in many components of literacy development, including decoding and spelling. There is a link between phoneme-level awareness and decoding in alphabetic writing systems because graphemes (letters) represent phonemes (sounds) in written words. That is, phoneme-level awareness, in conjunction with alphabet knowledge, enables children to understand how graphemes are mapped onto phonemes and blended to form spoken words (Adams 1990; Share 1995). These relationships are taught during phonics instruction. Additionally, PA has an indirect effect on reading comprehension because decoding skill is related to reading fluency, which, in turn, supports comprehension (LaBerge & Samuels 1974; Storch & Whitehurst 2001).

Longitudinal research on language comprehension has consistently demonstrated relations between preschool oral language and reading comprehension beginning in the third grade and beyond (Catts et al. 1999; Muter et al. 2004). Additionally, differences in language comprehension differentiate proficient from struggling readers (Catts et al. 1999). Components of language comprehension include:

- Oral vocabulary is defined as the words one understands and uses when speaking and listening. Research has confirmed that oral vocabulary knowledge is related to the frequency and complexity of child-directed speech (Masek et al. 2018). Oral vocabulary is generally categorized at three levels that provide information about a child's breadth and/or depth of word knowledge: receptive (the words in a child's listening vocabulary), expressive (words in a child's speaking vocabulary), and definitional (words with a depth of knowledge). Higher levels of oral vocabulary early on are related to later comprehension skills (Justice et al. 2013). Strong oral vocabulary can compensate for weak decoding skills. That is, children can rely on their vocabulary knowledge and context to help identify possible options for word recognition (Stanovich 1984).

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- Print concepts include understanding that print is meaningful (i.e., carries a message) and purposeful (i.e., serves many functions, including entertaining, informing, etc.). Additionally, the forms of print (e.g., menu, story book, recipe) vary depending on the function. Early in development, readers rely on clues from the physical environment (e.g., store logo) and cannot read outside of these settings (Adams 1990; Mason 1980). As readers progress, they rely less on physical context and more on their developing code skills, including alphabet knowledge, the alphabetic principle, and print conventions (e.g., directionality, 1:1 correspondence, punctuation).
- Language structures, including grammatical skill and syntax, develop rapidly in the early years and are highly sensitive to input (Huttenlocher et al. 2007). Put simply, children learn language and more complex language structures when they hear them. Conversely, they will never learn language and structures they are not exposed to.

A similar view of skilled reading is evident in *Simple View of Reading* (1986) which suggests reading comprehension includes both decoding and language comprehension (see Figure 2). According to Gough and Tunmer, if either process breaks down, comprehension cannot occur. Based on the *Simple View of Reading*, reading comprehension depends on listening comprehension. The product of decoding and language comprehension is reading comprehension, so if either of those skills is weak or missing, reading comprehension will suffer.

In other words, in order for students to be skilled readers, it requires deliberate instruction to both sides of the equation: decoding (word reading) and understanding the nuances of spoken language (listening comprehension).

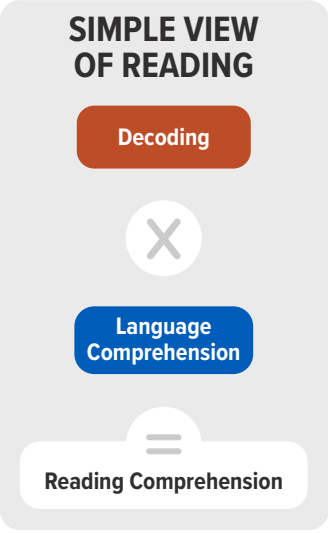

Figure 2. *Simple View of Reading* adapted from Gough and Tunmer (1986).

> *Without an awareness of the sound structure in words at the phoneme level, children will not understand how print works and thus can fail to deploy the phonics instruction teachers provide.*
>
> Dr. Christina Cassano
> (Professor of Childhood Education)

What About Motivation?

Motivation and engagement, though often overlooked in discussions of word recognition, are also critical to skilled reading. Within the domain of word recognition, motivation functions alongside executive functioning skills, such as attentional control, working memory, and planning, prompting the reader to put forth the effort required to coordinate the complex process of decoding words not immediately recognized and identifying known words (Duke & Cartwright 2021). Factors that contribute to motivation and engagement include a reader's purposes and goals of reading (Guthrie & Humenick 2004). A reader who wants to read a particular text is often able to apply executive functioning skills (e.g., planning, working memory, attentional control) that result in greater reading success than might be evident when the reader is faced with a similar text that does not incite the same level of interest and engagement (Duke & Cartwright 2021).

Motivation is also linked to reading achievement. Whereas high-achieving readers are motivated to read, struggling readers are motivated to read less, and as a result, encounter and are able to read fewer words (Juel 1988; Cunningham & Stanovich 1990). Estimates of words read by high- and low-achieving readers showed "staggering individual differences in volume of language experience, and therefore, opportunity to learn new words" (Nagy & Anderson 1984, p. 328).

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The High Cost of Reading Failure

Unlike oral language fluency, reading proficiency doesn't evolve naturally for many children and the consequences are high. Research shows that children who do not read proficiently by the end of grade 2 do not "catch up" (Clay 1979; Juel 1988; Stanovich 1986; Juel et al. 1986; Olson, Keenan et al. 2014; Sparks et al. 2014) and have a high probability of continuing to struggle throughout elementary school and beyond. Children who recovered from initial reading failure do so by the end of grade 2 (Spira et al. 2005).

The gap between high- and low-achieving readers continues to grow with each successive grade. Juel (1988) identified low levels of phonemic awareness, weak decoding skill, and limited print exposure all contribute to a "steadily widening gulf" between good and poor readers. Likewise, Stanovich (1986) argued with Juel's findings that problems "in the area of phonological awareness" can cause "delays in early code-breaking progress and initiates the cascade of interacting achievement failures and motivational problems" (p. 393).

There have been a lot of new findings, thanks to neurosciences and cognitive sciences, on what the brain actually does when it reads. Support for systematic early literacy instruction comes from brain studies using magnetic resonance imagery (MRI). One of the findings comes from studies of eye movements while reading; these studies have shown that skilled readers do not skip words. Reading is accomplished with letter-by-letter processing of the word. (Raynor et al. 2001). In other words, reading requires the ability to match the symbols with the speech sounds they represent.

In addition, cognitive neuroscientists have noted a consistent and universal pattern of activity connecting the phonological processor in the brain's front left side to the orthographic processor at the rear as reading takes place. The bridge between those two areas, the phonological assembly, is what connects written letters to sounds and makes reading possible. (Sandak et al. 2004; Houde et al. 2010) In other words, major regions of the left brain perform specific jobs in concert with other regions of the brain for this to happen.

Much as physical training develops muscles and improves athletic performance, deliberate practice in phonemic awareness and letter-sound knowledge hones and strengthens neural pathways crucial for processing text. Explicit instruction develops the alphabetic principle (the print-sound connection) and leads to efficient orthographic mapping, which lets readers automatically process words effortlessly using deeply ingrained phonologic knowledge. (Kilpatrick 2015; Rasinski 2020). This automaticity is a key stepping-stone to fluency and ultimately, comprehension.

> *A significant number of our students who struggle in reading manifest difficulty in reading fluency.*
>
> Dr. Tim Rasinski
> (Professor of Reading Education)

Research-Based, Intentional Instruction

Cognitive research supports the design and implementation of early literacy programs rooted in systematic instruction and deliberate practice of essential literacy elements. Such programs need not be formulaic—a "wash, rinse, repeat" protocol doesn't yield good results! Practitioners know that effective instruction relies on teacher ingenuity and instructional craft combined with scientific evidence.

An artfully designed program is that which melds instructional best-practice to research-based evidence. Rather than addressing key skills in isolation, for example, an effective program intentionally interweaves multiple components of early literacy instruction into a single lesson (Moats 2007). Employing a gradual release approach, in which direct instruction gives way to guided practice and then to independent application of skills, provides scaffolded support using repetition (Duke & Pearson 2002). And granting teachers the flexibility to give corrective feedback, engage students in guided practice, and use reteach and enrichment activities allows for customized lessons that address individual student needs within the program structure. (Snow et al. 1998).

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We believe that lessons must be engaging to establish a meaningful purpose which students can enthusiastically latch onto. Grade-appropriate books, particularly nonfiction, and conceptually rich decodable texts on wide-ranging subjects and genres spark interest and offer opportunities for students to apply newly gained skills *in context* (Foorman et al. 2016). Thoughtfully crafted interactive materials offer opportunities for guided practice, providing immediate feedback and support for learners.

> *There are meaningful, content-oriented decodable texts that support a wider range of children's needs and interests, so they can help children be successful at word reading and be motivated as readers.*
>
> Dr. Julia Lindsey
> (Foundational Reading Expert)

Young readers who can see aspects of their lives reflected in stories and characters are more likely to become deeply engaged in their own learning (Jackson and Zmuda 2014). The students' investment in the learning process is vital for achieving those regular, small successes that elevate understanding that will lead to reading proficiency.

The Foundations A-Z Literacy Program

Based on the scientific reading research and developed by educators, the Foundations A-Z literacy program is unique in that it offers explicit, systematic foundational skills instruction from kindergarten through grade 5. The grade level scope and sequences present a continuum of foundational skills—starting with the simple alphabetic phase, moving to the spelling-pattern phase, and finally, the more sophisticated polysyllabic and morphemic phase—aligned to national and state standards. Instruction starts with simple foundational skills and progresses to more complex skills that build on each other. Instruction begins with grade-level texts that offer ample opportunities for repeated readings and fluency practice, as well as vehicles for building content-area knowledge. (Stanovich 1986; Rasinski 2019). Teacher-led and peer-to-peer collaborative learning helps students hone skills and further deepen understanding. (Driver et al. 2000; Pappas et al. 2002). Within each lesson, ongoing observational data is gathered, allowing teachers to respond to students' needs by providing differentiated instruction (Duke & Mesmer Winter 2018-2019).

> *The brain has the ability to detect patterns in its environment. Morphemes (word roots) are word patterns that contain meaning.*
>
> Dr. Tim Rasinski
> (Professor of Reading Education)

The oft-neglected third phase of reading development, the polysyllabic-morphemic phase, is the focus of instruction starting in grade 3. (Adams 1990; Shefelbine 1990). Higher-level instruction on morphemes, syllable types, division rules, and implications of the schwa sound are built into well-integrated lessons. Engaging books and word study passages are presented in a variety of genres and include more challenging multisyllable content-area words. These conceptually rich and grade-appropriate texts lend themselves to repeated readings as a means to advance fluency and expand knowledge. (Rasinski 2020; Cervetti & Heibert 2015). The well-crafted lesson plans include vivid, high-interest texts and meaningful activities that support learning by both engaging students and helping teachers ply their craft in creative and purposeful ways.

Assessment is a key component of the program. Interactive unit tests along with teacher observation sheets allow for timely and effective instructional responses to student needs (Snow et al. 1998). Interim assessments are administered three times per year to gain a broader view of student and class performance in the context of CCSS.

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In the upper elementary grades, readers most often need support for reading multisyllabic words. When we teach readers to divide multisyllabic words into manageable parts—either through syllabification or by identifying common phonograms, letter clusters, and affixes—we offer them an effective strategy for decoding these longer words.

Dr. Susan Dougherty
(Associate Professor of Literacy Education)

Foundations A-Z adheres to scientifically based reading research without constraining teachers from exercising their creativity or forcing students to march in lockstep. Although science informs what students need to learn, it does not inform how students will meet the learning outcomes. By providing a systematic and explicit framework of instruction that fully embraces the teachable moment, Foundations A-Z helps bring both the scientific reading research and art of teaching to the classroom, which, in turn, serves as a launchpad for overall academic success.

Foundations A–Z Scope and Sequence Overview

	K	1	2	3	4	5
Phonological Awareness	•	•				
Phonics	•	•	•	•	•	•
Phonograms	•	•	•			
Print Concepts	•	•				
High-Frequency Words	•	•	•	•	•	•
Content Area Vocabluary				•	•	•
Handwriting (manuscript)	•	•	•			
Handwriting (cursive)			•	•	•	•
Fluency	•	•	•	•	•	•
Language Connection	•	•	•	•	•	•
Word Study			•	•	•	•

Foundations A–Z was written with underlying principles that include:

- Explicit research-based instruction
- Systematic scope and sequence
- Emphasis on phoneme-level instruction under the phonological awareness umbrella
- Instructional routines to practice foundational skills
- Embedded review to foster mastery of foundational skills
- Application of reading and writing skills using connected text in grades K–5 and writing connection
- Differentiated instruction with reteach and enrich opportunities
- Engaging instruction with a digital experience for students

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Reviewers

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