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Exact Path

Designed with the Science of Reading

October 2022

Exact Path

Introduction

Edmentum Exact Path is an adaptive learning platform providing individualized instruction and diagnostic assessment, designed to support teachers as they differentiate instruction for their students. The program is based on six learning-design principles gleaned from rigorous research in this area over the last 50 years.

Adaptive, Individualized Learning

Tailor learning to each student by providing instruction at the appropriate level, sequence, and pace.

Assessment-Driven Mastery Learning

Focus on efficient learning. Students show mastery of key content via assessment, invest time on not-yet-mastered content, and proceed through learning new content at their own pace.

Deliberate Practice and Immediate Feedback

Offer intentional and aligned practice to support increasing levels of understanding. Provide immediate feedback and coaching to improve student success.

Explicit Instruction and Scaffolding

Delivery of content begins with explicit instruction, then using a scaffolded approach, students move toward independent application.

Active, Engaging Learning

Involve learners in responding to and manipulating information while they learn—ensuring involvement in building understanding and minimal passive reception of information.

Subject-Area Best Practices

Engage learners and build understanding by using research-based best practices and instructional strategies.

This paper highlights the sixth learning-design principle, Subject-Area Best Practices, focusing on theory, best practice, and research on reading as reflected in Exact Path Reading modules.

The Elements of Reading

Teaching reading with efficacy depends on the application of scientifically-based reading research (SBRR) to curricular practices to ensure that students have the best possible opportunity to learn to read. SBRR came into the educational limelight about 25 years ago. The U.S. Congress created the National Reading Panel in 1997 to study best practices in response to a perceived reading crisis in the country. The Panel's report, released in 2000, was backed by scientific data and has been hugely influential on the research that has come since then. The panel called for reading practice in the nation to be supported by SBRR and raised the expectation that reading research should align more closely to the scientific method in order to qualify as SBRR.

Based on the report, general consensus exists about key reading skills—or elements of reading. Taken together, the ongoing research in these areas is known as the Science of Reading.

Phonological Awareness

Phonological awareness is the ability to hear and manipulate sounds in words and includes the important subset of phonemic awareness, in which learners are able to manipulate individual sounds. These are oral language skills, not associated with word meaning, but critical precursor skills to decoding. Adams (1990) described the five levels of phonological awareness, and her seminal work continues to guide educators in understanding how to move learners through the phonological awareness continuum today. Phonological awareness is not limited to the sounds we hear in words; rather, it includes a broader understanding of elements of spoken language, such as word awareness, syllable awareness, rhyming, and onset/rime (initial consonants/ending word sounds) segmenting and blending.

Phonics

Research shows that phonics instruction should be explicit and systematic, beginning with letter-sound relationships and blending those sounds to form words, known as the process of decoding text. Sound-spelling patterns also support learners in using known letter patterns to decode new words. Alphabetics, sound-spelling patterns, orthographic awareness, decoding, high-frequency words, concepts of print, and word-part analysis (morphology) are all subskills under the phonics umbrella. Children must also learn sight words (both decodable and irregularly spelled high-frequency words). Experts such as Ehri (2014)

unequivocally state that this learning must occur side-by-side with phonics instruction. As phonics skills increase, learners begin to automatically recognize words, a skill known as *automaticity*, which underlies the building of reading fluency.

Oral Reading Fluency

Fluent readers read accurately, at a steady rate, and with prosody (expression) and confidence. Automaticity frees brain power to work on reading fluency as learners begin to independently engage with texts. Reading fluency can't happen without phonological awareness and phonics instruction. Yet fluency does not necessarily follow these skills and needs to be modeled, practiced, and discussed explicitly.

Vocabulary

As readers become more fluent and gain morphological knowledge (Kirby et al., 2012), they then become able to rapidly acquire new vocabulary. Research suggests that vocabulary is most effectively taught in the context of what students are reading. However, effective vocabulary instruction requires more than just incidental definitions of words. Word meanings need to be directly taught with multiple exposures to build opportunities to explore the depth of new vocabulary items and use them in context (Biemeller & Boote, 2006). Broader vocabulary knowledge supports better reading comprehension, which is the ultimate goal of all reading instruction.

Comprehension

Understanding texts—and engaging meaningfully with texts to learn about ourselves/others and to tap into greater resources of knowledge—is the purpose of reading instruction within the English language arts discipline. Reading comprehension is the bedrock on which a student's academic success is built both in secondary and higher education. It is a student's ability to not only understand the surface-level of meaning contained within a text, but to understand multiple layers of meaning based on inference, author's point of view, and a critical analysis of the arguments and evidence a writer uses.

Fitting the Elements Into Instruction

In initial phases of learning to read in K–3, phonological awareness and phonics comprise a large component of instructional time, at which point they taper off and segue into word analysis skills. While reading fluency instruction and assessment begins generally in the latter half of first grade, it receives most emphasis in Grades 3–5 when educators work to ensure that students are on a proper trajectory for developing lifelong reading skills. As students move into the secondary grades, reading fluency continues to be measured but it is a focus primarily for students whom educators suspect have reading difficulties.

This brings us to an important concept underpinning the instruction of phonological awareness, phonics, and reading fluency, known together as reading foundational skills: these skills are constrained—that is, once mastered, they offer no more growth opportunities. Vocabulary and reading comprehension skills, on the other hand, are unconstrained. We can continue to grow in these skill areas throughout our lifetime (Paris, 2005). This is why it is so critical to help learners master the first three skill sets by placing them on a continuum that best suits their needs and learning styles, so that they can soar into deep comprehension of texts as they continue in their reading development.

> Exact Path offers just this type of continuum. Its diagnostic testing, individualized learning path, and regular progress monitoring checks that result in any needed adjustments to the path are ideal for learning the foundational skills. These same elements serve to appropriately scaffold learners as they grow in vocabulary and reading comprehension skills.

We will next look at what SBRR indicates about best practices in each of the key elements of reading and explore how Edmentum has applied the Science of Reading to the content and instructional architecture of Exact Path.

Phonological Awareness

What the Research on Phonological Awareness Says

Phonological awareness was identified as the first element of SBRR by the National Reading Panel in 2000. This decision is upheld by subsequent research. For example, in 2008 the National Early Literacy Panel's report stated that phonological awareness remains a strong predictor of later literacy. Additional studies continue to show that phonological awareness is necessary for decoding words and for vocabulary acquisition (Moats, 2009). Systematic instruction in phonological awareness has also been linked to increased print awareness, and it has proved successful in closing and even overcoming the reading foundations achievement gap between children from low-income homes and their peers from high-income homes (Lefebvre et al., 2011).

Best practices for phonological awareness instruction center around introducing learners to frequent lessons that are brief in duration—no more than two or three activities per session (Moats, 2010). Phonological awareness instruction should begin with larger sound units—for example, sentences and syllables—and move slowly to individual phonemes. Students should orally produce the sounds as part of the preferred "say-it-and-move-it" cycle by the use of sound boxes* (Blachman et al., 2019).

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*Sound boxes are also known as Elkonin boxes, which require students to move a marker as they hear each sound in a word. In a digital environment, students click on a box as they hear each sound in a word, therefore involving the kinesthetic experience of moving and clicking the mouse.

How Exact Path Applies the Research on Phonological Awareness

Phonological awareness learning occurs in 11 reading foundations modules across grades K–1 content in Exact Path. The modules are presented in a carefully ordered sequence based on research. The modules start with basic phonological awareness tasks, then move to those that are increasingly complex.
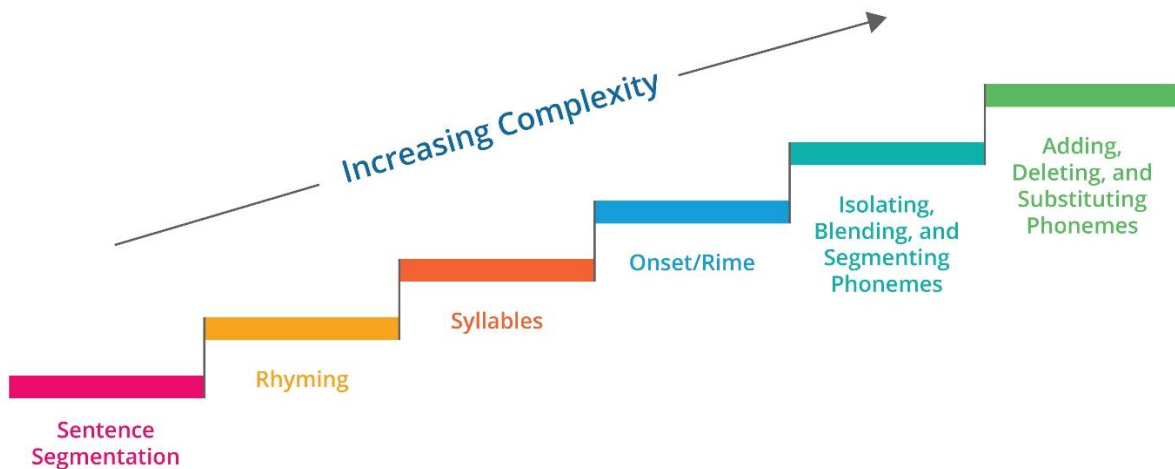
Exact Path takes students through this sequence efficiently, allowing individual learners to move quickly when they can and to slow down as they demonstrate need. Each component in the phonological awareness modules is brief in duration, as best practices suggest, whether learners are viewing tutorials, practicing, or demonstrating mastery through assessments.

Finally, Exact Path Phonological Awareness lessons use the "say-it-and-move-it" instructional model in key areas in which it is beneficial to learners. For example, in the learning module "Fishing for Sounds," learners use sound boxes to break apart word into the specific sounds they hear then blend those sounds together again into a word.
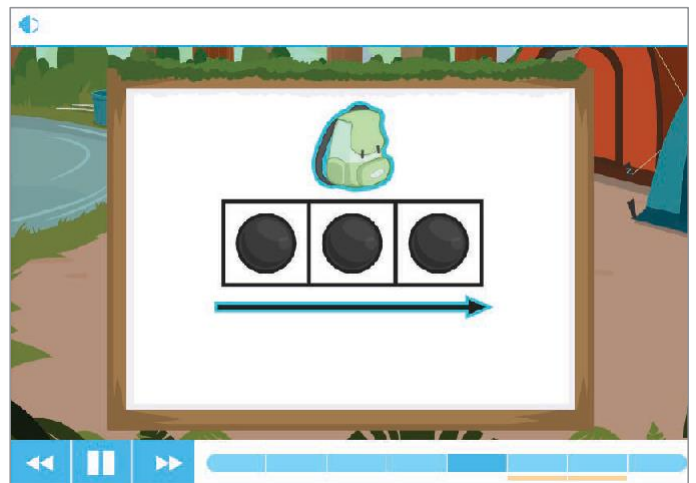

Figure 1. The kindergarten skill "individual sounds in words" uses research-based sound boxes.

Phonics

What the Research on Phonics Says

Today's researchers are in agreement that phonics instruction should be explicit and systematic. Mesmer & Griffith (2005) describe key characteristics of this type of instruction as follows:

- Direct instruction and learner practice emphasize specific phonics concepts in a sequenced and systematic way that exposes learners to the basic elements of the English orthographic code. As the code is mastered over time, learners store written words in their memory, quickly recalling their pronunciations and meanings.

- Instruction is founded in letter-sound relationships, and practice includes decodable text.

- Learners articulate sounds of letters in isolation and then blend isolated sounds, moving towards using letter-sounds to build words.

Evidence abounds that phonics instruction leads to better reading. Ehri et al. (2001) released a meta-analysis of 38 phonics research studies dating back to 1970 as a follow-up to the National Reading Panel's 2000 report. The conclusion stated, "[S]ystematic phonics instruction proved effective and should be implemented as part of literacy programs to teach beginning reading as well as to prevent and remediate reading difficulties." More recently, a meta-analysis undertaken by British scholars reached a similar conclusion: "Since there is evidence that systematic phonics teaching benefits children's reading accuracy, it should be part of every literacy teacher's repertoire and a routine part of literacy teaching" (Torgerson, Brooks, & Hall, 2006).

Best practices in phonics instruction take into account the umbrella view of this foundational skill. The related group of print concept skills—print awareness, sight (high-frequency) words, and word analysis—are integrated into decodable texts so that they occur in the context of phonics practice. For example, a text is considered decodable if up to 50% of the words are previously taught sight (high-frequency) words.

Systematic phonics instruction generally puts sight word instruction at regular intervals after some phonics skills have been taught and practiced. This sequential phonics-sight word integration is based on the idea that orthographic mapping skills make sight word learning easier, and these skills are not accessible until learners have achieved proficiency in phonemic awareness and phonics (Kilpatrick, 2015). In putting theory to the test, in a study with students at risk for learning disabilities, training phonics before sight words did create a slight advantage over the reverse order (McArthur et al., 2015).

In teaching print concepts, the use of e-books has been found to be an effective mode of instruction. Improved performance in concepts of print was shown for typically developing children who used e-books rather than print books, but the effect was even more pronounced for children at risk for learning disabilities (Shamir & Shlafer, 2011). A subsequent eye-tracking study showed that children spent more time looking at print in electronic storybooks, which improved their print awareness (Liao et al., 2020).

How Exact Path Applies the Research on Phonics

Exact Path is built around a clearly defined scope and sequence that outlines grapheme-phoneme correspondences. Exact Path makes systematic phonics instruction easy with lessons that have an explicit focus on mapping an individual letter, or combination of letters, with its appropriate sound.

A recent study of systematic phonics showed that many teachers do not feel entirely confident with the procedures associated with high quality phonics instruction (Flynn et al., 2021). So the ease of use represented by Exact Path is very helpful. Lessons and practice in letter-sound correspondence are effective tools to support teachers as students build phonics skills that will enable them to read
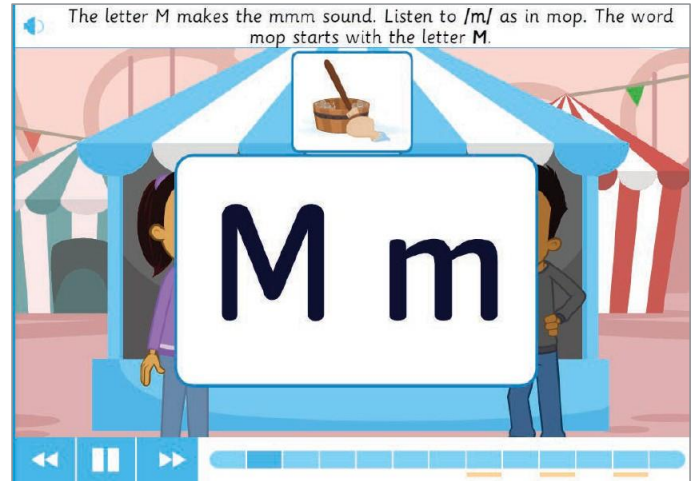
Figure 3. Systematic phonics instruction begins in kindergarten with explicit lessons like "Letter Wheel."

words with greater automaticity. Regular progress monitoring assessment helps students stay on track to master all elements of phonics—including letter-sounds, blends, digraphs, and vowel teams—by providing reteaching and specific scaffolding based on mastery data.

Per best practices, decodables are woven into Exact Path as letter-sound correspondences and other phonics skills are mastered. Each Exact Path e-book appears with a cover and pages that turn to mimic the act of reading a print book. This ensures that students gain knowledge of print concepts and book-handling skills while also gaining the advantages research associates with use of e-books with learners. Figure 4 shows the cover and sample pages from the decodable book entitled *Come and See*.

Figure 4. Beginning in kindergarten, e-books are aligned with decodability skills for learners.

Many of the instructional activities within Exact Path aim to build automaticity by providing instruction in an increasing bank of sight (high-frequency) words. Lessons focused on sight-word acquisition were built according to the research on orthographic mapping, or how sound-letter mappings are bound in memory. This research shows that sight-word instruction is most powerful when students can see the words spelled, hear the pronunciation, and have visual clues to the meaning simultaneously. This helps create bonds in memory that aid retention of the word in the student's memory (Ehri, 2014).
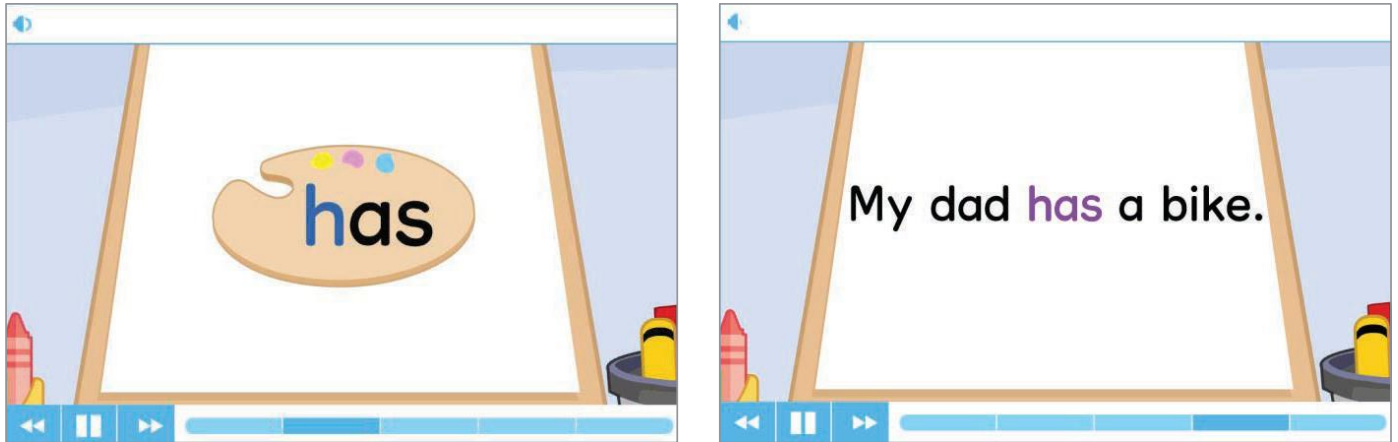
Figure 5. Students regularly practice sight words, as shown in these screens from Grade 1.

At Grades 1 and 2, word analysis skills are introduced in a systematic way via syllabication instruction. First grade syllabication lessons include these syllable types: open, closed, Vowel-consonant-silent *e* (VCe), vowel team, and *r*-controlled vowel. The words decoded using syllabication are limited to words with just two syllables
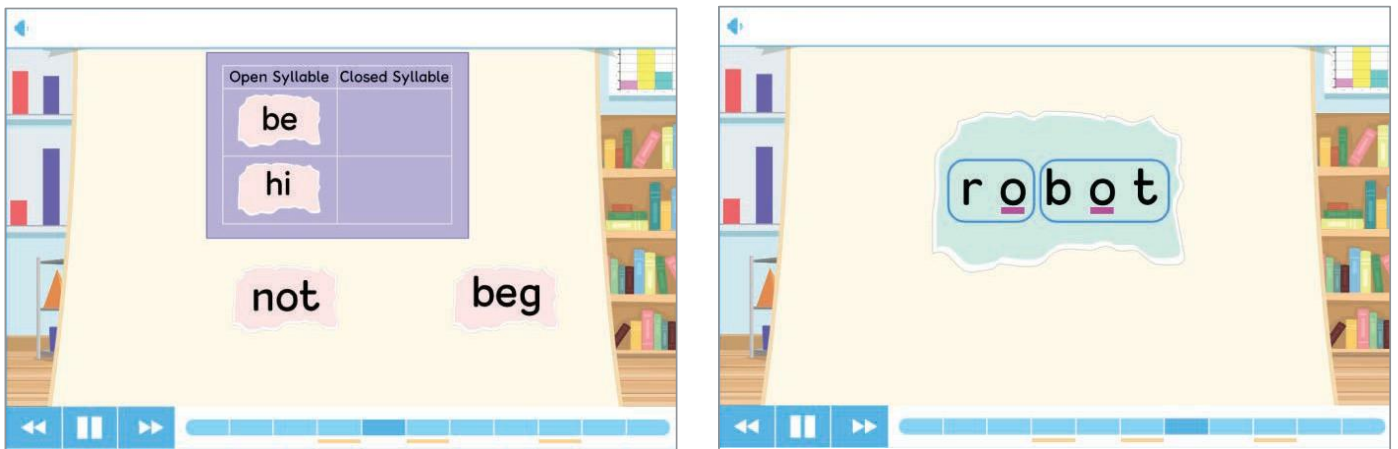
Figure 6. Grade 1 syllabication instruction includes open and closed syllables.

Figure 7. VCe, vowel team, and r-controlled vowel syllables are also included in Grade 1.

In second grade, students receive a brief review of open and closed syllables followed by VCe, vowel team, *r*-controlled vowel, and *-le* words. Three-syllable words are introduced in second-grade modules.
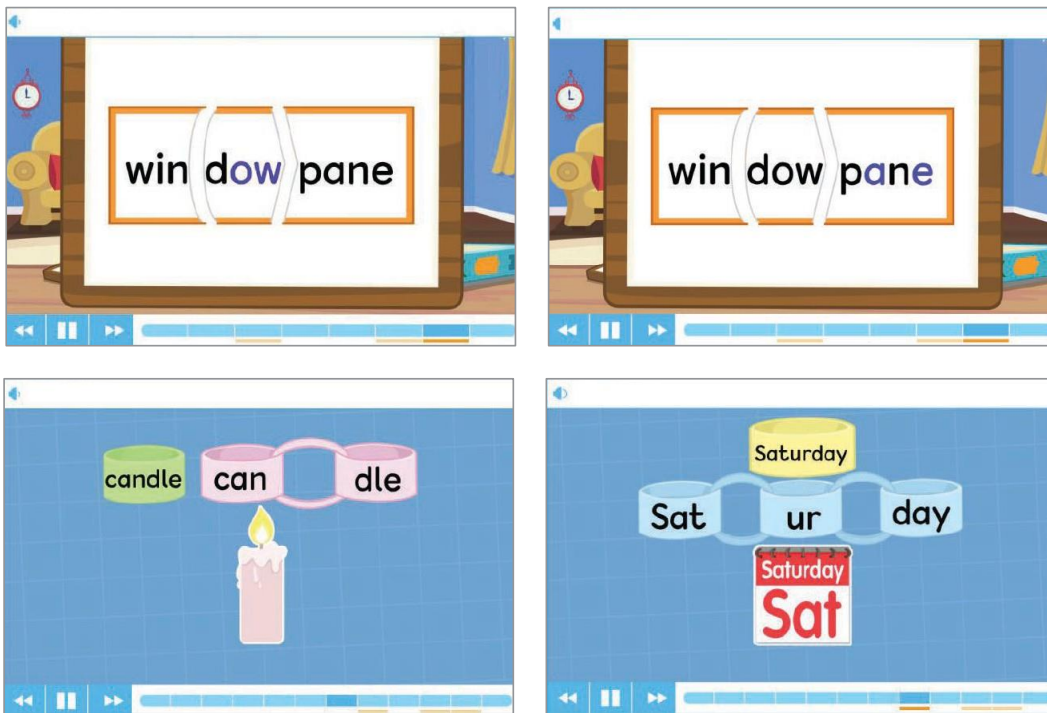

Figure 8. Grade 2 syllabication instruction extends to three-syllable words.

Reading Fluency

What the Research on Reading Fluency Says

Fluency has received a lot of research attention since the National Reading Panel named it one of the five critical sets of reading skills. As a recent synthesis of the research shows, there is agreement on how to do proper fluency instruction, practice, and assessment (Padeliadu & Giazitzidou, 2018).

Instruction must involve modeling of fluent reading and fluency rate goal-setting. Students should be cued to focus on speed, prosody, and comprehension during reading, not just one of those skills in isolation (Yang, 2006). Students should also be taught to preview text before reading and to scan for key words (Lee & Yoon Yoon, 2015; Morgan et al., 2012).

Best practice in fluency instruction promotes repeated readings (Stevens et al., 2016). In the synthesis cited above, the ideal practice includes at least four readings of a text. Variations of repeated reading—including varied practice reading, choral reading, echo reading, shared reading and performance reading—are also effective. For assessment, words correct per minute (wcpm) is usually acceptable as the best measure (Hasbrouck & Tindale, 2006). Generally, acceptable rates begin at 60 wcpm (for foundational readers engaged with decodable texts) and scale up to 120 wcpm as students at the fourth-grade level read connected texts. The texts used for assessment should be at a student's independent reading level, which means they can accurately read 95% of the words in a text.

One consistently strong voice in the fluency arena, Kilpatrick, reminds practitioners that fluency can only follow proficiency in phonemic awareness and phonics. Fluency bridges from foundational skills to comprehension and is, therefore, the "gateway to comprehension" (Kilpatrick, 2015). As a result, the placement of fluency in the reading continuum is important. When beginning readers struggle with fluency, they should be directed back to more foundational skills practice.

How Exact Path Applies the Research on Reading Fluency

Because Exact Path uses regular progress monitoring assessments, it offers an accurate early warning system when learners are struggling with fluency lessons. Students are automatically placed into the precursor foundational skills following assessment if they fail to master their current skills.

The Exact Path fluency lessons offer several of the features of effective fluency instruction and practice. In early fluency learning modules, students are cued to use punctuation marks to help them read with expression and to read in a manner reflecting their conversational pace and expression. They are also coached with tips for reading difficult words. The reading is first
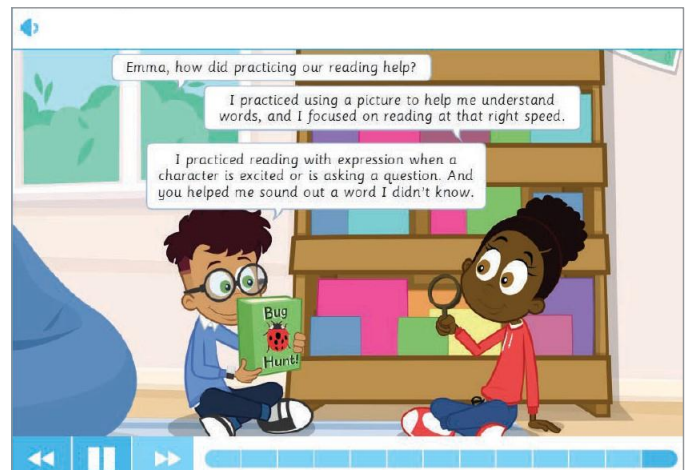

Figure 9. Exact Path characters have conversations that bring metacognitive skills to life for learners.

modeled, and then students are asked to read the same text alone. Once the independent reading is accomplished, the student is reminded of the helpful tips for fluent reading that have been applied.

In the instructional portions of later fluency models, students are cued to skim a text to determine what it is about, find unfamiliar words, and learn how to pronounce them. They are also coached to set a purpose for reading. Each of these skills is modeled by the characters in the learning models before they model applying fluency skills while reading the text. Finally, the characters remind students why engaging in multiple readings of the same text is helpful.

In the practice portions of the modules, students are given varied reading opportunities. For example, in the "Industrial Revolution" module, students continue reading additional texts with strong correlations to the model text on the same subject. They are asked to use the strategies modeled for them as they prepare to read and then to practice fluently reading these texts multiple times. They are cued up front and fully supported along the way.
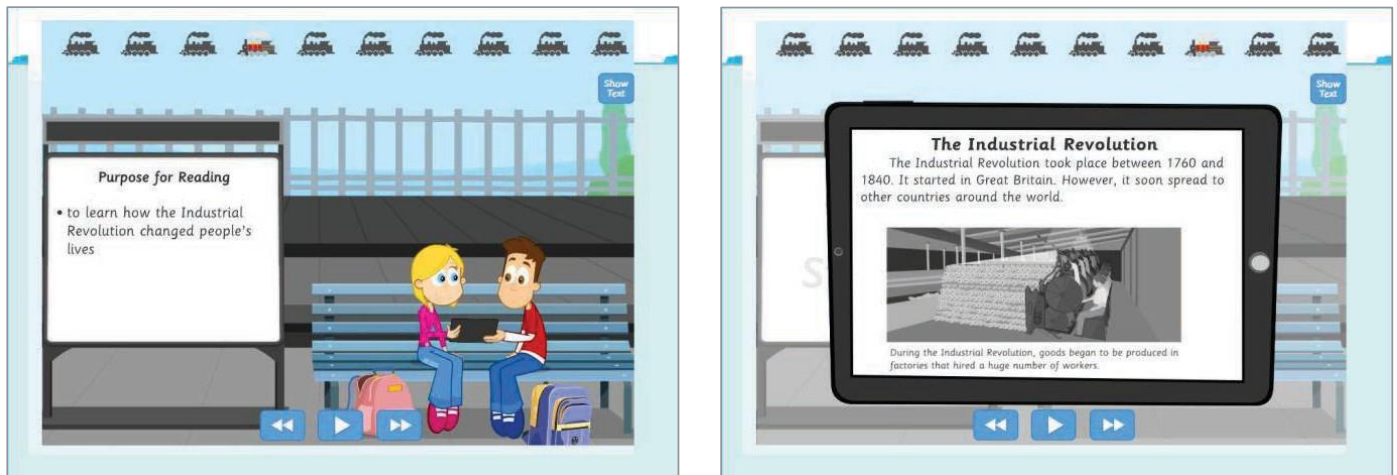

Figure 10. The Grade 5 "Industrial Revolution" module teaches research-based fluency skills.

Vocabulary

What the Research on Vocabulary Says

Just as fluency is a bridge between foundational skills and comprehension, increasing a student's vocabulary supports developing comprehension of increasingly complex texts. Why is that so? Knowing more words goes hand in hand with having a greater level of background knowledge—a critical component of reading comprehension.

At the same time, the more a student reads, the greater the opportunity for exposure to new words (Duff et al., 2015). So here we find ourselves in the "chicken and egg scenario." Should we give students more words in isolation, or should we have students read more to find new words? This is an instance when looking at meta-analyses of the wide range of vocabulary reading research work can help to provide an answer.

A recent meta-analysis of 36 studies showed two outcomes supported by evidence. The first is that teaching target words with texts supports comprehension of that text. Secondly, active engagement with the words has a greater impact on student learning than simply accessing definitions through reference material (Wright & Cervetti, 2016). So the evidence seems clear that the best vocabulary work for fluent readers is done during engagement with text.

Increasing research attention is being given to the idea that listening to texts is an important avenue for lifelong vocabulary gains. Within elementary classrooms, the value of reading aloud to students has long been understood. In a society that increasingly consumes information delivered orally via podcasts and other media, the topic deserves deep exploration.

How Exact Path Applies the Research on Vocabulary

Exact Path vocabulary lessons offer a balanced blend between morphological and word study contextualized in reading texts. Students dive deeply into word analysis skills to help them figure out unfamiliar words, but they are also helped to use context clues while reading to figure out the meanings of unknown words. Exact Path context clues learning modules offer both literary and informational texts, linked by theme. Explicit instruction is provided on context clues, then students apply it while reading texts.
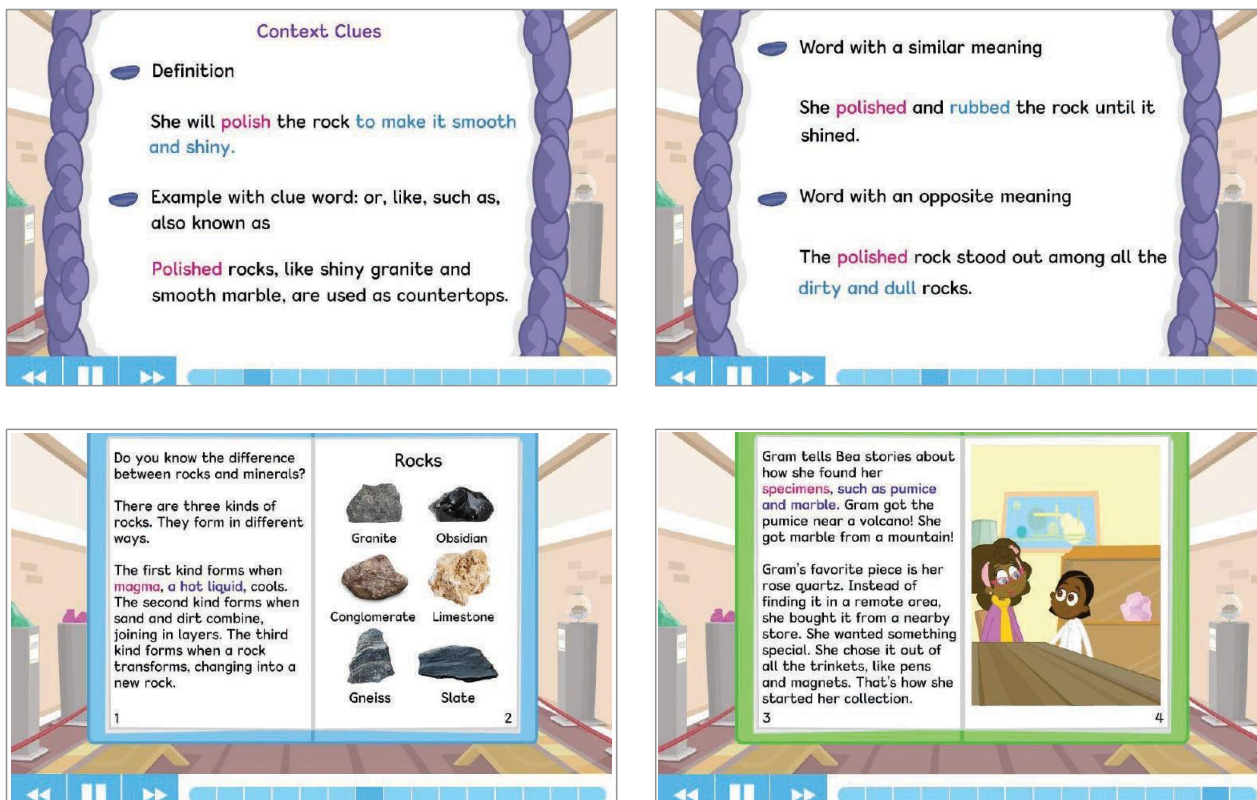

Figure 11a. The Grade 2 module "Context Clues Rock!" shows Exact Path's balanced approach to vocabulary development.
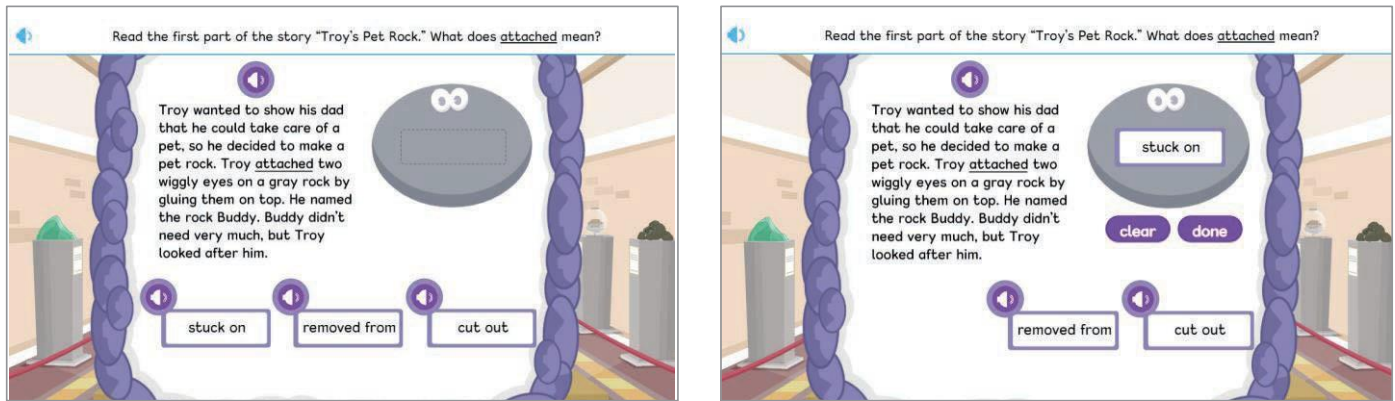
Figure 11b. In "Context Clues Rock!" students apply what they have learned while reading a text.

From Exact Path lessons like these, students learn more than the skills and strategies presented. They understand that they can learn exciting new words while reading and that they should not be deterred by encountering words they do not know.

Reading Comprehension

What the Research on Reading Comprehension Says

Reading comprehension is so complex that the educational field struggles to agree on a definition for it. The National Assessment of Educational Progress (NAEP) Reading Framework Committee did settle on this definition in 2009: "an active and complex process that involves understanding written text, developing and interpreting meaning, and using meaning as appropriate to type of text, purpose and situation" (U.S. Department of Education).

Due to the many components of and approaches to reading comprehension, each year the research in the field flourishes, making it difficult to stay abreast of the latest findings. Fortunately, regular efforts are made to synthesize the research and point to promising practices that help young readers become more successful at comprehending texts.

For example, at the end of the chapter "The Development of Children's Reading Comprehension" in the *Handbook of Research on Reading Comprehension*, Paris & Hamilton (2009) make practical suggestions about how to improve children's reading comprehension, based on the survey of research they present:

- Teach background knowledge.
- Teach text vocabulary in the context of larger ideas and themes.
- Teach comprehension strategies that lead to metacognition while reading.
- Engage and motivate children to read.

Exact Path

Following a broad survey of research, Elleman & Oslund (2019) make a similar summary statement about the conditions in which reading comprehension flourishes: "(a)n early and sustained focus on developing background knowledge, vocabulary, inference, and comprehension monitoring." McNamara & Kendeou (2011) drive home the important point that reading comprehension scaffolding is most important while *reading unfolds*. In other words, what is taught must be accessible during the act of reading.

Focusing on the role of technology in increasing students' reading comprehension ability, Waxman et al. (2003) conducted a meta-analysis to see the effects of digital instruction. They found that teaching and learning with technology has a small yet significant effect when compared to traditional instruction. Kamil & Chou (2009) state in their chapter of the *Handbook of Research on Reading Comprehension* that in general, technology has been effective in teaching reading comprehension skills focused on strategy and metacognition. This could be because technology allows assistance to occur in real time during the reading of a text.

How Exact Path Applies the Research on Reading Comprehension

Exact Path lessons provide reading comprehension strategy instruction followed by coaching during reading. To keep fluent learners engaged, Exact Path characters also converse about how they are applying the reading strategies, which offers strong modeling of metacognition.

Figure 12. In the kindergarten module "Question Time!" Exact Path characters ask and answer questions while reading a story

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Figure 13. In the Grade 5 module "Book Club Comparison" learners see how Exact Path characters model the use of a Venn diagram.

Learners are asked to apply comprehension skills during instructional modules and in a separate practice component with feedback. Exact Path keeps track of how students are performing as they answer questions and responds intelligently to determine how students should progress through a module and along their learning path.

As students move from the tutorial portion of a module to the practice component, the progression follows a gradual release methodology. The scaffolds of explicit instruction and modeling offered in the tutorial are systematically removed as students move through various types of practice, gradually shifting responsibility for learning and applying newly gained skills to the student.

> By building student independence, Exact Path supports students in learning to become independent readers. This follows the research showing that this type of skill and strategy instruction in comprehension gets the best results.

References

Adams, M.J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Biemiller, A. & Boote, C. (2006). An effective method for building meaning vocabulary in primary grades. *Journal of Educational Psychology 98(1)*, 44–62.

Blachman, B.A., Tangel, D.M., Ball, E.W. & Black, R. (2019, Spring). Combining phonological awareness and word recognition instruction. *Perspectives on Language and Literacy*.

Duff, D., Tomlin, J.B., & Catts, H. (2015). The influence of reading on vocabulary growth: A case for a Matthew effect. *Journal of Speech/Language, Hearing Research*, *58(3)*, 853–864.

Ehri, L.C. (2014). Orthographic mapping in the acquisition of sight word reading, spelling memory, and vocabulary learning. *Scientific Studies of Reading 18(1)*.

Ehri, L.C., Nunes, S.R., Willows, D.M., Schuster, B.V., Yaghoub-zadeh, Z., & Shanahan, T. (2001). Systematic phonics instruction helps students learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading*, *36*, pp. 250–287.

Elleman, A.M. & Oslund, E.L. (2019). Reading comprehension research: Implications for practice and policy. *Policy Insights from the Behavioral and Brain Sciences*, *(6)1*, 3–11.

Flynn, N., Powell, D., Stainthorp, R., & Stuart, M. (2021). Training teachers for phonics and early reading: Developing research-informed practice. *Journal of Research in Reading*, *44(2)*, 301–318.

Hasbrouck, J. & Tindal, G. (2006). Oral reading fluency norms: A valuable assessment tool for reading teachers. *The Reading Teacher*, *59(7)*, 636–644.

Israel, S.E. & Duffy, G.G., eds. (2009). *Handbook of Research on Reading Comprehension*. New York: Routledge.

Kilpatrick, D.A. (2015). *Assessing, preventing, and overcoming reading difficulties*. Hoboken, NJ: John Wiley & Sons.

Kirby, J.R., Deacon, S.H., Bowers, P.N., Izenberg, L., Wade-Woolley, L. & Parrila, R. (2012). Children's morphological awareness and reading ability. *Reading and Writing*, *25(2)*, 389–410.

Lee, J. & Yoon Yoon, S. (2015). The effects of repeated reading on reading fluency for students with reading disabilities: A meta-analysis. *Journal of Learning Disabilities*, *50(2)*, 213–224.

Lefebvre, P., Trudeau, N., & Sutton, A. (2011). Enhancing vocabulary, print awareness and phonological awareness through shared storybook reading with low-income preschoolers. *Journal of Early Childhood Literacy*, *11(4)*, 453–479.

Liao, C.N., Chang, K.E., Huang, Y.C., & Sung, Y.T. (2020). Electronic storybook design, kindergartners' visual attention, and print awareness: An eye-tracking investigation. *Computers & Education*, *144*, 103703.

McArthur, G., Castles, A., Kohnen, S., Larsen, L., Jones, K., Anandakumar, T. & Banales, E. (2015). Sight words and phonics training in children with dyslexia. *Journal of Learning Disabilities*, *48(4)*, 391–407.

McNamara, D.S. & Kendeou, P. (2011). Translating advances in reading comprehension research to educational practice. *International Electronic Journal of Elementary Education*, *4(1)*, 33–46.

Mesmer, H.A.E. & Griffith, P.L. (2005). Everybody's selling it—But just what is explicit, systematic phonics instruction? *The Reading Teacher*, 59, 366–376.

Moats, L. (2009). Knowledge foundations for teaching reading and spelling. *Reading and Writing*, *22*, 379–399.

Moats, L. (2010). *Speech to Print*. Baltimore, MD: Paul H. Brookes.

Morgan, P., Sideris, G., & Hua, Y. (2012). Initial and over-time effects of fluency interventions for students with or at risk for disabilities. *The Journal of Special Education*, *46(2)*, 94–116.

Padeliadu, S. & Giazitzidou, S. (2018) A synthesis of research on reading fluency development: Study of eight meta-analyses. *European Journal of Special Education Research*, *3(4)*, 247–248.

Paris, S.G. (2005). Reinterpreting the development of reading skills. *Reading Research Quarterly*, *40(2)*, 184–202.

Shamir, A. & Shlafer, I. (2011). E-Books effectiveness in promoting phonological awareness and concept about print: A comparison between children at risk for learning disabilities and typically developing kindergarteners. *Computers & Education*, *57(3)*, 1989–1997.

Stevens, E.A., Walker, M.A., & Vaughn, S. (2016). The effects of reading fluency interventions on the reading fluency and reading comprehension performance of elementary students with learning disabilities: A synthesis of the research from 2001 to 2014. *Journal of Learning Disabilities*, *50(5)*, 576–590.

Torgerson, C., Brooks, G., & Hall, J. (2006). *A systematic review of the research literature on the use of phonics in the teaching of reading and spelling* (Research Report RR711). U.K. Department for Education and Skills.

U.S. Department of Education (2009). *Reading framework for the 2009 National Assessment of Educational Progress*. Washington, D.C. https://www.nagb.gov/content/dam/nagb/en/documents/publications/frameworks/reading/2009-reading-framework.pdf

Waxman, H., Lin, M., & Michiko, G. (2003). A meta-analysis of the effectiveness of teaching and learning with technology on student outcomes. Naperville, IL: Learning Point Associates.

Wright, T.S. & Cervetti, G.N. (2017). A systematic review of the research on vocabulary instruction that impacts text comprehension. *Reading Research Quarterly*, *52(2)*, 203–226.

Yang, J. (2006). *A Meta-Analysis of the Effects of Interventions to Increase Reading Fluency Among Elementary School Students*. Tennessee: Graduate School of Vanderbilt University.