WHAT WORKS CLEARINGHOUSE™

Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade

ies NATIONAL CENTER FOR
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Institute of Education Sciences

About this practice guide

The Institute of Education Sciences (IES) publishes practice guides in education to provide educators with the best available evidence and expertise on current challenges in education. The What Works Clearinghouse (WWC) develops practice guides in conjunction with an expert panel, combining the panel's expertise with the findings of existing rigorous research to produce specific recommendations for addressing these challenges. The WWC and the panel rate the strength of the research evidence supporting each of their recommendations. See Appendix A for a full description of practice guides.

The goal of this practice guide is to offer educators specific, evidence-based recommendations for teaching foundational reading skills to students in kindergarten through 3rd grade. This guide is a companion to the existing practice guide, *Improving Reading Comprehension in Kindergarten Through 3rd Grade*, and as a set, these guides offer recommendations for preparing students to be successful readers. Both guides recommend some practices that can and should be implemented beginning in kindergarten, and both guides also suggest some instructional practices that can be implemented after students have mastered early reading skills. This guide synthesizes the best available research on foundational reading skills and shares practices that are supported by evidence. It is intended to be practical and easy for teachers to use. The guide includes many examples in each recommendation to demonstrate the concepts discussed.

Practice guides published by IES are available on the WWC website at http://whatworks.ed.gov.

How to use this guide

This guide provides teachers, reading coaches, principals, and other educators with instructional recommendations that can be implemented in conjunction with existing standards or curricula and does not recommend a particular curriculum. Teachers can use the guide when planning instruction to support the development of foundational reading skills among students in grades K–3 and in diverse contexts.

Professional-development providers, program developers, and researchers can also use this guide. Professional-development providers can use the guide to implement evidence-based instruction and align instruction with state standards or to prompt teacher discussion in professional learning communities. Program developers can use the guide to create more effective early-reading curricula and interventions. Finally, researchers may find opportunities to test the effectiveness of various approaches to foundational reading education and explore gaps or variations in the reading-instruction literature.

Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade

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Introduction

Introduction to the *Foundational Skills to Support Reading for Understanding in Kindergarten Through 3rd Grade* Practice Guide

Achieving high levels of literacy among young readers continues to be a challenge in the United States. In 2013, only 35 percent of 4th-graders scored at or above a proficient level on the National Assessment of Educational Progress—numbers that have remained largely unchanged since 1992.[1]

To develop literacy, students need instruction in two related sets of skills: foundational reading skills and reading comprehension skills. This What Works Clearinghouse (WWC) practice guide focuses on the foundational reading skills that enable students to read words (alphabetics), relate those words to their **oral language**, and read **connected text** with sufficient accuracy and **fluency** to understand what they read. This practice guide, developed by a panel of experts comprised of researchers and practitioners, presents four recommendations that educators can use to improve literacy skills in the early grades. These recommendations are based on the best available research, as well as the experience and expertise of the panel members.

> See the Glossary for a full list of key terms used in this guide and their definitions. These terms are **bolded** when first introduced in the guide.

Overarching themes

This guide provides teachers, reading coaches, principals, and other educators with actionable recommendations for developing the foundational reading skills of students in kindergarten through 3rd grade. This guide might also be relevant for educating older students who need reading remediation. Each recommendation provides instructional advice on a specific topic; together, the four recommendations presented in this practice guide highlight three interrelated themes for improving instruction in foundational reading skills.

- **Reinforcing the effectiveness of instruction in alphabetics, fluency, and vocabulary.** In a seminal report, the National Reading Panel (NRP) found strong evidence for the benefits of instruction in alphabetics, fluency, and vocabulary in studies conducted up to the year 2000.[2] Because the NRP's approach, study sources, and use of methodological standards are similar to those of the WWC, the panel determined that a review of research prior to 2000 would likely replicate much of the work of the NRP and reach similar conclusions. This practice guide reviews research published since 2000 and finds new evidence supporting instruction in alphabetics, fluency, and **vocabulary**, as well as new evidence supporting instruction in additional skills.[3] Using this updated evidence base, this guide provides detailed guidance to educators on how to implement these evidence-based practices.

- **Providing instruction in broad oral language skills.** This guide recommends expanding on the NRP report—which only addressed vocabulary—and instructing students in a range of oral language skills, specifically **inferential** and **narrative language** and **academic vocabulary**, which prepare students to read and communicate formal language.

- **Integrating all aspects of reading instruction.** The panel believes that the recommended activities should be part of an integrated approach to foundational reading instruction. For example, as soon as students can **decode** simple words (Recommendation 3), they should have opportunities to practice reading new and familiar words or word parts in connected

text (Recommendation 4). The panel recommends integrating the recommendations based on their expertise and the studies reviewed. Specifically, although no studies directly tested the effects of integrating the recommendations, 25 studies that meet WWC design standards had interventions that did integrate activities from multiple recommendations (see Table D.3).

Overview of the recommendations

1. **Teach students academic language skills, including the use of inferential and narrative language, and vocabulary knowledge.**

   1. Engage students in conversations that support the use and comprehension of inferential language.
   2. Explicitly engage students in developing narrative language skills.
   3. Teach academic vocabulary in the context of other reading activities.

2. **Develop awareness of the segments of sounds in speech and how they link to letters.**

   1. Teach students to recognize and manipulate segments of sound in speech.
   2. Teach students letter–sound relations.
   3. Use word-building and other activities to link students' knowledge of letter–sound relationships with phonemic awareness.

3. **Teach students to decode words, analyze word parts, and write and recognize words.**

   1. Teach students to blend letter sounds and sound–spelling patterns from left to right within a word to produce a recognizable pronunciation.
   2. Instruct students in common sound–spelling patterns.
   3. Teach students to recognize common word parts.
   4. Have students read decodable words in isolation and in text.

5. Teach regular and irregular high-frequency words so that students can recognize them efficiently.
6. Introduce non-decodable words that are essential to the meaning of the text as whole words.

4. **Ensure that each student reads connected text every day to support reading accuracy, fluency, and comprehension.**

   1. As students read orally, model strategies, scaffold, and provide feedback to support accurate and efficient word identification.
   2. Teach students to self-monitor their understanding of the text and to self-correct word-reading errors.
   3. Provide opportunities for oral reading practice with feedback to develop fluent and accurate reading with expression.

Summary of supporting research

Practice guide staff conducted a thorough literature search, identified studies that met protocol requirements, and then reviewed those studies using the WWC group design standards. This literature search focused on studies published since 2000 (that is, studies published after the NRP's systematic review of reading research).[4] Each recommendation is assigned a level of evidence that indicates the quality and quantity of evidence published since 2000 that assessed the effectiveness of the practices outlined in the recommendation.

A search for literature related to foundational reading instruction published between 2000 and 2014 yielded more than 4,500 citations. These studies were screened for relevance according to eligibility criteria described in the practice guide protocol.[5] Studies that included populations of interest, measured relevant outcomes, and assessed the effectiveness of replicable practices used to teach foundational reading skills were included. Of the eligible studies, 235 studies were reviewed using WWC

The **level of evidence** assigned to each recommendation indicates the strength of the evidence for the effect of the practices on student achievement, based on studies published since 2000.

group design standards. From this subset, 56 studies met the WWC's rigorous group design standards, were relevant to the panel's recommendations, and affect the level of evidence. Studies were classified as having a positive or negative effect when the result was

either statistically significant (unlikely to occur by chance) or substantively important (producing considerable differences in outcomes).

The evidence level for each recommendation is based on an assessment of the relevant evidence supporting each recommendation. Table I.1 shows the level of evidence rating for each recommendation as determined by WWC guidelines outlined in Table A.1 in Appendix A. (Appendix D presents more information on the body of research evidence supporting each recommendation.)

Table I.1. Recommendations and corresponding levels of evidence

	Levels of Evidence		
Recommendation	**Strong Evidence**	**Moderate Evidence**	**Minimal Evidence**
1. Teach students academic language skills, including the use of inferential and narrative language, and vocabulary knowledge.			◆
2. Develop awareness of the segments of sounds in speech and how they link to letters.	◆		
3. Teach students to decode words, analyze word parts, and write and recognize words.	◆		
4. Ensure that each student reads connected text every day to support reading accuracy, fluency, and comprehension.		◆	

How to use this guide

This guide provides teachers, reading coaches, principals, and other educators with instructional recommendations that can be implemented in conjunction with existing standards or curricula and does not recommend a particular curriculum. Teachers can

use the guide when planning instruction to support the development of foundational reading skills among students in grades K–3 and in diverse contexts.

The guide can also be useful to professional-development providers, program developers, and researchers. Professional-development

providers can use the guide to implement **evidence-based** instruction and align instruction with state standards or to prompt teacher discussion in professional-learning communities. Program developers can use the guide to create more-effective early-reading curricula and interventions. Finally, researchers may find opportunities to test the effectiveness of various approaches to foundational reading education and explore gaps or variations in the reading-instruction literature.

The panel believes that the recommendations should be implemented in the basic sequence in which they are presented, with adjustments based on students' abilities and needs. Figure I.1 illustrates the panel's suggested timeline for teachers to implement the recommendations in grades K–3. Teachers should implement Recommendation 1 beginning in kindergarten and continuing through 3rd grade. The panel believes that teachers should implement the relevant parts of Recommendations 2 and 3 based on the abilities and reading level of their students, recognizing that some parts of the recommendations apply to students in the early stages of reading acquisition, while others apply to students that are more advanced.

Figure I.1. Timeline for use of recommendations across grades K–3

Grade K	Grade 1	Grade 2	Grade 3
Recommendation 1			
Recommendation 2			
		Recommendation 3	
		Recommendation 4	
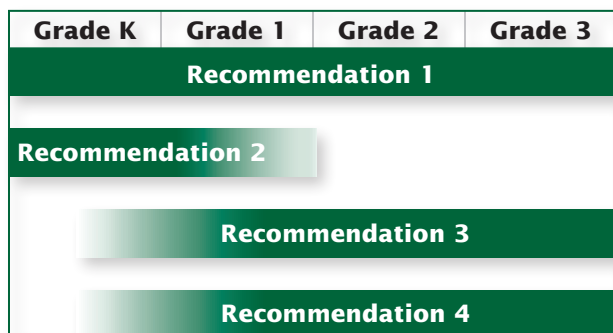
The figure does not mean that students need to master the activities in Recommendation 2 before beginning the activities in Recommendation 3. The recommendations address different aspects of foundational reading skills, and teachers may implement different parts of Recommendations 2 and 3 at

the same time, especially as students master the alphabetic principle. Likewise, teachers should assess when their students are ready to advance to new material; this may mean that some teachers implement recommendations earlier or later than others. The panel believes that teachers should initiate Recommendation 4 as soon as students can read a few words and use it as needed throughout reading instruction. The guide includes examples to illustrate how to adapt the activities in Recommendations 1 and 4 for different grades.

Alignment with existing practice guides

This practice guide is a companion to another WWC practice guide that focuses on **reading comprehension**—deriving meaning from the words, sentences, and paragraphs read—in the primary grades: *Improving Reading Comprehension in Kindergarten Through 3rd Grade*.[6] Like that practice guide, this guide provides recommendations intended to describe the essential components of good classroom instruction for English-speaking general education students and provide teachers with deep knowledge and shared understanding of these critical components.

English learners (ELs) and students with disabilities have distinct needs and are the focus of other practice guides[7] (studies reviewed for this guide had samples that were fewer than half ELs or students with an identified disability). However, the panel considers the recommendations in this guide to be relevant to these populations and knows of no evidence to the contrary. Furthermore, the *Teaching Academic Content and Literacy to English Learners in Elementary and Middle School*[8] practice guide finds evidence supporting a recommendation to teach academic vocabulary to English learners that is similar to Recommendation 1 of this guide. The panel also recognizes that elementary reading teachers may seek recommendations related to reading comprehension, writing instruction, or the use of ongoing assessments to

monitor student progress and identify instructional needs. The following practice guides provide content related to these populations, skills, and tools:

- *Improving Reading Comprehension in Kindergarten Through 3rd Grade*, a companion to the current guide, offers five recommendations to help educators improve the reading comprehension skills of students in kindergarten through grade 3.

- *Teaching Elementary School Students to Be Effective Writers*[9] offers four recommendations on writing instruction for students in kindergarten through grade 6.

- *Teaching Academic Content and Literacy to English Learners in Elementary and Middle School*[10] provides four recommendations on what works for English learners during reading and content-area instruction.

- *Assisting Students Struggling with Reading: Response to Intervention (RtI) and Multi-Tier Intervention in the Primary Grades*[11] offers five recommendations to help educators identify struggling readers and implement strategies to support their reading achievement.

- *Using Student Achievement Data to Support Instructional Decision Making*[12] includes guidance on the use of ongoing assessment to understand students' abilities and shape instruction.

Teach students academic language skills, including the use of inferential and narrative language, and vocabulary knowledge.

Academic language is a critical component of oral language. **Academic language skills** include the following abilities (see Example 1.1 for an explanation of each):

Implementation Timeline

Grade K	Grade 1	Grade 2	Grade 3
Recommendation 1			

- articulating ideas beyond the immediate context (inferential language)
- clearly relating a series of events, both fictional and nonfictional (narrative language)
- comprehending and using a wide range of academic vocabulary and grammatical structures, such as pronoun references

Students who enter kindergarten with limited academic language skills typically lag behind their peers in reading.[13] Academic language skills enable students to understand the formal structures and words found in books and school. Academic language includes words and structures that are common across subjects and unique to individual subjects. While students typically develop social language skills naturally—those used to communicate informally with family and friends—academic language skills usually require instruction. By guiding students to develop their academic language skills, teachers can mitigate some of the challenges that students encounter when learning to comprehend text.

Students of all ages and text-reading abilities need to engage in activities that purposefully develop academic language skills. Inferential language instruction supports students' ability to think analytically and to understand text that connects ideas from multiple contexts. Students with more advanced narrative language skills can follow increasingly intricate series

Example 1.1. Academic language skills

Academic language
the formal communication structure and words
that are common in books and at school

Academic language skills
the skills that enable students to use
and comprehend academic language

Inferential language skills
the ability to discuss topics
beyond their
immediate
context

Narrative language skills
the ability to clearly
relate a series of events

**Academic vocabulary
knowledge** the ability to
comprehend and use words
and grammatical structures
common to formal writing

*of events, such as stories, historical events, phenomena in nature, and instructions. The
panel encourages teachers to use a variety of texts, including* **informational texts***, during
activities involving academic language skills.*

The vocabulary activities in Recommendation 1 are similar to Recommendation 1 in the
Teaching Academic Content and Literacy to English Learners in Elementary and Middle
School *practice guide, to "teach a set of academic vocabulary words intensively across
several days using a variety of instructional activities."[14] Both emphasize the need to focus
on words that are common across subject areas and to reinforce the learning throughout
the day and week. The guidance for teaching academic vocabulary to English learners also
focuses on engaging students in discussions, similar to the first and second components of
Recommendation 1 in this guide, related to teaching inferential and narrative language.
However, this guide provides detailed instructions and examples to teach students narrative
and inferential language, and how to reinforce those skills. This guide also addresses the
need to explicitly teach students grammar rules common in formal settings.*

Summary of evidence: Minimal Evidence

Seven studies that examined interventions
teaching students inferential language and
vocabulary meet WWC group design stan-
dards and include a relevant outcome (see
Appendix D).[15] Three studies found that the
recommended practices had positive effects
on vocabulary outcomes (aligned with the
third component of Recommendation 1),[16] and
three studies found no discernible effects on
vocabulary outcomes.[17] Two of the studies
that found positive effects meet WWC group
design standards without reservations.[18] The
three studies that found positive effects were
implemented in the United States during
scheduled classes with students in kinder-
garten through 2nd grade; two of the studies
examined general education students,[19] and
one included students at risk for reading
difficulties.[20] These three studies compared
students receiving the intervention to students

receiving regular classroom instruction. All four studies examining **listening comprehension** outcomes found no discernible effects.[21] No study that meets WWC group design standards examined effects on **syntax** outcomes. Overall, the body of evidence indicated positive but inconsistent findings for vocabulary outcomes, no discernible effects for listening comprehension outcomes, and no findings on syntax outcomes. Therefore, the panel and staff assigned a *minimal* level of evidence to Recommendation 1.

How to carry out the recommendation

1. Engage students in conversations that support the use and comprehension of inferential language.

Develop students' inferential language—such as predicting, problem-solving, hypothesizing, or contrasting—with conversations before, during, and after read-alouds or other activities.[22] These conversations should engage students in higher-level thinking that encourages using inferential language.[23] Use open-ended questions to challenge students to think about the messages in both narrative and informational texts and how those messages apply to the world around them, by connecting events to

> **Inferential language** focuses on topics removed from the here and now.

their own lives, hypothesizing causal relationships, or solving problems (see Example 1.2).[24] As students progress, ask increasingly complex questions, such as why an author used a certain metaphor, to encourage them to think critically and use inferential language.

Example 1.2. Inferential language discussion prompts

Informational Text	Narrative Text
• Why do birds fly south for winter? • What would happen if you planted a tree in the desert? • Why is it important to recycle? • How can we encourage people to recycle?	• Why did the character do what he or she did? • What else could he or she have done? • What would you have done in that situation? • Can you imagine facing a similar problem today?

Teachers should first **model** how to provide reasoned answers that fully address the questions and illustrate critical thinking.[25] Prompt students to include additional detail, to connect the targeted idea and their response, and to answer with general statements that are not tied to the specific characters, events, or facts presented in the text (see Example 1.3). A prompt might include the question, "Why do you think that?" Similarly, if the teacher asks, "Why do birds fly south for the winter?" and a student responds, "It's cold," the teacher can encourage the student to restate the question and answer in a full sentence, such as, "Birds fly south for the winter because it is cold." As students' skills develop, they can engage in small-group conversations, with a designated student as the conversation leader.[26]

Example 1.3. Using inferential language in a read-aloud conversation

Teacher: This book is about cheetahs. Cheetahs are a kind of cat; they are actually a type of wild cat. Wild cats are different from the cats we have as pets in our homes.

Student 1: I have a cat.

Teacher: Is your cat a wild cat or a pet?

Student 1: She's my pet.

Teacher: Yes, if your cat lives in your house she is a pet. How would you describe your cat?

Student 1: She is gray. She is nice and soft.

Teacher: Okay, so you would describe your cat as gray, nice, and soft. Can you put the question and the answer together in one sentence? The question was "How would you describe your cat?" so your answer should start with, "I would describe…"

Student 1: I would describe my cat as gray, nice, and soft, and she likes to catch birds.

Teacher: Well, that is one way wild cats are similar to pet cats we have at home. They both like to catch things. What are some ways wild cats might be different from cats that are our pets?

Student 2: Wild cats are wild.

Teacher: Well, that's true. What makes wild cats seem wild?

Student 2: You can't pet them.

Teacher: Can you put the question and the answer together in one sentence? The question was, "What makes wild cats seem wild?"

Student 2: Wild cats seem wild because you can't pet them.

Teacher: Good!

Student 1: And they don't eat cat food. And they probably don't live inside.

Teacher: Exactly. Wild cats are wild! As wild animals, they don't like human contact, they catch their own food, and they live in the wild.

2. Explicitly engage students in developing narrative language skills.

Beginning readers need to develop narrative language skills to understand text and engage in discussions that extend across multiple sentences.[27] Narrative language refers to creating or understanding a fictional or real account of an experience or occurrence, such as how a caterpillar becomes a butterfly. Narrative language skills include the ability to organize information in a logical sequence, as well as connect that information using appropriate complex grammatical structures. Students can develop narrative language skills before and while they master basic text-reading skills.

Students need to learn complex grammatical structures and the specific elements of narrative language that are used to describe experiences or events. Example 1.4 presents several complex grammatical structures that the panel recommends teaching to students in kindergarten through 3rd grade. Teachers are encouraged to identify and teach additional complex grammatical structures if students are ready. The specific elements of narrative language include components of story grammar (characters, setting, plot, etc.) and components of linguistic structure (shown in Example 1.5). Along with complex grammatical

Example 1.4. Complex grammatical structures

Structure	Description	Example
Compound sentence	two complete, related thoughts, joined by a coordinating conjunction	*My favorite food is pizza, and my favorite pizza topping is pepperoni.*
Subordinate clause	a clause, beginning with a subordinating conjunction, that supplements an independent clause and cannot stand on its own	*We'll use the computers **when we finish the science project**.*
Adverbial clause	a subordinate clause that modifies a verb, adjective, or adverb	*I ran **as fast as I could**.*
Prepositional phrase	a phrase beginning with a preposition to demonstrate a relationship such as location or manner	*My pencil is **under the table**.*

Example 1.5. Elements of linguistic structure

Element	Description	Examples
Connectives	using conjunctions, adverbs, and other devices to create connections between parts of a narrative	***because**, **but then**, **later**, **instead**, **suddenly***
Noun phrases	using noun phrases (e.g., article + adjective + noun) for precise descriptions	***My brother's friend** ate **all the chocolate-chip cookies**!*
Verb phrases	inflecting verbs to denote the timing of events	*She **ran** to school. She **will ride** the bus home.*
Pronoun references	providing clear references to pronouns	***Tommy** was sick, so **his** mom made soup with **her** brand-new pot.*

structures, elements of linguistic structure and elements of story grammar contribute to both oral and reading comprehension. They are common deficits among K-3 students with below-average oral language abilities, but are not frequently addressed explicitly in early reading instruction.

Teach beginning readers complex grammatical structures and key elements of narrative language during whole-class or small-group lessons.[28] Introduce students to each new element or structure, model how to use the element to connect and expand ideas, and then provide continued opportunities for students to practice using the new elements. Support students' use by **scaffolding** their responses.[29] Initially, teachers might need

to prompt students to use a given narrative language structure and provide additional modeling. As students become more comfortable with the given element, they will require fewer prompts and modeling and will begin using the narrative structures or elements independently. Some elements and structures will present more challenges to students than others.

Engage students in the use of narrative language through activities that ask them to predict or summarize a story or factual information, or develop detailed descriptions.[30] For example, teachers can have students

- predict actions in the text based on the title and/or images if they have sufficient prior knowledge of the story context[31]

- discuss their earlier predictions and why they did or did not come true

- describe the scene in a picture in increasing detail or describe a scene for a partner to illustrate

- explain how to do something they enjoy, like shooting hoops

- identify when a given element is used in read-alouds

- summarize stories or factual information using a graphic organizer[32]

- summarize or relate the main idea, events, or other specific details of a passage[33]

When providing instruction in the elements of story grammar, the panel recommends first explaining how to organize a good summary and then providing scaffolding as students begin the activity. Initially, prompt students to include each element of the story in their summaries and to connect them appropriately. Gradually reduce prompts for specific story elements, and instead prompt students to draw on their knowledge of how to produce a summary. Finally, only prompt students if they omit important information from the summary.[34]

Have students complete these activities in small groups or pairs.[35] For example, students can form pairs in which one student summarizes a story and the other amends the summary with any missing story elements. Challenge students to present logically ordered predictions, to explain why they are making any predictions, and to include as many of the important components of the story as possible. The panel encourages teachers to have students connect their responses to events in the story in a logical manner to practice as many narrative and linguistic structures as possible to develop their narrative language skills.

The *Improving Reading Comprehension in Kindergarten Through 3rd Grade* practice guide provides additional information on how to teach text structure in both narrative and informational texts.[36]

3. Teach academic vocabulary in the context of other reading activities.

Academic vocabulary consists of words that are common in writing and other formal settings and that students need to learn to understand written text. They include words that frequently appear in instructions for assignments and activities across subject areas, such as *listen*, *group*, *locate*, *define*, *select*, *contrast*, *estimate*, and *concentrate*. Academic vocabulary can also include syntax (grammatical rules) uncommon in speech, such as the phrase *away they went*.

Introduce students to academic vocabulary that is relevant in many subject areas, including words or grammatical rules that support content that students are reading or learning.[37] The panel suggests that schools or grade-level teams develop a common set of vocabulary words that align with reading selections and curriculum standards for the year. Appropriate words are those that will occur frequently throughout the school year and in a variety of contexts and are likely unfamiliar to most students.[38] The common set of words can draw on lists of academic vocabulary and common root words.[39]

Each week, select a small group of words or grammatical rules to teach that are included in texts that students will hear or read.[40] The number of words or rules should depend on their complexity and student needs. Teach these words, phrases, and grammatical rules explicitly. When introducing a new word or phrase, provide a clear and concise definition that primary-grade students will understand, and then give an example of meaningful, supportive sentences that include the word.[41]

Alternatively, read the sentence with the new vocabulary word, and then replace the word in the sentence with its definition.[42] See Example 1.6 for an illustration of these activities.

After introducing students to new words, encourage deeper understanding by providing extended opportunities for them to use and discuss the words.[43] Activities that support deeper understanding allow students to

- make connections between a new vocabulary word and other known words

- relate the word to their own experiences

- differentiate between correct and incorrect uses of the word

- generate and answer questions that include the word[44]

Finally, ensure that students encounter new academic vocabulary words or phrases in many different contexts throughout the day and year.[45] Expose students to these words during read-alouds and classroom discussions in language-arts instruction as well as in other contexts, such as science experiments and math word problems.[46] Review new vocabulary words regularly, incorporate them into conversations and writing assignments, and draw attention to the words when they appear in text.

Example 1.6. Academic vocabulary instruction

Before reading, a 2nd-grade teacher selects academic vocabulary, including the word *investigate*, from a biography of Marie Curie that will be read aloud to students. The teacher develops a student-friendly definition.

> *Investigate:* to try to find out the truth about something

The teacher reads, "Marie Curie decided to investigate the energy that came from a certain kind of rock called uranium."

The teacher then follows up by saying, "*Investigate* means 'to try to find out the truth about something.' So, Marie Curie decided to find out the truth about the energy that came from a certain kind of rock called uranium. She wanted to *investigate* this energy. Is there anything that you would like to *investigate*?"

After reading the text, the teacher talks about other things that scientists investigate and then asks students to relate the word to their own experiences by recording what they would like to investigate. Student responses are recorded in a graphic organizer titled "Things We Want to Investigate." The teacher encourages the students to use the word *investigate* in their answers.

Throughout the year, the teacher makes a point to continue using the word *investigate* in different contexts, for example, "Today in math we are going to *investigate* how to share things so that everyone has the same amount." The teacher also supports students in using the word *investigate*, for example, "It sounds like you are interested in finding out about dinosaurs. Can you use our new word *investigate* to talk about that?" The teacher corrects any incorrect uses of the word.

Potential obstacles to implementing Recommendation 1 and the panel's advice

Obstacle 1.1. *Students enter my classroom with a range of oral language skills, and some may not be ready to participate in academic language activities.*

Panel's Advice. Students with weaker oral language skills may be reluctant to participate in whole-class discussions, so differentiate instruction to support the oral language development of each student. For example, teachers can integrate academic language activities into small-group reading instruction, where they can more easily tailor instruction to students' particular needs. All students need to develop academic language skills and will benefit from a rich exposure to language.

Obstacle 1.2. *There is not enough time for language instruction.*

Panel's Advice. Teachers do not need to dedicate a block of time specifically to language instruction. Instead, the panel recommends integrating language instruction with other literacy instruction as part of the reading block. For example, teachers can build inferential and narrative discussions around already-scheduled read-aloud time. Teachers can also integrate language instruction into other content areas by using texts in science and social studies to foster rich discussions using inferential language and academic vocabulary.

Develop awareness of the segments of sound in speech and how they link to letters.

*The National Reading Panel (NRP) report found that teaching students to recognize and manipulate the **segments of sound** in words (also referred to as **phonological awareness**) and to link those sounds to letters is necessary to prepare them to read words and comprehend text.[47] Recent evidence reviewed for this guide supports the NRP's conclusion. The ability to isolate sounds and then link those sounds to letters will help students read about 70 percent of regular monosyllabic words, such as fish, sun, and eat.[48] The system for linking sounds to letters is referred to as the **alphabetic principle**.*

*To effectively decode (convert from print to speech) and **encode** (convert from speech to print) words, students must be able to[49]*

- *identify the individual sounds, or **phonemes**, that make up the words they hear in speech*
- *name the letters of the alphabet as they appear in print*
- *identify each letter's corresponding sound(s)*

*Teachers should begin the instruction described in this recommendation as soon as possible. These activities support students in breaking down the sounds within spoken language and then mapping individual sounds to printed letters. Once students know a few consonant and vowel sounds and their corresponding letters, they can start to sound out and **blend** those letters into simple words. The process of combining letters into simple words, common spelling patterns, and increasingly complex words is described in Recommendation 3.*

Implementation Timeline

Grade K	Grade 1	Grade 2	Grade 3
Recommendation 2			

Summary of evidence: Strong Evidence

Seventeen studies that examined interventions to help students develop awareness of segments of sound and letter–sound correspondence meet WWC group design standards and include a relevant outcome (see Appendix D).[50] All 17 studies found positive effects in letter names and sounds and/or **phonology** outcomes: 12 studies found positive impacts on phonology outcomes,[51] and nine studies found positive impacts on letter names and sounds outcomes.[52] Eight of the studies examined interventions implementing all three components of the recommendation,[53] with most of the other studies including two recommendation components. Twelve of the studies meet WWC group design standards

without reservations.[54] The studies included diverse American students in the relevant grades—kindergarten and 1st grade; six studies included students at risk for reading difficulties,[55] while 11 studies included readers at all levels.[56] Twelve of the studies implemented the interventions with groups of two to eight students[57] and supplemented regular literacy instruction. The studies typically compared students receiving the intervention to students receiving regular classroom instruction. Overall, the body of evidence consistently indicated that the practices outlined in this recommendation had positive impacts on students' knowledge of letter names and sounds and phonology. Therefore, the panel and staff assigned a *strong* level of evidence to Recommendation 2.

How to carry out the recommendation

1. Teach students to recognize and manipulate segments of sound in speech.

Teach students how to recognize that words are made up of individual sound units (phonological awareness).[58] Begin by introducing students to larger segments of speech (words) with which they will be more familiar, and gradually draw their attention to smaller and smaller sound segments. This will prepare them to learn about the individual sounds that letters represent (the second component of this recommendation describes how to carry this out) and then recognize those sounds and letters as they are used in words (see the third component of this recommendation).

The panel recommends first demonstrating that sentences can be broken into words and then that some words can be broken into smaller words. Have students practice identifying the unique words in sentences or compound words, as in Example 2.1.

Next, demonstrate how words can be broken into **syllables**.[59] Many students will start breaking down spoken sentences and words into syllables in preschool; others will need this instruction at the beginning of

kindergarten. Tell students what syllables are, and model how to identify them. Then have students practice identifying and manipulating syllables within familiar words by

- placing their hands on their chin and paying attention to the number of times their chin moves down as they say words slowly[60]

- holding up a finger for each syllable as they say a word[61]

- blending syllables articulated by the teacher into a word[62]

Once students can break words into syllables, teach them to recognize even smaller units within a syllable, called **onsets** and **rimes**.[63]

> Throughout the guide, /_/ is used to denote a particular sound. For example, "/c/" and "/ool/" indicate first the sound made by the *c* in the word *cool*, and then the sound made by the remaining letters.

Example 2.1. Sample activities to identify words

Identifying words in sentences[64]

Teacher: We talked about how you can combine multiple words to form a sentence. I'm going to say a sentence, and I want you to count the number of *words* in that sentence. Ready?

Students: Yes!

Teacher: The boy ate two pieces of pizza.

Student: Six?

Teacher: Close. Listen one more time. The boy ate two pieces of pizza.

Student: Seven!

Teacher: Correct! There are seven words in that sentence.

Building and dividing compound words[65]

Teacher: Sometimes you can put two words together to form another word. For example, if I put *straw* and *berry* together, I get *strawberry*. What do you get if you put *book* and *shelf* together?

Student: *Bookshelf.*

Teacher: That's right! You can also break some words into smaller words. What do you get if you take the *cow* out of *cowboy*?

Student: *Boy*?

Teacher: That's right!

An onset is the initial consonant, **consonant blend**, or **digraph** in a syllable (e.g., the /c/ in *cool*). The rime is the vowel and the remaining phonemes in that syllable (e.g., the /ool/ in *cool*). Focus students' attention on recognizing and manipulating the onsets and rimes by having students segment familiar one-syllable words into their onsets and rimes and manipulate the onsets or rimes to create new words.[66] Teachers can draw from a number of activities that have students practice identifying onsets and rimes. Example 2.2 illustrates some of these exercises.

Finally, teach students to isolate and manipulate individual phonemes, the smallest units of sound in a word.[67] Begin **phonemic-awareness** instruction by demonstrating how to isolate individual sounds in words and segment words into their component sounds with modeling and guided practice.[68] For initial lessons, use two- or three-phoneme words such as *dig*, *sun*, and *at*.[69]

Students can practice isolating the sounds in words by using **Elkonin sound boxes** and by sorting pictures. Students can use Elkonin boxes and colored discs or letter tiles to mark the unique sounds they hear in words (see Example 2.3).[70] Additionally, students can sort cards with pictures based on the beginning, middle, or ending sounds of the word each picture represents.[71]

Example 2.2. Sample activities for onset–rime awareness[72]

Day One: Assembling Words

Teacher: I'm going to say two parts of a word. Listen carefully. What word do you get when you put these two parts together: /c/ and /ool/?

Students: *Cool.*

Teacher: Very good!

Day Two: Rhyming

Teacher: (after explaining what a rhyme is) What word rhymes with *can*?

Students: *Man.*

Teacher: Good! Does *can* rhyme with *tan*?

Students: Yes.

Teacher: Correct! Does *can* rhyme with *hat*?

Students: No.

Teacher: Right! Which of these other words also rhyme with *can*? *Ban*, *cat*, *fan*, *plan*.

Students: *Ban*, *fan*, and *plan*.

Teacher: Exactly!

Day Three: Onset Matching

Teacher: I have pictures of four animals. What type of animal is this? (revealing an image of a duck)

Students: Duck.

Teacher: Right! What sound does this animal's name start with?

Students: /d/

Teacher: What is this animal's name? (revealing an image of a dog)

Students: Dog.

Teacher: Does this animal's name start with the same sound as *duck*?

Students: Yes!

Teacher: Good. What is this animal called? (revealing an image of a sheep)

Students: Sheep.

Teacher: Does this animal start with the same sound as *duck*?

Students: No.

Teacher: Correct! What sound does this start with?

Students: /sh/

Teacher: Right! Now how about this final animal: what is this animal's name? (revealing an image of a donkey)

Students: Donkey.

Teacher: Correct! Does it start with the same sound as *duck*?

Students: Yes!

Teacher: That's correct! *Duck*, *dog*, and *donkey* all begin with /d/. *Sheep* does not begin with /d/.

Example 2.3. Phonemic awareness using Elkonin sound boxes

Have students use sound boxes to mark the phonemes in selected two- or three-phoneme words. Provide each student with a set of boxes matching the number of phonemes in the selected word. Place either a colored disc or letter tile over each box, depending on their familiarity with printed letters. Tell students the first word. Have students repeat the word slowly, pulling one disc or letter tile down into the box for each unique sound that they say. Then, have students run their finger under the boxes from left to right as they blend the individual sounds together and say the word.

If students are using colored discs, try to select words (e.g., *fan*) featuring consonants that are produced by creating a continuous flow of sound (i.e., *f, h, l, m, n, r, s, v, z*). Words featuring **continuous sounds** are easier for students to elongate as they identify the unique sounds. The panel recommends using words with continuous sounds initially, until students are able to recognize the unique sounds in a word.

If students use letter tiles, select words that contain letter sounds students have already learned so that they will be successful in mapping the printed letter tiles to the sounds in the word used in the activity. Additionally, if students struggle to distinguish sounds, draw attention to specific sounds by presenting students with words that differ by only one phoneme, such as *dog* and *dig*.

Once students have learned to connect several sounds to print, repeat this exercise, having them write the corresponding letters in the boxes, rather than pulling down discs or letter tiles.
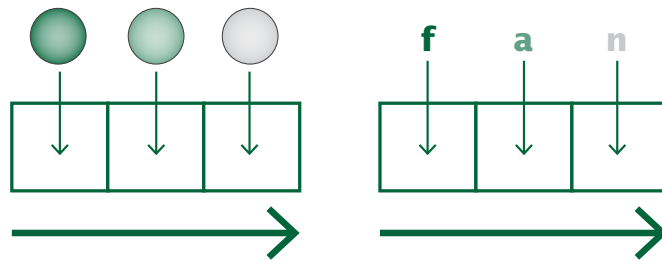
2. Teach students letter–sound relations.

Once students have learned to isolate phonemes in speech, teach students each letter of the alphabet and their corresponding sounds, working with a few phonemes at a time.[73] Many students enter kindergarten knowing the names of a few letters they have learned at home or in preschool, such as the letters in their name. The panel recommends building upon this foundation by reinforcing familiar letters and introducing new ones.

Present consonants and **short vowel** sounds represented by single letters first, since these appear frequently in words students will encounter in the early stages of reading. For example, the first group of phonemes taught could be /s/, /m/, /d/, /p/, /a/.[74]

The panel recommends next introducing consonant blends (e.g., *fl, sm, st*) and common two-letter consonant digraphs (e.g., *sh, th, ch*). Rather than asking students to memorize consonant blends as units, the panel recommends teaching each sound in a blend and then asking students to blend the sounds together. A digraph makes a single sound and must be taught as a unit. Then teach **long vowels** with **silent *e***, and finally two-letter vowel teams (vowel digraphs, e.g., *ea* and *ou*). Letters or letter combinations may correspond to multiple sounds; start with the most common sound each letter represents, and introduce each letter sound one at a time.

For each phoneme, begin by naming the letter or letters that represent the phoneme (e.g., *p* for /p/ or *s* and *h* for /sh/). Introduce the letters in both uppercase and lowercase.[75] Then, show a memorable picture of a familiar, regular word containing that phoneme (e.g., *pig*).[76] For each picture, the panel recommends telling the students a story that incorporates the corresponding sound of the letter, so that students remember the character and the sound when they see the letter in print (see Example 2.4). Say the sound that the phoneme makes in isolation, and have the students repeat that sound.

Finally, ensure that students have continued practice with the phoneme. Review the new letter sound together with a small group of previously learned letter sounds, and have students write the letters in meaningful contexts, such as writing their name or familiar words containing the letters, such as *mad* and *sad*.[77]

Example 2.4. Sample memorable picture and letter of the alphabet
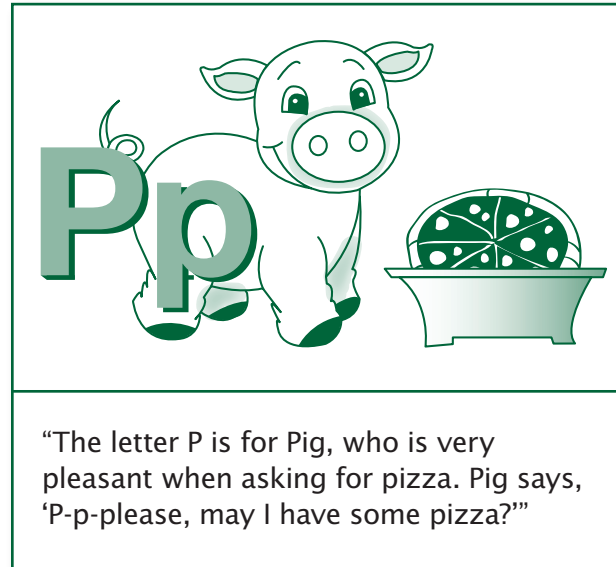
"The letter P is for Pig, who is very pleasant when asking for pizza. Pig says, 'P-p-please, may I have some pizza?'"

3. Use word-building and other activities to link students' knowledge of letter–sound relationships with phonemic awareness.

The final step in teaching students the alphabetic principle is connecting their awareness of how words are segmented into sounds with their knowledge of different letter–sound relationships.[78] This allows students to begin spelling and decoding words. Teachers can use Elkonin sound boxes with letter tiles and word-building activities for this instruction as soon as students have learned their first few letter sounds.

Use word-building exercises to enhance students' awareness of how words are composed and how each letter or phoneme in a word contributes to its spelling and pronunciation.[79] For example, provide students with a set of letter tiles or magnetic letters, and have them add or remove letters to create words or to change one word into a different word. Begin by modeling the activity and

working through a few examples with students as a group. Then, have students work independently to add single missing letters to build CVC (consonant-vowel-consonant) words first (e.g., adding *a* between *f* and *n* to create *fan*). Finally, engage students in advanced word-building activities that combine sound addition and sound substitution, as shown in Example 2.5.

Gradually include more advanced words in the activity as students become familiar with more advanced phonemic patterns, such as CVC words with a silent *e* (CVC*e*) or with two consonants for the initial or final sounds (CCVC and CVCC, respectively). For example, teachers can extend Example 2.5 to include instructions to make *cane* after *can*, *cart* after *cat*, or *flat* after *fat*.

Example 2.5. Advanced word-building

Provide students with letter tiles *f*, *a*, *t*, *c*, and *n*. Have them make the word *fat*, and then ask them to make other words by adding, moving, or replacing one letter tile at a time.

f	a	t	c	n

Teacher: Take the *f*, *a*, and *t* tiles and put them together so that the *f* is first, the *a* is in the middle, and the *t* is last. Does anyone know what the word is?

f	a	t

Student: *Fat.*

Teacher: Now, change a letter to make it say *fan*.

f	a	n

Teacher: Next, change a letter to make it say *can*.

c	a	n

Teacher: Now, make it say *cat*.

c	a	t

Teacher: Finally, make it say *fat* again.

f	a	t

Potential obstacles to implementing Recommendation 2 and the panel's advice

Obstacle 2.1. *Many students mix up letter shapes and sounds.*

Panel's Advice. Letter reversals (when students confuse the shape or sound of one letter for a different letter, such as confusing *d* for *b*) are common among children in the early grades. Focus on one letter at a time, teaching the first letter shape (e.g., *b*) in a variety of ways until the student can identify it instantly. Then, teach the student another letter or two, reviewing and reinforcing the first letter a bit longer. Finally, focus on the other letter (e.g. *d*) exclusively. After that, introduce both letters in different words to make sure students are recognizing each independently. For some children, particularly older students, continued problems with letter reversals can suggest disabilities or other reading challenges that require additional attention. If children continue to struggle with letter reversals, the panel recommends introducing a handwriting program. Handwriting programs focus students' attention and hand-eye coordination on the letter shape. See Recommendation 3 of the *Teaching Elementary School Students to Be Effective Writers* guide for more information about handwriting instruction.

Obstacle 2.2. *Some students have persistent problems with phonological awareness.*

Panel's Advice. Students who struggle persistently with phonological awareness often benefit from one-on-one or small-group intervention to help them isolate sounds in speech and link the sounds to letters. Early intervention can often remedy this phonological core deficit that otherwise may lead to deficiencies in single word decoding, which is a hallmark of reading disabilities or dyslexia.

Teach students to decode words, analyze word parts, and write and recognize words.

Once students know a few consonants and vowels, they can begin to apply their letter–sound knowledge to decode and read words in isolation or in connected text.[80] Students also need to learn how to break down and read

Implementation Timeline

Grade K	Grade 1	Grade 2	Grade 3
Recommendation 3			

*complex words by segmenting the words into pronounceable word parts. To do this, students must understand **morphology**, or the knowledge of the meaningful word parts in the language. Learning to recognize letter patterns and word parts, and understanding that sounds relate to letters in predictable and unpredictable ways, will help students decode and read increasingly complex words. It will also help them to read with greater fluency, accuracy, and comprehension.*

The more words students read and the more they learn sound–spelling patterns (groups of letters that represent a single sound, such as ph*) and word parts (letters or combinations of letters that appear in multiple words and hold a specific meaning, such as* -ing*), the more they will be able to recognize words in both familiar and unfamiliar contexts. Similarly, helping students to immediately recognize high-frequency words facilitates more fluent reading.[81] Increasing the ease of word recognition allows students to focus more on word meaning when they read, ultimately supporting reading comprehension.*

Teaching students to decode and recognize words and word parts was one of the effective instructional techniques identified by the National Reading Panel (NRP).[82] Recent compelling evidence reviewed for this practice guide supports the NRP's conclusions.

Summary of evidence: Strong Evidence

Eighteen studies that examined the effects of teaching students to decode words, analyze word parts, and write words meet WWC group design standards and include a relevant outcome (see Appendix D).[83] In total, 13 studies had positive effects on word reading and/or encoding outcomes:[84] 11 of these studies had positive impacts on word reading outcomes,[85] and four of these studies had positive impacts on encoding outcomes.[86] No study that meets WWC group design standards examined morphology outcomes.

The 13 studies that found positive effects contributed to the strong level of evidence.[87] Six of these studies examined interventions that aligned with five or six of the six components of Recommendation 3,[88] and an additional three studies were relevant to three or four of the components.[89] Seven of the studies meet WWC group design standards without reservations.[90] The studies included diverse student samples from kindergarten through 3rd grade; eight studies examined students at risk for reading difficulties,[91] and the other five studies included students of all ability levels.[92] Eight interventions were implemented in small groups of students,[93] four additional interventions examined one-on-one interventions,[94] and one intervention was implemented with the whole class.[95] About half of the studies implemented the interventions as supplements to regular literacy instruction, and all of the studies took place in schools. Overall, the body of evidence consistently indicated that the practices outlined in Recommendation 3 had positive effects on word reading and encoding outcomes for diverse students. Therefore, the panel and staff assigned a *strong* level of evidence to Recommendation 3.

How to carry out the recommendation

1. Teach students to blend letter sounds and sound–spelling patterns from left to right within a word to produce a recognizable pronunciation.

Teach students how to read a word systematically from left to right by combining each successive letter or combination of letters into one sound.[96] This is called **blending**. Start with simple consonant-vowel-consonant (CVC) words that are familiar to students. Demonstrate how to blend, and provide feedback as students begin to apply it independently.[97] Then, as students show progress in learning the skill, gradually progress to longer words and words that are new to the students.

Teachers can instruct students to blend either by **chunking** sounds or by **sounding out** each letter individually and then saying the sounds again quickly.

In the chunking approach, students combine the first and second letter sounds and letter–sound combinations (multiple letters producing one sound) and practice them as one chunk before adding the next sound to form another chunk. Students add each successive sound to the chunk they created just before it to build the complete word, as in Example 3.1.

> **Blending** is the process of reading a word systematically from left to right by combining each successive letter or combination of letters into one sound.
>
> **Chunking** is a type of blending in which students read the sounds from left to right but add each sound to the previous sound before going on to the next sound in the word.
>
> **Sounding out** a word is a type of blending that involves saying the sound of each letter or letter combination one by one until the end of the word, and then saying them all together again quickly.

Example 3.1. Blending *hat* by chunking and sounding out

Chunking	Sounding Out
Teacher: How does this word start?	**Teacher:** How does this word start?
Student: /h/	**Student:** /h/
Teacher: Then what's the next sound?	**Teacher:** Then what's the next sound?
Student: /a/	**Student:** /a/
Teacher: What sound do you get when you put those two together?	**Teacher:** And then what sound comes next?
Student: /ha/	**Student:** /t/
Teacher: And then what sound comes next?	**Teacher:** What happens when you put them together?
Student: /t/	**Student:** /h/ /a/ /t/
Teacher: What happens when you add /ha/ and /t/?	**Teacher:** What is the word?
Student: *Hat*!	**Student:** *Hat*!
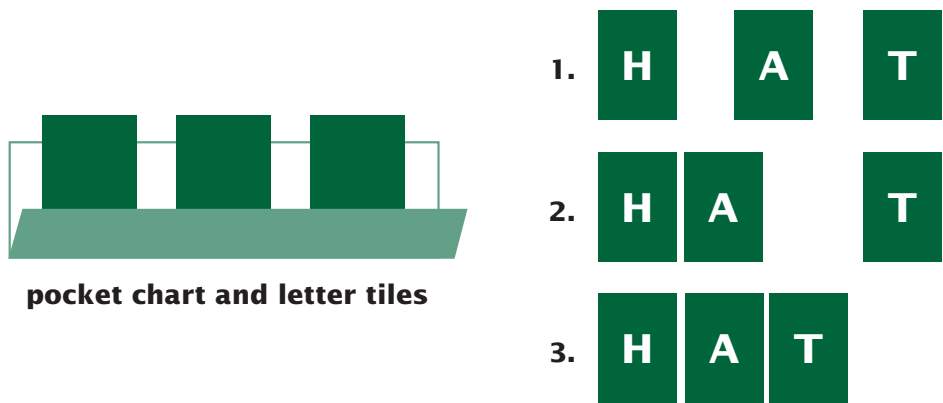
For the sounding-out approach to blending, demonstrate how to say each letter sound in a word, starting at the leftmost letter and moving right, and then join all the sounds together to form the word.[98] Teach students to "sound out smoothly," elongating and connecting the sounds as much as possible (e.g., /mmmaaannn/ rather than /m/.../a/.../n/). This will help students remember and combine the sounds to arrive at the correct word.

Another way to demonstrate chunking or sounding out is to use a pocket chart with letter tiles (see Example 3.2), magnetic letters, or an Elkonin sound box.[99] Space the letters out initially, and then move the tiles together as you read the word. Students can follow along with tiles on their desks.

Listen for students who add a strong schwa sound (/ə/, or "uh") after **stop sounds** (e.g., /b/ pronounced as *buh*). This may affect students' ability to blend sounds into recognizable words. Encourage them to minimize the schwa sound for sounds that require a brief vowel sound (e.g., voiced consonants

Example 3.2. Blending by chunking with a pocket chart and letter tiles

pocket chart and letter tiles

1. H A T
2. H A T
3. H A T

such as /b/ and /d/) and to eliminate the schwa sound for other consonants, to make it easier to recognize a word as they blend the sounds together.

The panel recommends teaching students to check their pronunciation by asking themselves if the word they produced by blending the letter sounds is familiar to them (i.e., if it "makes sense" or if it is a "real word"). If the word is not familiar to them, ask them to read the word again to make sure they blended correctly (see Recommendation 4 for more detail on self-monitoring).

2. Instruct students in common sound–spelling patterns.

Demonstrate to students how letters are often combined to form unique sounds that appear in multiple words (e.g., *-ng*; see Example 3.3 for a list of types of sound–spelling patterns).[100] Present letter combinations to students one at a time, with ample time to focus on each combination and its pronunciation, and with plenty of examples from familiar words to illustrate the pronunciation. Begin with initial consonant patterns, and as students advance, introduce

Example 3.3. Consonant, vowel, and syllable-construction patterns[101]

Category	Pattern	Examples
Consonant patterns	**Consonant digraphs** and **trigraphs** (multi-letter combinations that stand for one phoneme)	*th, sh, ch, ph, ng* *tch, dge*
	Blends (two or more consecutive consonants that retain their individual sounds)	*scr, st, cl, ft*
	Silent-letter combinations (two letters; one represents the phoneme, and the other is not pronounced)	*kn, wr, gn, rh, mb*
Vowel patterns	**Vowel teams** (a combination of two, three, or four letters standing for a single vowel sound)	*ea, oo, oa, igh, eigh*
	Vowel diphthongs (complex speech sounds or glides that begin with one vowel and gradually change to another vowel within the same syllable)	*oi, ou*
	***R*-controlled vowels** or **bossy *r*'s** (vowels making a unique sound when followed by *r*)	*ar, er, ir, or, ur*
	Long *e*	*ee, ie, ea, e_e, ey, ei, y, ea*
	Long *a*	*a_e, ai, ay, a_y, ei, ea, ey*
Syllable-construction patterns	**Closed syllables** (a short vowel spelled with a single vowel letter and ending in one or more consonants)	*in-sect* *stu-dent*
	VC*e* (a long vowel spelled with one vowel + one consonant + silent *e*)	*com-pete* *base-ball*
	Open syllables (ending with a long vowel sound, spelled with a single vowel letter)	*pro-gram* *tor-na-do*
	Vowel team (multiple letters spelling the vowel)	*train-er* *neigh-bor-hood*
	Vowel-*r* (vowel pronunciation changing before /r/)	*char-ter* *cir-cus*
	Consonant-*le* (unaccented final syllable containing a consonant before *l* followed by a silent *e*)	*drib-ble* *puz-zle*

vowel patterns and syllable-construction patterns.[102] Learning to recognize these patterns in words enables students to identify more complex words by pronouncing smaller parts of the word as they read.

Teachers can use the following activities to introduce and practice sound–spelling patterns:[103]

- Give students word cards with and without the target pattern, and ask them to sort the cards into groups or sort them on a **word wall** in the classroom.

- Ask students to think of words that use a given spelling pattern and pronunciation.

If these words are at the students' reading level, ask students to try writing them. Writing practice will extend students' familiarity with each pattern and help them internalize the different spelling patterns.

- Use Elkonin sound boxes to build words with specific sound–spelling patterns (see Example 3.4). Each distinct and recognizable sound should have its own sound box; consonant digraphs and other letter combinations that produce one sound should have one box for the group of letters. For silent-*e* words, place the *e* outside the set of boxes.

Example 3.4. Building words with Elkonin sound boxes

Select a series of words that demonstrate a recently taught sound–spelling pattern. Provide students with a worksheet of sound boxes where each sound–spelling pattern has its own box. Silent *e*'s should be placed outside the series of boxes, as they do not contribute to a sound corresponding to their placement within the word. Either have students write the words in the boxes as you say them, or provide them with a collection of letter tiles that includes all the letters and spelling patterns needed to create the words. Say the words one at a time, and have students create the words by writing letters or moving letter tiles into the appropriate boxes.

Students write in boxes

| t | r | ee |

| c | a | k | e

| sh | ou | t |
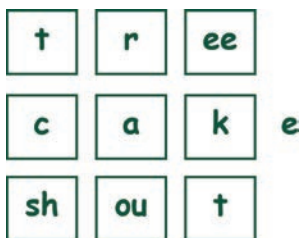
Students move letter tiles into boxes

| m | igh | t | y |

| kn | ee |

| S | a | t | ur | d | ay |

3. Teach students to recognize common word parts.

Once students have learned a few common spelling patterns, show them how to analyze words by isolating and identifying meaningful word parts within them that share a similar meaning or use.[104] Breaking down words into smaller, meaningful word parts can enable young readers to effectively read more challenging words. Students can also use their knowledge of the meaning of different word parts to infer meaning for a **multisyllabic word**.

Teach students about **suffixes** (e.g., *-s*, *-ed*, *-ing*, *-est*), **contractions** (e.g., *aren't*, *it's*, *you're*), forms of **prefixes** (e.g., *dis-*, *mis-*, *pre-*), and basic **roots** (e.g., *aqua*, *cent*, *uni*), and how to combine them to create words. Have students practice the new word parts by writing words or manipulating parts of the words to create new words (e.g. adding the suffix *-ing* to the words *park*, *call*, and *sing*), and then read the words aloud.[105] The panel also recommends having students practice building and modifying words by adding prefixes and suffixes to words in an exercise that expands on the earlier work with Elkonin sound boxes (see Example 3.5).

Help students decode more complex words by teaching a word-analysis strategy: identify the word parts and vowels, say the different parts of the word, and repeat the full sentence in which the word appears (as illustrated in Example 3.6).[106] Model the word-analysis strategy by using words that students have recently encountered in text, and mark individual word parts on the board.

Example 3.5. Manipulating word parts

Select a series of words that demonstrate a recently taught suffix, prefix, or root. Provide students with a worksheet of roots to which students can add prefixes and suffixes. Have students write the words in and around the boxes as you say them. Say the words one at a time, and have students create the words.

fast	est
fast	er
happ	y
happ	iness
pre	heat
pre	heat	ed
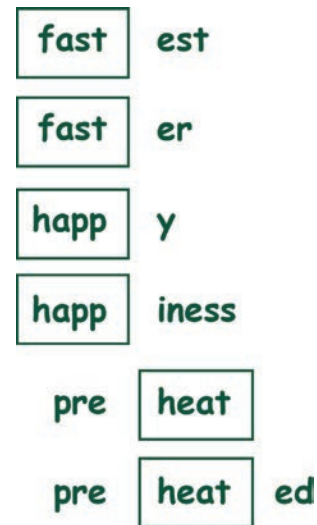
Example 3.6. Word-analysis strategy[107]

1. Circle recognizable word parts. Look for prefixes at the beginning, suffixes at the end, and other familiar word parts.	revisiting, unhappiness
2. Underline the other vowels.	revisiting, unhappiness
3. Say the different parts of the word.	*re-vis-it-ing, un-happ-i-ness*
4. Say them again fast to make it a real word.	*revisiting, unhappiness*
5. Make sure the word makes sense in the sentence.	

When students read the word, have them adjust the vowel sounds as needed to achieve a recognizable word when said at speed. For example, they may need to pronounce vowels with the schwa sound that usually sounds like a short *u* or sometimes a short *i* (e.g., the *o* in *harmony*). As students apply the steps independently, post instructions on the classroom wall or provide students with written instructions to use as a reference.

4. Have students read decodable words in isolation and in text.

Provide students with opportunities to practice the letter sounds and sound–spelling patterns taught in the classroom using word lists, decodable sentences, short decodable texts, or texts that contain many examples of words spelled with recently learned letter sounds or sound–spelling patterns.[108]

Give each student a copy of a word list and/or connected text passage for the letter combination being taught, or write or display the words and passage on a board for the whole group to read together. Ask students to underline the letter combination in each word in the word list, and then in the appropriate words in the passage. Example 3.7 shows a sample word list and a short passage of connected text that a teacher could use with students who have recently learned the letter combination *oi* (a **diphthong**).

Example 3.7. Sample word list and connected text for a lesson on *oi*

Word list

soil	join	oink
voice	noise	choice
coin	foil	avoid

Connected text passage

Sam went out to buy foil from the store. He lost his coins on the way. He looked for his coins, but he could not see them.

Sam asked Luis to join him and help look for the coins. They could not find them.

Then, Sam and Luis heard a voice. It was Mia. She found Sam's coins! Sam, Luis, and Mia went to the store together to buy the foil.

5. Teach regular and irregular high-frequency words so that students can recognize them efficiently.

Help students learn to quickly recognize words that appear frequently in all kinds of text, known as high-frequency words. Because these words occur so often in text, learning to recognize them quickly will speed up the reading process so that students can focus more on the meaning of the text.

Teach students high-frequency words with irregular and regular spellings (see Example 3.8).[109] **Irregular words** have exceptions to the typical sound–spelling patterns and are not easy for early readers to decode. Teach these words **holistically**—that is, as whole words, rather than as combinations of sound units.[110] For regular words, have students apply their letter–sound skills—for example, using Elkonin sound boxes—to identify the word initially. Have students practice reading the words frequently until they learn to recognize them quickly.[111]

Example 3.8. High-frequency words

Irregular words		Regular words	
the	*there*	*in*	*did*
was	*want*	*and*	*then*
from	*said*	*had*	*with*
have	*friend*	*that*	*down*
of		*him*	

Teachers can use the following activities to teach and provide practice on high-frequency words:

- Use flashcards to directly teach any new words. Show students a word and pronounce it. Have students repeat the word, spell the word, and then say the whole word again. Then mix up the cards and provide practice so students learn to recognize the words quickly.

- Select a small number of high-frequency words that students have just encountered in a text. Read a word aloud, and then ask a student to point to the word in the text, spell the word, and repeat the word aloud.[112]

- Create a word wall of high-frequency words in the classroom. Have students read the word wall with a partner. Refer to the wall often, and ask students to point out a word on the wall when they come across it.

- Present students with a list of new high-frequency words to learn. Teach each word. Then ask students to write the words on large cards or construction paper, with different students writing different words. Have them add the words to the word wall in the classroom.

- Write the words on flashcards and have students practice them in small groups, as in Example 3.9.

- Have students practice their high-frequency words outside of their regular literacy instruction, as in Example 3.10.

Example 3.9. High-frequency word practice with flashcards

1. Create flashcards for a small number of words students have been introduced to recently; include both words that students are beginning to recognize and words they still struggle with.

2. Present the flashcards, and ask students in small groups to take turns identifying words correctly within 3 seconds.

3. If students do not correctly read a word within 3 seconds, tell them the word and place the word on a "teacher pile." If students do correctly identify the word within the time period, place it on a "student pile."

4. Repeat steps 2 and 3, decreasing the allotted time to 2 seconds, then 1 second, then asking students to identify the words immediately.

5. At the end of the activity, reteach and provide practice in all the words in the "teacher pile."

Example 3.10. The "Star Words" activity

1. For each student, the teacher puts three to five high-frequency words on individual cards and connects the cards with a ring.

2. Throughout the week, other adults (aides, other teachers, or parents) ask the student to read the words on the ring.

3. For each word the student reads correctly, the adult puts a star on the card.

4. When the student receives three stars on each card, more high-frequency words can be added to the ring.

6. Introduce non-decodable words that are essential to the meaning of the text as whole words.

Non-decodable words are comprised of irregular sound–spelling patterns or sound–spelling patterns that students have not yet learned. Books may include complex words that contain sound–spelling patterns that students have not learned, but that are important to the story or information (e.g., *Tyrannosaurus rex*, *pigeon*, and *villain*). Before introducing a new text, determine if it includes any non-decodable words and, if so, identify a few that are repeated often within the text, are meaningful, and that students will encounter in future texts or settings.[113] Introduce these non-decodable words to students in advance of reading the new text, including their spelling and meaning. Teaching non-decodable words expands students' reading opportunities beyond decodable texts. The panel recommends limiting the number of these words introduced at a time, because learning them holistically places considerable demands on students' memory.

Potential obstacles to implementing Recommendation 3 and the panel's advice

Obstacle 3.1. *My students often invent spell-ings for words when I am not able to respond to their questions immediately. Should I dis-courage this habit?*

Panel's Advice. When students, particularly kindergartners and 1st-graders, are writing independently, encourage them to try to spell words on their own, even if they might spell the word incorrectly. This provides them with an important opportunity to practice apply-ing their letter–sound knowledge. As they develop spelling and language skills, students should use invented spelling less frequently. Remind students to use their knowledge of sound–spelling patterns to inform their spelling and writing. Encourage students to review how they spelled words to see if the spelling is logical and looks correct, and to attempt a different spelling if the first spell-ing looks incorrect. By the time students are in 3rd grade, ask them to use the number of syllables in a word to help determine whether their spelling appears logical. Words that appear frequently in writing, especially irregu-lar high-frequency words and words that stu-dents misspell frequently, can be posted on a word wall and/or added to students' personal dictionaries or writing journals.

Obstacle 3.2. *Students are able to identify the sounds of the letters in a word, but they have trouble arriving at the correct pronuncia-tion for the word.*

Panel's Advice. Students should be taught to sound out or blend sounds smoothly, without stopping between sounds, as described in the first component of Recommendation 3. Teachers should listen for students who add a schwa sound after stop sounds (e.g., /b/ becomes buh) and should work with those students to reduce or eliminate the schwa sound. When teaching students to sound out or blend a multisyllabic word using the method described in the second component of Recommendation 3, teachers should encourage students to be flexible with their vowel pronunciation in order to arrive at a recognizable word.

Ensure that each student reads connected text every day to support reading accuracy, fluency, and comprehension.

Reading connected text (multiple related sentences) poses different challenges than reading isolated words or phrases. Reading connected text accurately, fluently, and with appropriate phrasing and comprehension requires students to identify words quickly, integrate ideas in the text with their background knowledge, self-monitor their understanding, and apply strategies to support comprehension and repair misunderstandings.[114] The National Reading Panel (NRP) found compelling evidence that instruction to increase reading fluency is critical to both reading comprehension and future reading success and ease.[115] The new research examined for this guide confirms those earlier conclusions.

Implementation Timeline

Grade K	Grade 1	Grade 2	Grade 3
Recommendation 4			

Having students read connected text daily, both with and without constructive feedback, facilitates the development of reading accuracy, fluency, and comprehension and should begin as soon as students can identify a few words. Students should interact with a variety of connected texts, including texts of varied levels, diverse genres, and wide-ranging content. In particular, students should read both informational and narrative text, beginning in the early grades.

For recommendations on teaching reading comprehension, see the guide, Improving Reading Comprehension in Kindergarten Through 3rd Grade, *a companion to this practice guide.[116]*

Summary of evidence: Moderate Evidence

Twenty-two studies that examined the effectiveness of interventions with connected text meet WWC group design standards and include a relevant outcome (see Appendix D).[117] Although 18 studies showed positive effects on word reading, **oral reading accuracy**, **oral reading fluency**, and/or reading comprehension outcomes,[118] eight of these studies also reported no discernible effects on other outcomes in these areas.[119] In addition, three studies found no discernible effects for any outcome,[120] and one study found a negative effect for one outcome.[121] Because of this inconsistent pattern of positive effects, the panel and staff did not assign a strong evidence rating to this recommendation.

The 18 studies that found positive effects contributed to the moderate level of evidence;[122] the remainder of this paragraph focuses on those studies. Nine of these studies had interventions that included all three components of Recommendation 4,[123] and the interventions in an additional five studies aligned with two components of Recommendation 4.[124] Fifteen studies meet WWC group design standards without reservations[125] The studies collectively included diverse students in kindergarten through grade 3; 11 studies examined students at risk for reading difficulties,[126] and the other seven studies examined general education students.[127] The interventions in 11 studies were delivered one-on-one,[128] while six studies examined interventions implemented with small groups of students,[129] and one intervention used a combination of small groups and whole-class instruction.[130] Sixteen studies occurred in the United States,[131] and two studies occurred in the United Kingdom.[132] Overall, the 18 studies related to Recommendation 4 found an inconsistent pattern of positive effects. Therefore, the panel and staff assigned a *moderate* level of evidence to Recommendation 4.

1. As students read orally, model strategies, scaffold, and provide feedback to support accurate and efficient word identification.

Students need to practice reading connected text while they are learning the alphabetic principle and decoding, as described in Recommendations 2 and 3.[133] For example, first introduce a particular sound–spelling pattern (e.g., *th*) by presenting isolated words, and then have students read texts featuring words that contain the given pattern.

To help students practice decoding and **word identification**, plan activities in which students receive support from a more proficient reader—such as a teacher, parent, or another student—who can provide constructive feedback or support. Work one-on-one or in small groups with students, modeling the use of effective word-reading strategies in oral reading, and providing prompting and scaffolding when students encounter challenging words. The activities can use **instructional-level text** with examples of recently taught sound–spelling patterns.[134] Instructional-level text provides some challenge without overwhelming the student, as presented in Example 4.1. Students reading an instructional-level text should be able to read most of the words and grammatical structures, missing no more than one word out of every 10.

Example 4.1. Text levels

As text difficulty decreases from **frustration level** to instructional level and finally to **independent level**, texts present less challenge and students require less support to read texts accurately.

Frustration Level | Instructional Level | Independent Level

Support Needed

More — Challenge — Less
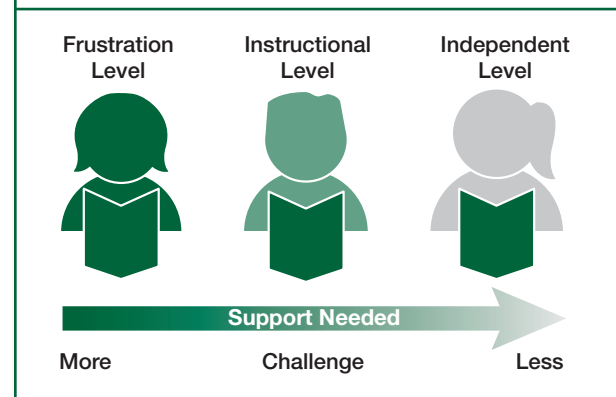
When students encounter words that they find difficult to read, remind them to apply the decoding and word-recognition skills and strategies they have learned and to then reread the word in context, as illustrated in Example 4.2.[135]

Example 4.2. Prompting students to apply word-reading strategies

For less advanced readers:

1. **"Look for parts you know."**
   Point out known letter sounds, sound–spelling patterns, or rime patterns if the student does not recognize any.
2. **"Sound it out."**
   If the student has difficulty, prompt each step of the process as shown in Recommendation 3.
3. **"Check it! Does it make sense?"**
   Prompt the reader to reread the sentence.

For more advanced readers:

1. **"You know this word part. Say this part."**
   Point to familiar prefixes or suffixes (e.g., *-ing*) or the first syllable of the word. Repeat for additional parts or syllables as needed.
2. **"Now read the whole word."**

When students cannot decode words or sound–spelling patterns using their existing knowledge and strategies—such as the irregular words *of* and *was*—simply tell students the words or sound–spelling patterns and ask them to repeat the word.[136] The panel recommends asking the student to reread the sentence to be sure the word makes sense.

The panel discourages teachers from allowing students to use guessing strategies to identify unfamiliar words, because these will not be effective with more-advanced texts. For example, discourage students from guessing unknown words using beginning letters or pictures.[137] The panel also cautions against giving hints that encourage students to guess a word as if answering a riddle (e.g., "What do you call the place where you live?" if students cannot make sense of the letters *h-o-m-e*).

As students' reading skills develop, scaffold by providing fewer prompts and supports and expecting students to apply skills and strategies independently.[138] For example, rather than prompting the student to sound out a word, the teacher can ask the student, "What can you try?" This encourages the student to identify and then implement the strategy independently. Eventually, students will begin to identify unknown words without prompting from the teacher. This process of gradually releasing responsibility to students is important for students' growth as independent readers, and it is essential to the development of word-reading skills.[139] Students may again need teacher support when they progress to more challenging types of words and more challenging texts.

2. Teach students to self-monitor their understanding of the text and to self-correct word-reading errors.

Teach students to monitor their understanding as they read and to correct word-reading errors when they occur.[140] Competent readers can recognize when the text does not make sense

because they have misread a word, and can correct their mistake. Often students do not recognize word-reading errors because they have not been paying attention to their own reading to know whether their reading made sense.

Model and teach self-monitoring and self-correction using activities such as the "Fix It" game (see Example 4.3), and integrate these strategies with word-reading and fluency instruction.[141] Model each step in the game so that students understand what they need to do. Then play one or two rounds of the game with students in small groups to demonstrate the types of errors they should look for and how to correct them.

Example 4.3. The "Fix It" game

Steps:

1. The teacher introduces the task by explaining that sometimes we make mistakes when we read, and the mistakes make the sentences sound silly because the words don't make sense. When a sentence or passage makes sense, it sounds right; it doesn't sound silly or mixed-up.
2. The teacher reads a list of sentences; some contain a word that does not make sense, while other sentences do make sense.
3. Students must say whether or not each sentence makes sense or sounds right. If it doesn't, students must explain why not.
4. If a sentence does not make sense, students must "fix it."

Example:

Teacher: "The bus stepped at the corner." Does that make sense?
Student(s): No.
Teacher: Why not?
Student(s): A bus can't step.
Teacher: Fix it!
Student(s): "The bus stopped at the corner."
Teacher: Right! That makes sense! Remember that when you read, it has to make sense. If it doesn't, you have to go back and fix it!

When a student makes a word-reading error on a word he or she should be able to read, pause so the student can correct the error; provide support if needed.[142] Rather than simply telling the student the correct word, have students reread the sentence in which the misread word appears. For students who cannot identify the error word on their own, read the sentence(s) exactly as the student did, including the error. Ask the student, "Did that make sense?" or "Did that sound right?" Use these scaffolds less frequently as students begin to independently self-monitor and self-correct their errors.

3. Provide opportunities for oral reading practice with feedback to develop fluent and accurate reading with expression.

Have students practice to develop reading fluency—the ability to read orally at a natural pace and with **expression**, including appropriate pauses at the ends of sentences.[143] Through

modeling and feedback, help students under-stand how to read the text in meaningful phrases rather than word by word.

Model expression and phrasing in fluent reading.[144] Introduce students to punctuation marks, and explain how to interpret them.[145] Provide feedback and additional modeling on how to phrase text and read with expres-sion, including which words to emphasize. Decrease the support for expressive reading as students begin to read text in progres-sively longer phrases.

Using familiar texts, model how to read accurately at a fluent pace. Initially, set a slow, steady pace for student reading, and gradu-ally increase the reading rate and accuracy, moving on to more challenging text.[146] When reading text along with students, read with expression in a quiet voice and set a pace that reflects students' word-reading abilities, slow-ing down a bit for words that present par-ticular challenges.[147] To develop fluency when students read independently the text should be at their independent level, and when students read with feedback the text should be at their instructional level (reading levels are shown in Example 4.1).[148] It is important not to ask students to read frustration-level text without feedback, as it can lead them to practice ineffective word-reading strategies that reduce comprehension.

Activities to practice reading fluently include the following:

- individual oral reading with support[149]

- individual oral reading with a recording device, with teacher feedback provided later

- partner reading[150]

- **choral reading** in small groups with care-ful monitoring to ensure that all students are participating, as opposed to copying their peers

- **echo reading**, where a more experienced reader (often the teacher) reads a section of text aloud and then the student reads the same section aloud

- **alternated reading**, where the student and a more experienced reader (often the teacher), take turns reading continuous sections of text

- **simultaneous reading**, where the student(s) and teacher read the same text aloud at the same time

- individual oral reading with computerized reading devices, provided that the text is read at a pace appropriate to the students' reading rate[151]

When working with e-books or other comput-erized reading devices, make sure that the text used is appropriate to students' word-reading and comprehension abilities so that students actively practice oral reading.

To support oral reading fluency, give students assignments for both **repeated reading**[152]—in which they read the same text multiple times for mastery—and **wide reading**[153]—in which they read many different texts. In repeated reading, students are less likely to practice incorrect word reading or to guess unknown words. They are repeatedly exposed to the same words, which should help students recognize them more efficiently. Wide reading, on the other hand, exposes students to more diverse vocabulary and world knowledge.

Teachers can support students' fluency prac-tice in the following ways:

- Preempt word-reading challenges pre-sented in new texts by identifying and practicing challenging words with students before they read the full text.[154]

- Remind students that the purpose of reading is to derive meaning from the text. To support comprehension, regu-larly ask students a few questions after reading a text.

- If students adopt a guessing strategy to identify words, rather than taking the time to use the strategies they have been taught, temporarily reduce or suspend fluency practice, and increase activities designed to support word-reading accuracy (described earlier in this recommendation).

Potential obstacles to implementing Recommendation 4 and the panel's advice

Obstacle 4.1. *How do I select texts that are accessible to all students in my classroom?*

Panel's Advice. Teachers can monitor student progress and adjust the assigned text for students of above- or below-average reading ability.[155] Text selection should reflect student abilities, the purpose of instruction, and the degree of scaffolding and feedback available. For example, independent-level texts may be appropriate for independent fluency practice. In contrast, frustration-level texts may be appropriate for practice applying word-reading skills with individual teacher support. This may mean that some students use different texts for a given activity than others, based on their reading ability, or that students practice different skills when working with the same text.

For students with serious comprehension difficulties, select texts that students will be able to comprehend with support—that is, clearly written, well-organized texts, ideally about topics familiar to students. More-proficient readers may require text above their grade level to keep them challenged and engaged.

Obstacle 4.2. *My beginning readers can only decode a few letter sounds, so they rely on illustrations to identify words rather than applying other word-identification strategies.*

Panel's Advice. In the early stages of reading development, students know only a few letter sounds, so most texts contain words they cannot yet decode. This problem can be preempted by having students read decodable text—text that is written so that students can read it using the letter sounds and high-frequency sight words they have learned. In non-decodable text, rather than allowing students to rely on the illustrations—a habit that will not be effective with more-difficult texts and may become difficult to break—use the opportunity to model sounding out words for students. When students come to an unfamiliar word, follow the process shown in Example 4.2. This will provide the students with the correct word, but it will also demonstrate that this is the strategy students should use independently when possible. When students stop on a word that is very challenging or irregular, tell them the word and have them repeat the word and reread the sentence, as described in the first component of this recommendation.

Obstacle 4.3. *I have limited time and resources for one-on-one instruction. How can I maximize my instructional time to provide each student with individualized feedback?*

Panel's Advice. Throughout the week, teachers can provide individualized instruction or feedback to each student while other students are working independently or in small groups. While the teacher works with one student or a small group of students, the rest of the class can complete partner reading or independent reading with computerized reading devices. If another adult or an older student is available, the rest of the class could work on echo reading, alternated reading, or simultaneous reading activities.

Establish clear classroom routines and expectations around independent and small-group reading activities, so that students are accustomed to and comfortable with these types of activities. Independent and small-group activities are most effective if the teacher has carefully taught the routines for the activity, has provided opportunities for students to practice with teacher feedback, and implements the routine regularly to maintain familiarity.

Glossary

A

Academic language is the formal language that is common in books and at school, but that students are unlikely to encounter in everyday conversations with friends and family.

Academic language skills include the ability to articulate complex ideas, the ability to relate a series of events comprehensibly, and the ability to use and comprehend a wide range of vocabulary and grammatical structures.

Academic vocabulary consists of words and grammatical structures that students do not encounter in their daily conversations but that are common in formal settings, and therefore need to be taught if students are to successfully understand written text. This includes words that commonly appear in instructions, such as *contrast*, *concentrate*, *select*, *locate*, *define*, and *estimate*.

The **alphabetic principle** is the concept that letters and letter combinations represent individual phonemes in written words.

In **alternated reading**, the student and a second reader, typically the teacher or another more proficient reader, take turns reading continuous sections of the text, without repeating any of the text.

B

Blending refers to reading a word systematically from left to right by combining the sounds of each successive letter or combination of letters.

C

In **choral reading**, students all read the same text aloud at a set pace.

Chunking is a decoding strategy in which the reader adds letter sounds successively and cumulatively to produce a word.

Connected text consists of multiple related sentences.

A **consonant blend** is made up of two or more consecutive consonants that retain their individual sounds (e.g., /bl/ in *block* or /str/ in *string*).

A **continuous sound**, also referred to as a continuant sound, is a sound that can be held without distortion (e.g., /f/, /l/, /m/, /n/, /r/, /s/, /v/, /z/).

A **contraction** is a shortened form of a word or group of words, with the omitted letters often replaced in written English by an apostrophe (e.g., *isn't* for *is not*, or *don't* for *do not*).

D

Decoding is the ability to translate a word from print to speech, usually by employing knowledge of letter–sound relationships; also, the act of deciphering a new word by sounding it out.

A **digraph** is a group of two consecutive letters that are read as a single sound (e.g., /ea/ in *bread*; /ch/ in *chat*; /ng/ in *sing*).

A **diphthong** is a vowel produced by the tongue shifting position during articulation. The vowel feels as if it has two parts, as the sound begins with one vowel and gradually changes to another vowel within the same syllable (e.g., *ow*, *oy*, *ou*, *oi*).

E

In **echo reading**, a more proficient reader (usually the teacher) reads a section of the text aloud, and then the student reads that same section of text aloud.

Elkonin sound boxes are tools used during phonemic-awareness and encoding instruction. One box is provided for each sound in a target word. Elkonin boxes are sometimes referred to as *sound boxes*.

Encoding refers to determining the spelling of a word based on the sounds in the word.

Evidence-based practices, policies, or recommendations are those that are supported by studies that meet WWC design standards with or without reservations.

Expression is an element of fluent reading that involves reading with expression, including proper intonation, pausing, and phrasing.

F

Fluency. See *oral reading fluency*.

Frustration-level text is text that is difficult for readers to read accurately.

H

Holistic teaching here refers to teaching words as whole words rather than as combinations of sound units.

I

Independent-level text is text that is relatively easy for readers to read accurately without support.

Inferential language moves beyond the immediate context. Inferential language focuses on topics removed from the here and now, thus requiring students to predict, reason, problem-solve, hypothesize, and/or contrast.

Informational text analyzes or explains factual information about the natural or social world. Informational texts may include pieces that argue in favor of one position or another, true narratives such as biographies, and procedural texts and documents. Textbooks and other texts used to support science and social studies learning in school contain primarily informational text.

Instructional-level text is text that is challenging but manageable for readers to read accurately with support.

Irregular words are words that have exceptions to the typical sound–spelling patterns. Irregular words are difficult to decode because the sounds of the letters in the word do not add up to the correct pronunciation.

L

Letter reversal is when students confuse (i.e., incorrectly identify or incorrectly write) letter shapes and/or sounds.

Listening comprehension outcomes measure a student's ability to follow, process, and understand spoken language, including comprehension of informational and narrative texts.

Long vowels are the vowel sounds in English that are also the names of the alphabet letters *a*, *e*, *i*, *o*, and *u* (as in, for example, *halo*, *bind*, and *told*).

M

Modeling refers to a teacher overtly demonstrating a strategy, skill, or concept that students will be learning and using.

Morphology refers to the knowledge of meaningful word parts in a language (typically the knowledge of prefixes, suffixes, and/or roots and base words).

Multisyllabic words contain more than one vowel sound, and thus, more than one syllable.

N

Narrative language refers to the production or comprehension of a fictional or real account of an experience. Narrative language skills include the ability to clearly relate a series of events, as well as applying more-nuanced grammatical structures to connect pieces of information.

Non-decodable words are words that the reader is unable to decode.

O

Onset–rime pairs involve two parts of a syllable: the *onset* consists of the initial consonant(s), and the *rime* consists of the vowel and any consonants that follow it. (For example, in the word *sat*, the onset is *s* and the rime is *at*. In the word *flip*, the onset is *fl* and the rime is *ip*).

Oral language is the system we use to communicate with others through speaking and listening.

Oral reading accuracy refers to the ability to read a given passage of text aloud accurately, but without regard to reading rate. In some tests, results are reported in the form of the percentage of words read accurately; in other tests, students read several texts of increasing difficulty, and the score represents the highest text level a student can read at a predetermined level of accuracy (e.g., 90 percent accuracy).

Oral reading fluency is the ability to read a passage of text aloud accurately, at an appropriate rate, and with expression (i.e., with appropriate expression, including appropriate pausing and oral interpretation of the text).

P

A **phoneme** is the smallest unit of sound within a language system. A phoneme may be a word by itself, or it may be combined with other phonemes to make a word.

Phonemic awareness is the ability to understand that sounds in spoken language work together to make words. Phonemic awareness is auditory; it does not involve printed letters. It includes the ability to notice, think about, and manipulate the individual phonemes in spoken words. Phonemic awareness is a type of phonological awareness.

Phonological awareness is the ability to recognize that words are made up of individual sound units. It is an umbrella term that is used to refer to a student's sensitivity to any aspect of phonological structure in language. It encompasses awareness of individual words in sentences, syllables, and onset–rime segments, as well as awareness of individual phonemes. Phonological awareness can also refer to the awareness of segments of sounds in words.

Phonology refers to the sound structure of language. Phonology tasks are auditory/oral tasks that focus on students' ability to articulate the sounds of language, without involving letter or word knowledge.

A **prefix** is a morpheme that precedes a root or base word and contributes to or modifies the meaning of a word (e.g., *re–* in *reprint*).

R

Reading comprehension refers to the understanding of the meaning of a passage and the context in which the words occur. Reading comprehension depends on various underlying components including decoding (the ability to translate words into speech), knowledge of word meanings, fluency, and the ability to understand and interpret spoken language.

Repeated reading refers to the instructional practice of having students practice rereading the same text as a way to support the development of oral reading fluency.

The **root** of a word is the element that contains the main meaning of the word. The root is used to form a family of words with related meanings by adding other elements, such as prefixes, suffixes, and inflected endings, before and/or after the root. A root is not necessarily a complete word by itself (e.g., *spect* in *inspector*).

Rime See *onset–rime pairs*.

S

Scaffolding refers to the temporary support provided to students to enable them to answer a question correctly or perform some other task that they have not been able to perform independently. This support may occur as immediate, specific feedback that a teacher offers during student practice—including reminders, prompts, or "hints." It may involve giving students encouragement or cues, breaking a problem down into smaller steps, using a graphic organizer, or providing an example. Scaffolding may be embedded in the features of the instructional design, such as starting with simpler skills and building progressively to more difficult skills or providing readers with accessible text. The support

is decreased, or faded, as students become able to accomplish the task without help. However, when new or more-advanced tasks are introduced (or more-difficult texts are encountered), scaffolding may be required once again.

Segments of sound are sounds that are part of a word, as in /c/, /a/, and /t/ in *cat*. Awareness of the segments of sound in speech is also referred to as phonological awareness.

Short vowels are the sounds of /a/, /e/, /i/, /o/, and /u/ heard in *bat*, *bet*, *bit*, *bob*, and *bub*, as well as the sound of /y/ heard in *gym*.

A **silent-*e* pattern** is a sound–spelling pattern with a final silent *e* that changes the pronunciation of the vowel that precedes it.

In **simultaneous reading**, the teacher and student(s) read the same text aloud, at the same pace.

Sounding out a word is a type of blending that involves saying the sound of each letter or letter combination one by one until the end of the word, and then saying them all together again quickly.

Stop sounds are made with quick puffs of air, and the sound cannot be maintained (e.g., /b/, /d/, /g/, /k/, /p/, /t/). Words beginning with stop sounds may be more difficult for students to sound out than words beginning with continuous sounds.

A **suffix** is a morpheme attached to the end of a base, root, or stem that changes the meaning or grammatical function of the word (e.g., *–en* in *oxen* or *–ness* in *kindness*).

A **syllable** is a segment of a word that contains one vowel sound. The vowel sound may be represented by one or more letters, and it may or may not be preceded and/or followed by a consonant.

Syntax refers to the formation of sentences and the associated grammatical rules.

V

Vocabulary refers to knowledge about the meanings, uses, and pronunciation of words.

W

Wide reading refers to reading a diverse variety of texts.

Word identification refers to recognizing in print a word in one's spoken vocabulary.

A **word wall** is a prominent space on the classroom wall that is used to display high-frequency irregular words and/or words that contain the sound–spelling patterns that students have learned.

Postscript from the Institute of Education Sciences

What is a practice guide?

The Institute of Education Sciences (IES) publishes practice guides to share evidence and expert guidance on addressing education-related challenges not readily solved with a single program, policy, or practice. Each practice guide's panel of experts develops recommendations for a coherent approach to a multifaceted problem. Each recommendation is explicitly connected to supporting evidence. Using What Works Clearinghouse (WWC) design standards, the supporting evidence is rated to reflect how well the research demonstrates the effectiveness of the recommended practices. *Strong evidence* means positive findings are demonstrated in multiple well-designed, well-executed studies, leaving little or no doubt that the positive effects are caused by the recommended practice. *Moderate evidence* means well-designed studies show positive impacts, but there are questions about whether the findings can be generalized beyond the study samples or whether the studies definitively show evidence that the practice is effective. *Minimal evidence* means that there is not definitive evidence that the recommended practice is effective in improving the outcome of interest, although there may be data to suggest a correlation between the practice and the outcome of interest. (See Table A.1 for more details on levels of evidence.)

How are practice guides developed?

To produce a practice guide, IES first selects a topic. Topic selection is informed by inquiries and requests to the WWC Help Desk, a limited literature search, and evaluation of the topic's evidence base. Next, IES recruits a panel chair who has a national reputation and expertise in the topic. The chair, working with IES and WWC staff, then selects panelists to co-author the guide. Panelists are selected based on their expertise in the topic area and the belief that they can work together to develop relevant, evidence-based recommendations. Panels include two practitioners with expertise in the topic.

Relevant studies are identified through panel recommendations and a systematic literature search. These studies are then reviewed against the WWC design standards by certified reviewers who rate each effectiveness study. The panel synthesizes the evidence into recommendations. WWC staff summarize the research and help draft the practice guide.

IES practice guides are then subjected to external peer review. This review is done independently of the IES staff that supported the development of the guide. A critical task of the peer reviewers of a practice guide is to determine whether the evidence cited in support of particular recommendations is up-to-date and that studies of similar or better quality that point in a different direction have not been overlooked. Peer reviewers also evaluate whether the level of evidence category assigned to each recommendation is appropriate. After the review, a practice guide is revised to meet any concerns of the reviewers and to gain the approval of the standards and review staff at IES.

Institute of Education Sciences levels of evidence for What Works Clearinghouse practice guides

This section provides information about the role of evidence in IES's WWC practice guides. It describes how practice guide panels determine the level of evidence for each recommendation and explains the criteria for each of the three levels of evidence (strong evidence, moderate evidence, and minimal evidence).

The level of evidence assigned to each recommendation in this practice guide represents the panel's judgment of the quality of the existing research to support a claim that, when these practices were implemented in past research, positive effects were observed on student outcomes. After careful review of

the studies supporting each recommendation, panelists determine the level of evidence for each recommendation using the criteria in Table A.1. The panel first considers the relevance of individual studies to the recommendation and then discusses the entire evidence base, taking the following into consideration:

- the number of studies

- the study designs

- the internal validity of the studies

- whether the studies represent the range of participants and settings on which the recommendation is focused

- whether findings from the studies can be attributed to the recommended practice

- whether findings in the studies are consistently positive

A rating of *strong evidence* refers to consistent evidence that the recommended strategies, programs, or practices improve student outcomes for a diverse population of students.[156] In other words, there is strong causal and generalizable evidence.

A rating of *moderate evidence* refers either to evidence from studies that allow strong causal conclusions but cannot be generalized with assurance to the population on which a recommendation is focused (perhaps because the findings have not been widely replicated) or to evidence from studies that are generalizable but have some causal ambiguity. It also might be that the studies that exist do not specifically examine the outcomes of interest in the practice guide, although the studies may be related to the recommendation.

A rating of *minimal evidence* suggests that the panel cannot point to a body of evidence that demonstrates the practice's positive effect on student achievement. In some cases, this simply means that the recommended practices would be difficult to study in a rigorous, experimental fashion;[157] in other cases, it

means that researchers have not yet studied this practice, or that there is weak or conflicting evidence of effectiveness. A minimal evidence rating does not indicate that the recommendation is any less important than other recommendations with a strong or moderate evidence rating.

In developing the levels of evidence, the panel considers each of the criteria in Table A.1. The level of evidence rating is determined by the lowest rating achieved for any individual criterion. Thus, for a recommendation to get a strong rating, the research must be rated as strong on each criterion. If at least one criterion receives a rating of moderate and none receives a rating of minimal, then the level of evidence is determined to be moderate. If one or more criteria receive a rating of minimal, then the level of evidence is determined to be minimal.

The panel relied on WWC design standards to assess the quality of evidence supporting education programs and practices. The WWC evaluates evidence for the causal validity of instructional programs and practices according to WWC design standards. Information about these standards is available at http://whatworks.ed.gov. Eligible studies that meet WWC designs standards without reservations or meet WWC design standards with reservations are indicated by **bold text** in the endnotes and references pages.

A final note about IES practice guides

In policy and other arenas, expert panels typically try to build a consensus, forging statements that all its members endorse. Practice guides do more than find common ground; they create a list of actionable recommendations. Where research clearly shows which practices are effective, the panelists use this evidence to guide their recommendations. However, in some cases research does not provide a clear indication of what works. In these cases, the panelists' interpretation of the existing (but incomplete) evidence plays an important role in guiding the

recommendations. As a result, it is possible that two teams of recognized experts working independently to produce a practice guide on the same topic would come to very different conclusions. Those who use the guides should recognize that the recommendations represent, in effect, the advice of consultants. However, the advice might be better than what a school or district could obtain on its own. Practice guide authors are nationally recognized experts who collectively endorse the recommendations, justify their choices with supporting evidence, and face rigorous independent peer review of their conclusions. Schools and districts would likely not find such a comprehensive approach when seeking the advice of individual consultants.

Institute of Education Sciences

Table A.1. Institute of Education Sciences levels of evidence for What Works Clearinghouse practice guides

Criteria	STRONG Evidence Base	MODERATE Evidence Base	MINIMAL Evidence Base
Validity	High internal validity (high-quality causal designs). Studies must meet WWC design standards with or without reservations.[158] AND High external validity (requires multiple studies with high-quality causal designs that represent the population on which the recommendation is focused). Studies must meet WWC design standards with or without reservations.	High internal validity but moderate external validity (i.e., studies that support strong causal conclusions but generalization is uncertain). OR High external validity but moderate internal validity (i.e., studies that support the generality of a relation but the causality is uncertain).[159]	The research may include evidence from studies that do not meet the criteria for moderate or strong evidence (e.g., case studies, qualitative research).
Effects on relevant outcomes	Consistent positive effects without contradictory evidence (i.e., no statistically significant negative effects) in studies with high internal validity.	A preponderance of evidence of positive effects. Contradictory evidence (i.e., statistically significant negative effects) must be discussed by the panel and considered with regard to relevance to the scope of the guide and intensity of the recommendation as a component of the intervention evaluated.	There may be weak or contradictory evidence of effects.
Relevance to scope	Direct relevance to scope (i.e., ecological validity)—relevant context (e.g., classroom vs. laboratory), sample (e.g., age and characteristics), and outcomes evaluated.	Relevance to scope (ecological validity) may vary, including relevant context (e.g., classroom vs. laboratory), sample (e.g., age and characteristics), and outcomes evaluated. At least some research is directly relevant to scope (but the research that is relevant to scope does not qualify as strong with respect to validity).	The research may be out of the scope of the practice guide.
Relationship between research and recommendations	Direct test of the recommendation in the studies or the recommendation is a major component of the intervention tested in the studies.	Intensity of the recommendation as a component of the interventions evaluated in the studies may vary.	Studies for which the intensity of the recommendation as a component of the interventions evaluated in the studies is low; and/or the recommendation reflects expert opinion based on reasonable extrapolations from research.

(continued)

Table A.1. Institute of Education Sciences levels of evidence for What Works Clearinghouse practice guides *(continued)*

Criteria	STRONG Evidence Base	MODERATE Evidence Base	MINIMAL Evidence Base
Panel confidence	The panel has a high degree of confidence that this practice is effective.	The panel determines that the research does not rise to the level of strong but is more compelling than a minimal level of evidence. The panel may not be confident about whether the research has effectively controlled for other explanations or whether the practice would be effective in most or all contexts.	In the panel's opinion, the recommendation must be addressed as part of the practice guide; however, the panel cannot point to a body of research that rises to the level of moderate or strong.
Role of expert opinion	Not applicable	Not applicable	Expert opinion based on defensible interpretations of theory (theories). (In some cases, this simply means that the recommended practices would be difficult to study in a rigorous, experimental fashion; in other cases, it means that researchers have not yet studied this practice.)
When assessment is the focus of the recommendation	For assessments, meets the standards of *The Standards for Educational and Psychological Testing*.[160]	For assessments, evidence of reliability that meets *The Standards for Educational and Psychological Testing* but with evidence of validity from samples not adequately representative of the population on which the recommendation is focused.	Not applicable

Appendix B

About the Authors

Panel

Barbara Foorman, Ph.D. (Chair), is the Francis Eppes Professor of Education and the director of the Florida Center for Reading Research at Florida State University. In 2005, Dr. Foorman served as the Commissioner of Education Research for the Institute of Education Sciences (IES) in the U.S. Department of Education. Dr. Foorman has written more than 140 publications in the area of reading and language development and was co-editor of the *Journal of Research on Educational Effectiveness* until 2012. She has been the principal investigator of grants examining early-reading interventions, measurements of K–12 reading, and literacy development in Spanish-speaking children, funded by the National Institute of Child Health and Human Development (NICHD), IES, and the Florida and Texas state departments of education. She is the developer of the *Texas Primary Reading Inventory (TPRI)* and the *Florida Assessments for Instruction in Reading (FAIR)*. Dr. Foorman has served on the Reading Instruction Advisory Board of the International Reading Association and on the board of the Society for Research on Educational Effectiveness, as well as on many national consensus panels on reading.

Michael Coyne, Ph.D., is Professor and Program Coordinator of Special Education in the Neag School of Education at the University of Connecticut. He is also a research scientist at the Center for Behavioral Education and Research. He has expertise in beginning-reading and early-vocabulary instruction and intervention, school-based experimental research, multi-tiered or response-to-intervention (RtI) systems of support, and effective practices for students with learning disabilities. Dr. Coyne has directed or co-directed four multi-year research grants funded by IES focused on optimizing vocabulary and beginning-reading practices for students with diverse learning needs through school-based experimental research. Dr. Coyne has held certification in both elementary and special education and is a former special educator in public schools.

Carolyn A. Denton, Ph.D., is a professor in the Children's Learning Institute, part of the Department of Pediatrics at the University of Texas Health Science Center at Houston. Dr. Denton's research is focused on interventions for the prevention and remediation of reading difficulties and disabilities, interventions for students who have both ADHD and reading difficulties, multi-tier systems of support, the role of the reading coach in professional development, and reading comprehension. She has been a lead researcher for several federally funded research projects examining reading interventions and reading comprehension in both elementary and secondary schools. Dr. Denton is the author of numerous articles and book chapters and the co-author of four books. She has made presentations and provided training to teachers, administrators, reading coaches, researchers, clinicians, and university faculties throughout the United States and in Europe and Hong Kong.

Joseph Dimino, Ph.D., has had experience as a general education teacher, special education teacher, administrator, behavior specialist, and researcher. Currently, he is the deputy executive director of the Instructional Research Group. As a co-principal investigator, he developed and conducted professional development for national studies assessing the impact of reading comprehension and vocabulary instruction on teaching practices and student achievement. Dr. Dimino has extensive experience developing and providing professional development to teachers, administrators, instructional assistants, and parents, in the areas of classroom management, early-reading intervention, and vocabulary and reading comprehension instruction. He served as one of seven professional development staff members for the National Center on Student Progress Monitoring. Dr. Dimino was a panel member for the *Assisting Students Struggling with Reading* practice guide and staff for the *Assisting Students Struggling with Mathematics* practice guide and the

updated English learner practice guide, *Teaching Academic Content and Literacy to English Learners in Elementary and Middle School*.[161] Dr. Dimino has co-authored books in reading comprehension, early-reading interventions and vocabulary instruction. He consults nationally in these areas and presents at state, national and international conferences. Dr. Dimino has published articles in numerous peer-reviewed scholarly journals.

Lynda Hayes, Ph.D., is the director of the P.K. Yonge Developmental Research School, a K–12 publicly funded laboratory school affiliated with the University of Florida. Prior to this role, she served for 10 years as a regional leader in K–12 reading reform through the design and delivery of teacher and school-leader training in evidence-based reading instruction. In partnership with the Northeast Florida Educational Consortium and University of Florida early-childhood educators, Dr. Hayes led two Early Reading First projects devoted to transforming preschool literacy instruction in six Florida school districts. For more than 10 years, she has collaborated with a University of Florida professor-in-residence to design, implement, and evaluate an RtI or multi-tier systems of support approach to reorganizing systems of assessment and instruction to improve student learning in reading and mathematics. Dr. Hayes regularly presents at state and national conferences. Dr. Hayes taught preschool through 3rd grade for 16 years before being selected as P.K. Yonge's first elementary reading coach.

Laura Justice, Ph.D., is a clinical speech-language pathologist and an applied researcher in early-childhood language and literacy development, communication disorders, and educational interventions. Dr. Justice is Executive Director of the Schoenbaum Family Center and Crane Center for Early Childhood Research and Policy at The Ohio State University, where she is also Distinguished Professor in the College of Education and Human Ecology. Dr. Justice's research activities have been supported by grants from the American Speech-Language-Hearing Association,

the International Reading Association, the National Institutes of Health, and the U.S. Department of Education. Her research on early language and literacy has received awards from the International Reading Association, the American Speech-Language-Hearing Association, and the Council for Exceptional Children. Dr. Justice is currently an associate editor of the *Early Childhood Research Quarterly* and past editor of the *American Journal of Speech-Language Pathology*.

Warnick Lewis, M.Ed., is a teacher at Bond Elementary School in Tallahassee, Florida. She has 10 years of experience as an elementary-school teacher and has taught kindergarten, 2nd grade, and 3rd grade. Ms. Lewis has worked extensively with the Florida Center for Reading Research in implementing strategies to increase reading efficiency in low-performing students. Her work has included volunteering to be videotaped using evidence-based strategies that can increase fluency, phonics, phoneme-awareness, vocabulary, and comprehension skills for struggling readers, as well as differentiating instruction to meet the needs of the students. Throughout her career, she has provided model lessons for teachers at the school and throughout the district. Mrs. Lewis is actively involved on the technology committee at the school. Her responsibilities include increasing teachers' knowledge of relevant technology through mini-workshops, as well as helping teachers integrate technology into their classrooms.

Richard Wagner, Ph.D., is the Robert O. Lawton Professor of Cognitive and Developmental Psychology at Florida State University, where he is also an associate director of the Florida Center for Reading Research. Dr. Wagner's research interests include the relationship between phonological processing skills and reading abilities in children, as well as the prevention and remediation of dyslexia. He coauthored the *Comprehensive Test of Phonological Processing (CTOPP-2)* and the *Test of Word Reading Efficiency (TOWRE-2)*. Dr. Wagner's publications include the articles "Developmental relations between reading and

writing at the word, sentence, and text levels: A latent change score analysis" in the *Journal of Educational Psychology*; "Long-term effects of first-grade multitier intervention" in the *Journal of Research on Educational Effectiveness*; and "Text (oral) reading fluency as a construct in reading development: Investigation of its mediating role for children from grades 1 to 4" in *Scientific Studies of Reading*. He is the principal investigator of the NICHD Multidisciplinary Learning Disabilities Research Center.

Staff

The panel would like to thank Julie Miller, Marc Moss, Erin Panzarella, Nathan Wozny, and the team of WWC certified reviewers for their contributions to this practice guide.

Nicholas Beyler, Ph.D., is a statistician at Mathematica Policy Research. Dr. Beyler served as the evidence lead for the practice guide. He is certified as a WWC reviewer and serves as deputy methodologist for the special education topic area. Dr. Beyler works primarily on projects in the areas of education and nutrition.

Kelley Borradaile, Ph.D., is a survey researcher at Mathematica Policy Research. Dr. Borradaile has worked as a certified WWC reviewer for this practice guide as well as for several education topic areas. In addition to the field of education, she has also reviewed evidence and synthesized findings on employment strategies for low-income adults and responsible fatherhood and family-strengthening initiatives. Outside of her work as a reviewer, she conducts data-collection and data-analysis activities for evaluations in the education and nutrition fields.

Joshua Furgeson, Ph.D., is a senior researcher at Mathematica Policy Research and a former high school teacher. He is the lead methodologist for the special education topic areas in the WWC, and he leads the practice guides under Mathematica's contract. He has helped develop two other practice guides: *Improving Mathematical Problem Solving in Grades 4 Through 8* and *Teaching*

Strategies for Improving Algebra Knowledge in Middle and High School Students.

Juliette Henke, M.P.P., is a researcher at Mathematica Policy Research. Ms. Henke has served as a coordinator and reviewer for WWC products in several content areas including adolescent literacy and children with emotional and behavioral disorders. She supported the panel for this practice guide in analyzing the evidence for effective foundational reading practices reviewed for the guide. Ms. Henke has participated in other meta-analyses and syntheses focused on paraprofessional home-visiting programs and substance abuse and mental health, and has experience on a range of evaluations, primarily in the areas of education, family support, and nutrition.

Betsy Keating, M.P.P., is a research analyst at Mathematica Policy Research. She helped coordinate the review of studies related to the panel's recommendations and helped draft the text of the practice guide. Ms. Keating is certified as a WWC reviewer. She worked on the *Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students* practice guide and has completed reviews for the special education topic area. She has also worked on various other projects focused on education, including an implementation study of district-charter collaboration grants.

Samina Sattar, M.P.A., is a researcher at Mathematica Policy Research and has contributed to the review and coordination of evidence for several WWC products, including the practice guide *Improving Reading Comprehension in Kindergarten Through 3rd Grade*. She supported the panel in documenting the evidence for effective practices in foundational reading and translating research findings into practitioner-friendly text. Ms. Sattar has also provided support for multi-site evaluations of math curricula, intensive teacher-induction programs, and teacher pay-for-performance incentives. Outside of her work in the field of education, she conducts research for evaluations in the labor, health, and family-welfare fields.

Andrei Streke, Ph.D., a researcher at Mathematica Policy Research, specializes in systematic reviews and meta-analyses. He has been involved in many aspects of the WWC since 2004 and currently serves as the co-lead methodologist for the literacy topic area. Dr. Streke also conducted evidence reviews for a national registry hosted by the Substance Abuse and Mental Health Services Administration, and he has assessed systematic review products developed by the Regional Educational Laboratories and the International Initiative for Impact Evaluation. He has participated in impact evaluations, including the evaluation of an intervention for struggling readers in middle and high school.

Sarah Wissel, M.P.A., a program analyst at Mathematica Policy Research, plays numerous roles in the development of WWC products, including practice guides. She has assisted panels in developing several practice guides, including *Improving Reading Comprehension in Kindergarten Through 3rd Grade* and *Using Student Achievement Data to Support Instructional Decision Making*, and she worked with the panel to develop the recommendations in this guide. In addition, she served as a coordinator for the topic areas of adolescent literacy and beginning reading. Ms. Wissel also contributes to multi-site research on teacher-evaluation systems and school-improvement programs.

Disclosure of Potential Conflicts of Interest

Practice guide panels are composed of individuals who are nationally recognized experts on the topics about which they are making recommendations. IES expects the experts to be involved professionally in a variety of matters that relate to their work as a panel. Panel members are asked to disclose these professional activities and institute deliberative processes that encourage critical examination of their views as they relate to the content of the practice guide. The potential influence of the panel members' professional activities is further muted by the requirement that they ground their recommendations in evidence that is documented in the practice guide. In addition, before all practice guides are published, they undergo an independent external peer review focusing on whether the evidence related to the recommendations in the guide have been presented appropriately.

The professional activities reported by each panel member that appear to be most closely associated with the panel recommendations are noted below.

Barbara Foorman is a coauthor of three curriculum products and two assessments. She receives royalties from the sales of *Scholastic Spelling*, *Phonemic Awareness in Young Children*, and the *Texas Primary Reading Inventory (TPRI)*. The guide does not mention studies of the *Phonemic Awareness in Young Children* intervention, nor of the two assessments.

Michael Coyne is a consulting author of *Scott Foresman Kindergarten Early Reading Intervention* and receives royalties from the sales of this program. The program is a small-group kindergarten intervention that focuses on teaching phonemic awareness, alphabetics, and early word reading and spelling. Studies of this intervention are mentioned in the guide.[162]

Carolyn A. Denton is a coauthor of *Responsive Reading Instruction: Flexible Intervention for Struggling Readers in the Early Grades*. *Responsive Reading Instruction* is a small-group intervention that focuses on teaching phonemic awareness, phonics, word reading, spelling, and fluency, and that includes scaffolded practice in oral reading of text. Studies of this intervention are mentioned in the guide.[163]

Joseph Dimino is a coauthor of *Interventions for Reading Success* and *Learning How to Improve Vocabulary Instruction Through Teacher Study Groups*. He receives royalties for both programs from Brookes Publishing. The concepts in *Interventions for Reading Success* are similar to practices discussed in the guide, but the book is not a published curriculum and is not referenced in the guide.

Lynda Hayes is a coauthor of the *University of Florida Literacy Initiative (UFLI)* tutoring model, but does not receive royalties from the program. *UFLI* is used to train current and future teachers, and is not promoted as a commercial product. A study of the intervention is mentioned in the guide.[164]

Richard Wagner is a consulting author of *Scholastic Phonics Inventor*, a computer-based test of phonics knowledge, and receives royalties for the assessment. The guide does not include any studies using this assessment.

Rationale for Evidence Ratings

The level of evidence is based on the findings of studies that examined the effectiveness of recommended practices, meet What Works Clearinghouse (WWC) design standards, and have outcomes in key domains, and that the panel could confidently attribute to a recommendation (see sections on *eligible outcomes* and *interventions that include components from multiple recommendations* in Appendix D). The research used to support the recommendations in this practice guide was primarily identified through a keyword search of several databases. The search focused on studies published between 2000 and 2014 that examined practices for teaching foundational reading skills to students in kindergarten through grade 3. This search was supplemented with additional studies recommended by the expert panel.

The search identified more than 4,500 studies. These studies were then screened using eligibility requirements described in the protocol. For example, the study had to use an eligible design and examine students in the United States and other English-speaking countries. A total of 235 studies met protocol requirements and were reviewed using WWC group design standards. Fifty-six group design studies meet WWC group design standards, tested interventions that the staff and panel could confidently attribute to one recommendation, and had outcomes in key domains.[165]

For this practice guide, study findings in an outcome domain are classified as having a positive or negative effect when the findings are either:

- statistically significant ($p \leq 0.05$)[166] or
- substantively important as defined by the WWC.[167]

Eligible populations. The recommendations in this guide are primarily intended for teachers to use with typically developing students for whom English is the primary language. However, some of the studies used to support the recommendations were conducted with populations of students at greater risk of experiencing difficulty learning to read.[168] In this guide, "at risk" refers to studies in which all sample students scored below a threshold on a pretest—either below the 50th percentile in their classroom, school, or district; below the 50th percentile in an initial sample; or below the 50th percentile on a standardized test norm. Studies with samples labeled as "struggling readers" or "at risk" are not classified as "at risk" unless it was clear that the students were selected based on scoring below the 50th percentile. Samples with students who are at risk for or have emotional or behavioral disorders are also identified in

the appendix tables. Studies in which more than 50 percent of the sampled students had identified disabilities or were English learners were excluded from this review.

Eligible outcomes. The study outcomes were classified into 12 domains related to children's early reading skills (see Table D.1). The outcome domains reflect specific reading concepts (e.g., letter names and sounds) as well as general reading achievement. When studies administer multiple measures within a domain, the tables in this appendix report the overall average effect size for all measures in the domain meeting WWC group design standards.

For consistency, the level of evidence is based on outcomes measured closest to the end of the intervention; these immediate posttest results are listed in the appendix tables. Follow-up outcomes administered after the immediate posttests are presented in the notes of the appendix tables.[169]

To simplify and focus the synthesis of evidence, the panel identified key outcome domains for each recommendation that are closely aligned with the recommendation's practices (see Table D.2). For example, the

Table D.1. Description of outcome domains

Outcome Domain	Description	Sample Outcomes
Encoding	Understanding how letters are combined to represent speech, including spelling	▪ Number of words spelled correctly
General achievement	Skills measured across multiple domains	▪ Reading test score on state test
Letter names and sounds	Knowledge of the names and sounds of the letters of the alphabet	▪ Linking letter sounds to printed letters ▪ Naming letters
Listening Comprehension	Ability to follow, process, and understand spoken language	▪ Providing missing words to complete sentences or passages read by the examiner, so that they make sense ▪ Listening to a sentence read aloud and choosing the picture that best depicts the sentence
Morphology	Knowledge of word parts such as suffixes, prefixes, and/or roots and base words	▪ Reading a sentence and selecting the affixes in certain words
Oral reading accuracy	Ability to read a passage of text correctly	▪ Accurately reading a percentage of words from a passage
Oral reading fluency	Ability to read a passage of text aloud accurately, at an appropriate rate, and with expression	▪ Reading a certain number of words correctly in a minute
Phonology	Understanding the sound structure of language, including articulating language sounds through phonological awareness and phonemic awareness	▪ Blending onsets and rimes or individual phonemes into words (e.g., /s/ /un/ ➔ *sun*) ▪ Deleting specific sounds from spoken words (e.g., "Say *play* without the /p/." ➔ "*lay*.")
Reading comprehension	Understanding the meaning of a passage and the context of the words	▪ Oral or written retelling ▪ Providing missing words to complete sentences
Syntax	Understanding how to form sentences using appropriate grammatical rules	▪ Assessing whether a sentence read aloud is grammatically correct ▪ Combining two short sentences into a grammatically correct single sentence
Vocabulary	Knowledge of the meanings, uses, and pronunciation of words	▪ Verbally defining words and using them in a sentence ▪ Using a particular number of words
Word reading	Ability to translate words into speech, to recognize and identify words, and to analyze words using lists of words rather than passages of connected text	▪ Reading aloud lists of words or nonwords ▪ Silently reading a list of words and selecting the word pronounced by the examiner

panel expects that instruction on phonemic awareness (Recommendation 2) would likely affect outcomes in the phonology domain, but would be unlikely to immediately affect students' listening comprehension skills in a significant way. The panel and staff considered only the findings in the predetermined key domains when determining the level of evidence for each recommendation. For brevity, findings in other domains are not presented in the guide. Nine identified studies examine practices related to a recommendation and meet standards but do not examine the effect of the recommended practices on outcomes in a key domain, so they do not contribute to the level of evidence, are not used as supporting citations for recommended practices, and are not described in this appendix.[170]

Table D.2. Key domains for each recommendation

Recommendation 1	Recommendation 2	Recommendation 3	Recommendation 4
▪ Listening comprehension ▪ Syntax ▪ Vocabulary	▪ Phonology ▪ Letter names and sounds	▪ Word reading ▪ Encoding ▪ Morphology	▪ Word reading ▪ Oral reading accuracy ▪ Oral reading fluency ▪ Reading comprehension

Interventions that include components from multiple recommendations. Many study interventions include instructional practices that are part of multiple recommendations. For example, one intervention might include instruction on phonemic awareness, phonics skills, and letter–sound correspondence (Recommendation 2); instruction on sight words and decodable words (Recommendation 3); and reading fluency and comprehension activities, including timed reading, repeated choral reading, and comprehension discussion (Recommendation 4). Any component of this intervention—and any of these recommendations—could have caused the reported effects in the study.

Because instruction from Recommendations 2–4 is integrated in most curricula, many recent studies do not test interventions with major components from only one recommendation. Excluding interventions with any practices that cross recommendations would ignore relevant evidence and cause the level of evidence to depend mostly on supplemental interventions with limited generalizability.

To determine whether each study with an intervention that included components from multiple recommendations should be used to support the level of evidence for a specific recommendation, the panel and staff determined whether the specific intervention activities aligned with each recommendation were a major part of the intervention and likely to cause any effects (regardless of whether effects were positive, negative, or not discernible). Based on this determination, two types of studies could support individual recommendations:

1. Studies with interventions that had a major component(s) from only one recommendation (i.e., the components from other recommendations were minor and unlikely to affect outcomes); or

2. Studies with interventions that included major components from two recommendations, but where the panel and staff believed the close alignment between the recommendations and their key domains allowed effects in key domains to be attributed to one specific recommendation. For example, if the panel and staff determined that the intervention's phonemic awareness instruction (Recommendation 2) and repeated reading component (Recommendation 4) were both major parts of the intervention and likely caused effects on outcomes, then the panel and staff could use the intervention's effects on phonology outcomes to support Recommendation 2 (because repeated reading would be less likely to affect phonology) and the intervention's effects on fluency outcomes to support Recommendation 4 (because phonemic awareness instruction would be less likely to affect fluency). There were four studies of this type,[171] and most examined Recommendations 2 and 3.

For the remaining 25 studies, the panel and staff determined that interventions included major components from multiple recommendations and could not be used to support any one recommendation.[172] Accordingly, these studies do not contribute to the level of evidence and are not used as supporting citations for the recommended practices. However, these studies support the panel's suggested approach to integrate all the

recommendations and are listed in Table D.3. These studies are relevant to the practice guide's overall recommended approach.

Classifying the intervention and comparison conditions. Some studies evaluated multiple interventions using multiple intervention groups or compared the same intervention group to multiple comparison groups. These contrasts can test multiple interventions that are related to a single recommendation. In this situation, when there were multiple related intervention or comparison groups, the panel and staff identified the contrast that provided the most direct test of the given recommendation and designated that as the most relevant contrast for the recommendation. (The WWC classifies all contrasts that share an intervention or comparison group as part of the same study, and thus only one contrast can contribute to the level of evidence.) For example, if a study tests two interventions—phonemic awareness instruction as well as phonemic awareness and letter name instruction—against a comparison group, then both contrasts against the comparison group are relevant to Recommendation 2, but the contrast of phonemic awareness and letter name instruction vs. the comparison is the more complete test of Recommendation 2 and thus more relevant.

The panel and staff considered only the most relevant contrast for the level of evidence for the recommendation, and only that contrast is described in the tables. Other contrasts are briefly described in the table notes.[173]

Table D.3. Studies supporting multiple recommendations[a]

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[b]	Outcome domain and effect size[c]	Related recommendations
Meets WWC Group Design Standards Without Reservations					
Begeny et al. (2010)[d] *Randomized controlled trial*	45 2nd-graders in the southeastern United States	Tutors implemented the *Great Leaps* program one-on-one with students, instead of regular language arts instruction. The intervention focused on letter recognition and phonics, high-frequency words, and reading stories. The intervention involved 8- to 10-minute sessions 3 times a week for 3 months.	Teachers taught their regular lessons.	Word reading = 0.22	2, 3
Borman, Dowling, and Schneck (2008)[e] *Randomized controlled trial*	680 1st- through 3rd-graders in Florida, Georgia, Idaho, Indiana, North Carolina, and Texas[f]	Teachers implemented the *Open Court* intervention with the whole class. *Open Court* had three parts: (1) preparing to read, which focused on letters and sounds, phonemic awareness, fluency, and word knowledge; (2) reading and responding, which focused on reading, developing vocabulary and comprehension skills; and (3) language arts, which focused on writing, spelling, and grammar usage. The intervention involved 2.5-hour sessions daily for a full school year.	Teachers taught their regular lessons.	Reading comprehension = 0.26 Vocabulary = 0.23	1, 2, 3, 4
Gilbert et al. (2013) *Randomized controlled trial*	212 at risk 1st-graders in the United States (participants were in two adjacent cohorts)	Graduate research assistants implemented a small-group, multi-tiered supplemental tutoring program using a responsiveness-to-intervention (RTI) approach. Topics covered in the tutoring included letter–sound correspondence, sight words, phonemic awareness, decoding, and text reading. The intervention involved 45-minute sessions 3 times a week for 14 weeks.	Teachers taught their regular lessons.	Word reading = 0.09	2, 3, 4

(continued)

Table D.3. Studies supporting multiple recommendationsᵃ *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[b]	Outcome domain and effect size[c]	Related recommen- dations
Savage, Carless, and Stuart (2003) *Randomized controlled trial* This study compares multiple intervention groups to the same comparison group of students.		*SoundWorks vs. typical instruction*			
	52 at risk 5- and 6-year-olds in the United Kingdom	Paraeducators implemented the *Sound-Works* intervention with groups of students. The intervention focused on letter–sound activities, phoneme segmentation and blending, and writing. The intervention involved 20-minute sessions 4 times a week for 9 weeks and replaced typical reading instruction.	Teachers taught their regular lessons.	Encoding = 0.09 Letter names and sounds = 1.52* Phonology = 0.18 Word reading = 0.49	2, 3
		Rime instruction vs. typical instruction			
	52 at risk 5- and 6-year-olds in the United Kingdom	Paraeducators implemented a rime instruction intervention with groups of students. Students arranged plastic letters to spell the word associated with a picture. In addition, students completed activities related to rimes, including writing words, sorting words into groups based on their rimes, and practicing onset–rimes. The intervention involved 20-minute sessions 4 times a week for 9 weeks and replaced typical reading instruction.	Teachers taught their regular lessons.	Encoding = 0.25 Letter names and sounds = 0.90* Phonology = 0.54	2, 3
		Combined phoneme and rime instruction vs. typical instruction			
	52 at risk 5- and 6-year-olds in the United Kingdom	Paraeducators implemented an intervention that combined phonemic awareness and rime instruction to student groups of an unspecified size. The intervention focused on both rime activities and phonemic awareness instruction. The intervention involved 20-minute sessions 4 times a week for 9 weeks and replaced typical reading instruction.	Teachers taught their regular lessons.	Encoding = 0.39 Letter names and sounds = 0.72* Phonology = 0.21 Word reading = 0.78*	2, 3
Savage et al. (2013) *Randomized controlled trial*	1,067 kindergartners, 1st-graders, and 2nd-graders in Quebec, Ontario, and Alberta, Canada	Teachers implemented the computer-based *ABRACADABRA* program within their existing classroom activities. The intervention covered topics including letter knowledge, phonological awareness, high-frequency words, reading accurately with expression, choral reading, and comprehension activities. The intervention involved 60-minute sessions twice a week for 10 to 12 weeks.	Teachers taught their regular lessons.	Letter names and sounds = 0.21 Listening comprehension = 0.08 Oral reading fluency = −0.12[g] Phonology = 0.27 Reading comprehension = 0.01 Word reading = 0.11	1, 2, 3, 4
Simmons et al. (2011) *Randomized controlled trial*	206 at risk kindergartners in south-central Texas and eastern Connecticut	Teachers implemented the *Early Reading Intervention* program with small groups of students. The *Early Reading Intervention* had four units: (1) learning letters and sounds; (2) segmenting, blending, and integrating sounds; (3) reading words; and (4) reading sentences and storybooks. The first half of each session focused on phonological awareness and the alphabet, while the second half focused on writing and spelling using the sounds previously taught. The intervention involved 30-minute sessions daily for 126 days.	Teachers taught their regular lessons.	Encoding = 0.28 Letter names and sounds = 0.31 Phonology = 0.37* Word reading = 0.24	2, 3

(continued)

Table D.3. Studies supporting multiple recommendations[a] *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[b]	Outcome domain and effect size[c]	Related recommen-dations
Torgesen et al. (2006)[h] *Randomized controlled trial* This study compares multiple intervention groups to multiple comparison groups of students.		**Spell Read PAT *vs. typical instruction***			
	92 at risk 3rd-grad-ers near Pittsburgh, Pennsylvania[l]	Teachers implemented 140 lessons from the *Spell Read Phonological Audi-tory Training (Spell Read PAT)* program with groups of 3 students. The inter-vention had three phases: (1) letter names and sounds; (2) blending and two-syllable words; and (3) beginning and ending sounds and multisyllabic words. All phases incorporated shared reading and writing activities. The inter-vention involved 55-minute sessions daily for 7 months.	Teachers taught their regular lessons.	Word Reading = 0.27[j]	2, 3
		Spell Read PAT *vs. Failure Free Reading*[k]			
	108 at risk 3rd-grad-ers near Pittsburgh, Pennsylvania[l]	Teachers implemented 140 lessons from the *Spell Read PAT* program with groups of 3 students. The intervention had three phases: (1) letter names and sounds; (2) blending and two-syllable words; and (3) beginning and ending sounds and multisyllabic words. All phases incorpo-rated shared reading and writing activities. The intervention involved 55-minute sessions daily for 7 months.	Teachers imple-mented *Failure Free Reading* with individual stu-dents. The inter-vention combined computer-based lessons, workbook exercises, and teacher-led instruc-tion on sight-word reading, vocabu-lary, fluency, and comprehension.	Word reading = 0.16[m]	2, 3
Vadasy, Sanders, and Peyton (2006a) *Randomized controlled trial*	67 at risk kinder-gartners in urban schools in the United States	Paraeducators implemented one-on-one tutoring in phonemic and alpha-betic skills. The intervention provided instruction on phonemic decoding skills and oral reading practice using decod-able texts. The intervention involved 30-minute sessions 4 times a week for 18 weeks.[n]	Teachers taught their regular lessons.	Encoding = 0.57* Letter names and sounds = −0.08 Phonology = 0.56 Oral reading fluency = 0.80* Reading compre-hension = 0.28 Word reading = 0.90*	2, 3, 4
Vadasy, Sanders, and Peyton (2006b), Experiment 2 *Randomized controlled trial*	21 at risk 2nd- and 3rd-grad-ers in the northwest-ern United States	Paraeducators provided individual tutoring to students. The first 10 weeks of the intervention focused on letter–sound correspondence, word reading, and spelling. The second half of the intervention focused on reading and spelling multi-syllable words. The inter-vention involved 30-minute sessions 4 times a week for 20 weeks.	Teachers taught their regular lessons.	Encoding = −0.26 Oral reading fluency = 0.55 Reading compre-hension = 0.21 Word reading = 0.71	2, 3, 4

(continued)

Table D.3. Studies supporting multiple recommendations[a] *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[b]	Outcome domain and effect size[c]	Related recommendations
Walton, Walton, and Felton (2001), Experiment 1 *Randomized controlled trial* This study compares multiple intervention groups to the same comparison group of students.		*Combining sounds to form words vs. typical instruction*			
	20 1st-graders in British Columbia, Canada	Research assistants delivered an intervention on letter recoding to groups of 2 to 4 students. The research assistant first provided 1 to 2 minutes of direct instruction on prereading skills, including working with students to sound out letters in sequence to combine them into words. Following the direct instruction, students played cooperative games that covered the topics from the direct instruction. The intervention involved 25-minute sessions twice a week for 11 weeks.	Teachers taught their regular lessons.	Letter names and sounds = 0.59 Phonology = 0.51 Word reading = 0.88	2, 3
		Rime spelling vs. typical instruction			
	20 at risk 1st-graders in British Columbia, Canada	Research assistants delivered an intervention on letter recoding to groups of 2 to 4 students. The research assistant first provided 1 to 2 minutes of direct instruction on prereading skills, including presenting students with words with the same rime spellings and teaching students to recognize ending rime spellings. Following the direct instruction, students played cooperative games that covered the topics from the direct instruction. The intervention involved 25-minute sessions twice a week for 11 weeks.	Teachers taught their regular lessons.	Letter names and sounds = 0.69 Phonology = 0.48 Word reading = 0.88	2, 3
		Meets WWC Group Design Standards With Reservations			
Amendum, Vernon-Feagans, and Ginsberg (2011)[o] *Randomized controlled trial that needs to demonstrate equivalence*	167 kindergartners and 1st-graders in the rural southwestern United States	Teachers implemented the *Targeted Reading Intervention* one-on-one with students. The intervention focused on rereading text to improve fluency, phonological decoding, sight-word recognition, and comprehension strategies. The intervention involved 15- to 20-minute sessions over 7 months.	Teachers taught their regular lessons.	Reading Comprehension = 0.45	1, 2, 3, 4
Borman and Dowling (2009) *Quasi-experimental design*	750 kindergartners in the United States[p]	Teachers implemented *Superkids* with the whole class. The first half of the school year focused on instruction on 13 letters, and the second half of the school year focused on decoding and encoding, as well as blending sounds. The intervention involved 82-minute sessions daily for a full school year.	Teachers taught their regular lessons.	Word reading = 0.30[q]	2, 3
Buckingham, Wheldall, and Beaman (2012)[r] *Randomized controlled trial that needs to demonstrate equivalence*	22 at risk kindergarteners and 2nd-graders in New South Wales, Australia	Trained instructors implemented the *MiniLit* program with groups of 3 to 4 students. Each session included (1) sounds and words activities which covered letter-sound correspondences, blending and segmenting sounds, and sight words; (2) text reading of words and sentences; and (3) storybook reading. The intervention involved 1-hour sessions 4 days a week for 27 weeks.	Teachers taught their regular lessons.	Encoding = 0.85 Word reading = 1.08*	2, 3, 4

(continued)

Table D.3. Studies supporting multiple recommendations[a] *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[b]	Outcome domain and effect size[c]	Related recommen-dations
Cham-bers et al. (2011)[s] *Randomized controlled trial that needs to demonstrate equivalence*	280 at risk 2nd-graders in high-pov-erty schools in nine geographi-cally diverse states in the United States	Tutors implemented the computer-based *Team Alphie* program with groups of 6 students. Two students would work together at a computer, taking turns being the "coach" and the student. The intervention covered pho-nemic awareness, phonics, fluency, and comprehension. Each session included time for each student to read aloud. The intervention involved 45-minute ses-sions 4 days a week.	Tutors covered similar topics to the intervention condition during daily one-on-one 20-minute sessions that did not use a computer.	Word reading = n.r.[t] Reading compre-hension = n.r.	2, 3, 4
Coyne et al. (2013)[u] *Randomized controlled trial that needs to demonstrate equivalence*	162 at risk kindergart-ners in cen-tral Florida	Teachers implemented the *Early Reading Intervention* program with small groups of students. The intervention had four units: (1) learning letters and sounds; (2) segmenting, blending, and integrating sounds; (3) reading words; and (4) read-ing sentences and storybooks. The first half of each session focused on pho-nological awareness and the alphabet, while the second half focused on writ-ing and spelling using the sounds previ-ously taught. The intervention involved 30-minute sessions daily for 126 days.	Teachers taught their regular lessons.	Letter names and sounds = −0.06 Word reading = −0.12	2, 3
Duff, Hayiou-Thomas, and Hulme (2012) *Quasi-exper-imental design*	59 5- to 7-year-olds in North Yorkshire county in the United Kingdom	Teachers implemented a reading pro-gram that emphasized the link between phonological awareness and reading. Instruction took place in groups of 3 students or individually. The interven-tion involved 20-minute sessions daily for 10 weeks.	Teachers taught their regular lessons.	Letter names and sounds = 0.13[v]	2, 4
Ehri et al. (2007) *Quasi-exper-imental design*	134 at risk 1st-grad-ers in an unknown location in the United States	Tutors implemented one-on-one ses-sions using the *Reading Rescue* pro-gram. The tutoring sessions covered the following topics: fluency; word analysis and comprehension; phonologi-cal awareness and word study; pho-nemic awareness; writing to develop phonological awareness, phonics, and comprehension; and comprehension and vocabulary development with a new book. The intervention involved sessions of unspecified frequency and length over 6 months.	Teachers taught their regular lessons.	Word reading = 0.74*	1, 2, 3, 4

(continued)

Table D.3. Studies supporting multiple recommendations[a] *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[b]	Outcome domain and effect size[c]	Related recommen-dations
Johnston and Watson (2004)[w] **Experiment 2** *Quasi-experimental design*	59 5-year olds in Clackman-nanshire and Fife, Scotland	Interventionists implemented a synthetic phonics intervention with groups of 4 to 5 students. Sessions focused on identifying letter names and sounds as well as blending phonemes. The intervention involved 15-minute sessions twice a week for 10 weeks.	Interventionists asked groups of 4 to 5 students to identify the picture corresponding to a word said aloud. The intervention-ist then showed the students the written word cor-responding to the picture, and the students played games to practice associating pictures with whole words.	Letter names and sounds = 0.90** Word reading = 0.97*	2, 3
Little et al. (2012)[y] *Randomized controlled trial that needs to demonstrate equivalence*	90 at risk kindergart-ners in central Florida	Instructors implemented 126 lessons of the *Early Reading Intervention* with groups of 5 students. The intervention contained four units: (1) learning letters and sounds; (2) segmenting, blending and integrating sounds; (3) reading words; and (4) reading sentences and storybooks. The intervention involved 30-minute sessions daily.	Instructors pro-vided 30 minutes of supplemental instruction per day to groups of 5 stu-dents. The exact type of supplemen-tal instruction var-ied by school, with some schools using commercial inter-vention programs and some schools using teacher-constructed and/or district core curricu-lum materials.	Phonology = 0.29 Word reading = 0.17	2, 3
Powers and Price-Johnson (2006) *Quasi-experimental design*	1,888 kin-dergartners in Tucson, Arizona	Teachers implemented the com-puter-based *Waterford Early Reading Program*. The program focused on teaching students to read, write, and type on a keyboard. Students com-pleted the program individually. The intervention involved 15-minute ses-sions that occurred at an unspecified frequency over a full school year.	Teachers taught their regular lessons.	Letter names and sounds = 0.16 Phonology = 0.31 Reading compre-hension = 0.22	2, 3
Skindrud and Ger-sten (2006) *Quasi-experimental design*	434 2nd- and 3rd-graders in Sacramento, California	Teachers implemented the *Open Court Collections for Young Scholars* curricu-lum with the whole class. Each session involved whole-class reading, followed by small-group instruction or indepen-dent work. The intervention involved 2-hour sessions daily over 2 years.	Teachers imple-mented the *Success for All* whole-school reading reform approach. Students received small-group instruction on reading, as well as additional writ-ing, spelling, and grammar lessons outside of normal reading block class-time. The com-parison condition involved 90-minute sessions daily for 2 years.	General achieve-ment = 0.31	1, 2, 3, 4

(continued)

Table D.3. Studies supporting multiple recommendations[a] *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[b]	Outcome domain and effect size[c]	Related recommen-dations
Vadasy and Sanders (2010)[z] *Randomized controlled trial that needs to demonstrate equivalence*	64 at risk kinder-gartners in public schools in an unspeci-fied urban location[aa]	Paraeducators provided individual tutoring to students using the *Sound Partners* model. The tutoring sessions had 20 minutes of instruction on letter–sound correspondence, segmenting and blending phonemes, word reading, spelling, and irregular words. The final 10 minutes of each session was spent on assisted oral reading practice. The intervention involved 30-minute sessions 4 times a week for 18 weeks.	Teachers taught their regular lessons.	Letter names and sounds = 0.76* Encoding = 0.93*	2, 3, 4
Vadasy, Sanders, and Peyton (2006b), Experiment 1 *Quasi-experimental design*	31 at risk 2nd- grad-ers in the northwest-ern United States	Paraeducators implemented supplemental one-on-one instruction with students. The intervention focused on letter–sound correspondence, oral reading practice, and spelling. The intervention involved 30-minute sessions 4 times a week for 20 weeks.	Teachers taught their regular lessons.	Encoding = 0.91* Reading compre-hension = 0.50 Word reading = 0.67	2, 3, 4
Walton, Walton, and Felton (2001), Experiment 2 *Quasi-experimental design*	39 kinder-gartners in British Columbia, Canada	Research assistants delivered an intervention on letter recoding to groups of 2 to 4 students. The research assistant first provided 1 to 2 minutes of direct instruction on prereading skills, including working with students to sound out letters in sequence to combine them into words. Following the direct instruction, students played cooperative games that covered the topics from the direct instruction. The intervention involved 25-minute sessions twice a week for 11 weeks.	Teachers taught their regular lessons.	Phonology = 0.35	2, 3
Wan-zek and Vaughn (2008), Experiment 1 *Quasi-experimental design*	50 at risk 1st- grad-ers in the southwest-ern United States	Tutors provided groups of 5 students with a reading intervention outside the classroom. The first 15 minutes of each session focused on phonics and word recognition, including letter names and sounds, spelling, and word families. The next 5 minutes of the session consisted of fluency activities that addressed improving reading speed and accuracy. In the final 10 minutes of each session, students read short passages and answered comprehension questions. The intervention involved 30-minute sessions daily for 13 weeks.	Teachers taught their regular lessons. Some students received an alternate reading supplement.[ab]	Word Reading = 0.15	2, 3

[a] The studies in this table do not affect the level of evidence for any recommendation. Three studies in this table have multiple relevant contrasts; shaded rows indicate each unique, relevant contrast within each published study.

[b] The duration of the comparison condition was the same as the duration of the intervention condition, unless otherwise noted.

[c] All effect sizes and statistical-significance levels are calculated by the WWC unless otherwise noted. WWC calculations sometimes differ from author-reported results due to WWC adjustments for baseline differences, clustering, or multiple comparisons. Effect sizes that were statistically significant ($p \leq 0.05$) are marked with an asterisk (*). Effect sizes marked "n.r." were not reported. For brevity, this table reports the domain average effect size and statistical significance, and does not include findings for each outcome measure in the domain. Only outcomes from the key domains of the related recommendations for each study are included in the table.

[d] This study is also used as evidence for Recommendation 4. However, the contrast supporting Recommendation 4 includes a different intervention condition than this contrast.

[e] The study does not provide enough information to precisely calculate attrition; however, under all possible scenarios, there was low attrition.

[f] While the study also included 4th- and 5th-grade students, those students are not included in the results reported here because the practice guide targets kindergarten through grade 3. The WWC calculated effect sizes by combining unadjusted posttest data for just the 1st- through 3rd-grade samples and correcting for clustering.

[g] The oral reading fluency and reading comprehension outcomes were only measured with 1st- and 2nd-graders.

[h] This study also included another contrast, *Wilson Reading* vs. *Failure Free Reading*, which was relevant to Recommendations 2 and 3 and met WWC group design standards with reservations. However, this contrast did not have outcomes in the key domains for Recommendations 2 and 3. A third different contrast from this study, involving a different intervention group, contributed to the level of evidence for Recommendation 3.

[i] While the study also included 5th-grade students, those students are not included in the results reported here because this practice guide targets kindergarten through grade 3. For this comparison, the authors conducted separate analyses for eight subgroups; the WWC reports a pooled analysis for all subgroups within the relevant age range.

[j] A follow-up (*n* = 91) was also administered one year after the intervention ended (reported in **Torgesen et al., 2007**). The WWC-calculated effect sizes are 0.18 for the word reading domain, 0.07 for the reading comprehension domain, and 0.00 for the oral reading fluency domain. None of these effect sizes is statistically significant.

[k] This contrast is rated *meets WWC group design standards with reservations*. It is a randomized controlled trial with high attrition, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[l] While the study also included 5th-grade students, those students are not included in the results reported here because this practice guide targets kindergarten through grade 3. For this comparison, the authors conducted separate analyses for eight subgroups; the WWC reports a pooled analysis for all subgroups of the right age.

[m] This is the one-year follow-up effect size, reported in **Torgesen et al. (2007)**. No immediate posttest outcomes in the key domains met WWC group design standards.

[n] Although the study does not label the intervention as *Sound Partners*, WWC has determined that this intervention is the same as *Sound Partners*.

[o] This study is a cluster randomized controlled trial that has high attrition, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[p] The authors did not report sample sizes for each outcome; measures were administered to between 726 and 750 students.

[q] This is the author-reported statistical significance.

[r] This study is a randomized controlled trial with compromised randomization, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[s] This study is a cluster randomized controlled trial that presents analyses focused on student performance and includes students who were not present at the time of randomization. Under current guidance, this design must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[t] The WWC could not calculate effect sizes given the information available in the study.

[u] This study is a cluster randomized controlled trial in which randomization occurred prior to selection of students to participate in the study, which could compromise the randomization process. This design must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[v] The study reports effect sizes as Cohen's *d*; the WWC converted these to Hedge's *g*.

[w] This study is also used as evidence for Recommendation 3. However, the contrast supporting Recommendation 3 includes a different comparison condition than this contrast.

[x] A follow-up (*n* = 57) was also administered three months after the intervention ended. The WWC-calculated effect sizes are 0.47 for the letter names and sounds domain and 0.70 for the word reading domain. The word reading effect is statistically significant. A second follow-up (*n* = 55) was administered nine months after the intervention ended. The WWC-calculated effect size for the word reading domain is 0.90, and the effect is statistically significant.

[y] This study is a randomized controlled trial with compromised randomization, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[z] This study is a randomized controlled trial with high attrition, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[aa] The majority of students in the study's full sample were "language-minority" students, but the results reported here are the disaggregated results for the non–language minority students only.

[ab] Ten of the 29 students in the comparison group received typical classroom instruction; the remaining 19 students received an alternate reading intervention for 30–700 minutes per week over 13 weeks in addition to typical classroom instruction.

Recommendation 1. Teach students academic language skills, including the use of inferential and narrative language, and vocabulary knowledge.

Level of evidence: Minimal Evidence[174]

WWC staff and the panel assigned an evidence level of *minimal* based on the seven relevant studies that meet WWC group design standards (see Table D.4).[175] The panel identified key outcome domains that are closely aligned with the recommendation's three components: listening comprehension (narrative language instruction), syntax (inferential language instruction), and vocabulary (vocabulary instruction). Three studies found positive effects on vocabulary outcomes[176]—aligned with the third recommendation component on teaching academic vocabulary—and these studies demonstrated internal validity and external validity. However, three other studies found no discernible effects on vocabulary outcomes.[177] In addition, the recommendation received a minimal level of evidence because none of the studies examined effects on syntax outcomes (aligned with the second component of Recommendation 1, developing narrative language skills) and all of the studies examining listening comprehension outcomes (aligned with the first component of Recommendation 1, using inferential language) found no discernible effects.[178]

Three of the six studies that examined outcomes in the vocabulary domain showed positive effects.[179] One of these three studies measured vocabulary knowledge using a standardized test,[180] and two studies used researcher-developed measures.[181] All four studies examining listening comprehension outcomes found no discernible effects.[182] Two of these studies used standardized tests,[183] one study employed a combination of standardized and researcher-developed measures,[184] and one study used a researcher-developed test.[185] The panel believes that narrative interventions can improve skills other than listening comprehension, and

that the insignificant effects for the listening comprehension outcomes might result from less precise outcome measures.

The studies collectively demonstrated strong internal validity: five studies were randomized controlled trials with low sample attrition that meet WWC group design standards without reservations,[186] and two studies were randomized controlled trials that needed to demonstrate equivalence and meet WWC group design standards with reservations.[187]

Only one study was closely aligned with all three components of the recommendation.[188] This study evaluated explicit whole-class instruction that focused on vocabulary, grammar, and reading narrative and expository texts aloud. The intervention group was compared to classrooms engaged in their regular activities, and the study reported a positive effect on a researcher-developed measure of vocabulary and no discernible effects on a measure of listening comprehension.

Three of the studies compared interventions with instruction on inferential language and vocabulary—the first and third components of Recommendation 1—to regular instruction.[189] Collectively, these studies had both vocabulary and listening comprehension outcomes, and typically found no discernible effects. In one study, intervention students identified the clue words commonly used to indicate comparisons as they read silently.[190] Teachers then encouraged the students to use those words to describe orally the differences and similarities of animals described in the text, and write a summary of the text. In the second study, teachers implemented a supplemental vocabulary program that focused on teaching vocabulary words that are common in written communication.[191] Finally, one study did find positive effects on a standardized measure of vocabulary, but it found no discernible effects on listening comprehension.[192] In this large study, teachers introduced kindergartners to academic and content-specific vocabulary, and then engaged students in extended conversations

that modeled complex language structure and introduced taught words.

Two study interventions featured instruction on narrative language and vocabulary—the second and third components of Recommendation 1—and both these studies found no discernible effects on vocabulary.[193] In one study, an author-developed intervention based on storybooks and focused on building vocabulary and narrative skills was compared to regular instruction.[194] The second study compared an author-developed storybook intervention involving vocabulary and comprehension instruction with the sounds and letters module of the *Open Court* intervention.[195]

A final study intervention involved only vocabulary instruction—the third component of Recommendation 1—and compared the intervention to regular instruction. In this study, graduate students read storybooks multiple times to small groups of students, exposing students to target vocabulary words.[196] The study reported a positive effect on a researcher-developed measure of vocabulary.

The students in the seven studies were in kindergarten through 2nd grade, and the study samples and locations were diverse. Six studies were conducted across the United States (including the Pacific Northwest, South, Southeast, and Mid-Atlantic regions),[197] and one study[198] was conducted in the United Kingdom. All participants in three studies were at risk for reading difficulties.[199] Participants in the remaining four studies were students drawn from general education classrooms and schools.[200]

The interventions typically occurred during the school day, lasted more than eight weeks, and were usually implemented by a teacher. For six studies,[201] the intervention occurred during scheduled classes within the regular school day, and the remaining study intervention was a supplemental intervention occurring either before or after school.[202] The interventions lasted from nine weeks to about one and a half school years, with the median being around 20 weeks. The delivery of the intervention also varied: four of the interventions were delivered by teachers,[203] one was delivered by a combination of teachers and teacher assistants,[204] one was delivered by teaching assistants,[205] and one by graduate students.[206] The studies as a whole, supported by a sample of 4,550 students, provide moderate to high external validity.

The panel and staff determined there is minimal evidence for Recommendation 1. The seven studies contributing evidence for the recommendation have internal and external validity; however, the findings do not provide a preponderance of evidence of positive effects.

Table D.4. Studies providing evidence for Recommendation 1

Study and design	Participants and location	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
**Meets WWC Group Design Standards Without Reservations**
Baker et al. (2013) *Randomized controlled trial*	205–208 (depending on outcome) 1st-graders in 12 schools in the Pacific Northwest region of the United States	Teachers provided explicit whole-class instruction during read-alouds of narrative and expository texts, focusing on vocabulary and grammar and prompting discussions. Teachers identified the type of book and taught the students relevant vocabulary. While reading the book, the teacher focused on grammar in narrative texts, and the "What I Know, What I Want to Know, What I Learned (KWL)" reading strategy in expository texts. After the book was finished, the class summarized the text, practiced retelling it, and reviewed vocabulary. The intervention involved 30-minute sessions 4 times a week for 19 weeks.	Teachers led read-aloud activities following their usual practices for the whole class.	Listening comprehension = 0.15 Vocabulary = 0.71*	1, 2, 3
Duff et al. (2014) *Randomized controlled trial*	52 at risk 6-year-old students in the United Kingdom	Teaching assistants implemented an author-developed intervention for groups of 2 to 4 students. The intervention had two components: (1) a reading strand, which focused on phonological awareness and reading, and (2) a language component, which was based on storybooks and focused on building vocabulary and narrative skills. The teaching assistants led 20- to 30-minute sessions daily for 9 weeks, with the reading strand implemented 3 times a week and the language component twice a week.	Teachers taught their regular lessons.	Listening comprehension = 0.01[c] Vocabulary = −0.10	2, 3
Justice, Meier, and Walpole (2005) *Randomized controlled trial*	57 at risk kindergartners in the Mid-Atlantic region of the United States	Graduate students read storybooks multiple times to groups of 3 to 6 students, exposing students to target vocabulary words. The intervention involved 20-minute sessions 1 to 3 times a week for 10 weeks.	Teachers taught their regular lessons.	Vocabulary = 0.42	3
Simmons et al. (2007)[d] *Randomized controlled trial*	64 at risk kindergartners in the Pacific Northwest region of the United States	Teachers and teaching assistants provided groups of 5 or fewer students with highly detailed, scripted instruction that incorporated scaffolding and specific examples for students. The first half of each lesson taught phonological awareness and alphabetic knowledge. The second half focused on understanding story structure, encouraging story retelling, and learning vocabulary through repeated readings of storybooks, targeted vocabulary lessons, and exposing students to vocabulary words multiple times within and across lessons. Instruction involved 108 30-minute lessons daily during supplemental instruction time, either before or after the typical school day.	Teachers and teaching assistants provided groups of 5 or fewer students with moderately detailed instruction on phonemic awareness and letters, based on the Sounds and Letters component of *Open Court Reading 2000*.	Vocabulary = 0.10[e]	2, 3,

(continued)

Table D.4. Studies providing evidence for Recommendation 1 *(continued)*

Study and design	Participants and location	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Williams et al. (2009)[f] *Randomized controlled trial*	141 2nd-graders in 10 class-rooms in an unspecified location	Using whole-class instruction focused on specific animals, teachers introduced and defined vocabulary words, and then read about the target animals from an encyclopedia. Next, teachers asked students to read a compare-and-contrast paragraph, to use a matrix to organize the paragraph's content, and to write a summary of the text. The intervention involved 22 45-minute sessions 3 times a week over 2 months.	Teachers taught their regular lessons with no instruction in reading science content.	Vocabulary = 1.71[g]	1, 3
Meets WWC Group Design Standards With Reservations					
Apthorp et al. (2012)[h] *Randomized controlled trial that needs to demonstrate equivalence*	2,803 kindergartners through 2nd-grad-ers in the southeastern United States	Teachers implemented the *Elements of Reading: Vocabulary* program with the whole class as a supplement to their existing reading program. The intervention focused on teaching vocabulary words that are common in written, but not verbal, communication, as well as words that are more complex versions of simple concepts (such as *abolish* and *chamber*). On day 1 of each unit, the teacher introduced the context and meaning of the target vocabulary words through a story, detailed explanations, and illustrated cards. During the following 3 days, students used the same group of words in different contexts. On the final day of the unit, day 5, teachers assessed students' knowledge of the words. The intervention was implemented in 10- to 20-minute sessions 5 days a week daily for about one and a half school years.	Teachers taught their regular lessons.	Listening comprehension = 0.05[i]	1, 3
Good-son et al. (2010)[j] *Randomized controlled trial that needs to demonstrate equivalence*	1,228 kindergart-ners in the Mississippi Delta region and sur-rounding districts in the United States	Teachers implemented *Kindergarten PAVEd for Success (K-PAVE)* to their entire classrooms as a supplement to typical instruction. Each week, teachers introduced 10 thematically-linked target vocabulary words using explicit instruction with picture cards. Teachers reinforced the 10 words throughout with three strategies: (1) using interactive readings of one nonfiction book and one fiction book that included the target words at least twice; (2) having conversations with students using the words; and (3) leading activities in other subjects that included the target words. The intervention took place over 24 weeks.	Teachers taught their regular lessons.	Listening comprehension = 0.13[k] Vocabulary = 0.05*	1, 3

[a] The duration of the comparison condition was the same as the duration of the intervention condition, unless otherwise noted.

[b] All effect sizes and statistical-significance levels are calculated by the WWC unless otherwise noted. WWC calculations sometimes differ from author-reported results due to WWC adjustments for baseline differences, clustering, or multiple comparisons. Effect sizes that were statistically significant ($p \leq 0.05$) are marked with an asterisk (*). For brevity, this table reports the domain average effect size and statistical significance, and does not include findings for each outcome measure in the domain. The key domains for Recommendation 1 are listening comprehension, syntax, and vocabulary.

[c] The study did not report the information necessary for the WWC to calculate effect sizes. The presented effect sizes are reported in the study.

[d] This study also included another relevant contrast that compared the same intervention group to a different comparison group (highly specified instruction and storybook reading vs. highly specified instruction); the findings are similar. Additional information for this study was reported in **Coyne et al. (2004b)**.

[e] The effects of this intervention on one standardized outcome were reported in **Simmons et al. (2007)** (effect size = −0.05) and one researcher-developed outcome in **Coyne et al. (2004b)** (effect size = 0.25). Because the analytic sample of students was identical in both studies, the WWC pooled both outcomes to calculate a domain average effect.

[f] This study also included another relevant contrast that compared a different intervention group to the same comparison group (content-only vs. typical classroom instruction); the findings are similar.

[g] The authors reported cluster-level standard deviations for classrooms but did not report standard deviations for individual students. This effect size was not used when determining the level of evidence for this recommendation, and the statistical significance of this finding was calculated by the authors.

[h] This study is a cluster randomized controlled trial with unknown attrition, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[i] This author-reported effect size is for the second-year follow-up outcomes. No immediate posttest outcomes met WWC group design standards.

[j] The study is a cluster randomized controlled trial that presents analyses focused on student performance and may include students who were not present at the time of randomization. Under current WWC guidance, this design must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

[k] The authors used a three-level hierarchical linear modeling (HLM) analysis that accounts for clustering at the classroom and school levels. The effect sizes and statistical significance reported are based on nonimputed data and were reported by the authors. The sample sizes reported are for the students with posttest data.

Recommendation 2. Develop awareness of the segments of sounds in speech and how they link to letters.

Level of evidence: Strong Evidence

WWC staff and the panel assigned this recommendation an evidence level of *strong* based on the 17 relevant studies that meet WWC group design standards and had outcomes in the key domains (see Table D.5).[207] All 17 studies found positive effects in at least one of this recommendation's two key domains (letter names and sounds, and phonology). The studies collectively demonstrated strong internal validity; 12 of the studies meet WWC group design standards without reservations.[208] Eight of the 17 studies examined interventions including all three components of the recommendation,[209] with most of the other studies including two components of the recommendation. The studies had high external validity, including diverse American students in the relevant grades—kindergarten and 1st grade—and typically comparing the intervention to regular classroom instruction.

The studies provide evidence of consistent positive effects in both key domains: 12 studies found positive impacts in the phonology domain,[210] and nine studies found positive impacts in the letter names and sounds domain.[211] Each of the six studies that examined only phonology outcomes[212] and four studies that examined only letter–sound outcomes[213] found positive effects. Of the seven studies that examined outcomes in both domains, four studies found positive impacts in both domains,[214] two studies found positive impacts in only the phonology domain,[215] and one study found positive impacts in only the letter names and sounds domain.[216]

Eleven studies measured the impacts using standardized outcome measures,[217] and three studies used researcher-developed outcomes to measure impacts.[218] Three studies used a combination of standardized outcome measures and author-created measures.[219]

The studies demonstrate strong internal validity: 12 were randomized controlled trials that meet WWC group design standards without reservations.[220] Of the remaining five studies, two studies were quasi-experimental designs[221] and three studies were randomized controlled trials that demonstrated baseline equivalence as required.[222] These five studies meet WWC group design standards with reservations.

Consistent with the panel's recommendation to integrate instruction of the recommended practices, the study interventions typically

implement more than one of the recommendation's three components: recognizing and manipulating segments of sounds in speech, understanding letter–sound relations, and linking knowledge of letter–sound relationships with phonemic awareness.

Eight studies examining interventions closely aligned with all three components of Recommendation 2 found positive impacts.[223] In all eight interventions, teachers led students in activities around phonemic awareness, including blending and segmenting phonemes, and identifying specific phonemes in words. For example, three interventions taught students to identify initial phonemes in words,[224] and two study interventions included instruction on rhyming skills.[225] Each of the interventions also included letter–sound instruction, the second component of Recommendation 2. For example, in one study, instructors taught students seven letter sounds, and after practicing the sounds, students identified the letter of the sound that the instructor spoke aloud during a cooperative game.[226] Finally, the studies' interventions addressed connecting letter–sound relationships and phonemic awareness, the third component of Recommendation 2. For example, one of these studies used word-building exercises to enhance students' awareness of how each letter or phoneme in a word contributes to its spelling and pronunciation.[227] Of the eight studies, seven compared the students in the intervention group to students engaged in regular classroom activities;[228] the comparison group in the remaining study read storybooks.[229] Together, these studies provide compelling evidence for implementing all the components of Recommendation 2 together.

Four studies with positive effects tested interventions closely related to the first and second components of Recommendation 2.[230] In all four studies, teachers led students in activities related to phonemic awareness, including blending and segmenting phonemes, and identifying specific phonemes in words.[231] In terms of letter–sound awareness—the second component of Recommendation 2—two of the four studies' interventions taught letter identification,[232] one taught letter–sound correspondence,[233] and one contained components focused on alphabetic understanding.[234] Of the four studies, three compared students in the intervention group to students engaged in regular classroom activities;[235] the remaining study's comparison groups received math or drawing instruction.[236]

One study intervention related to the first and third components of Recommendation 2 also included instruction on phonemic awareness, blending and segment phonemes, and rhyming.[237] In addition, this study's intervention combined instruction on phonemes with reading activities. The study compared students receiving the intervention to students receiving regular classroom instruction.

Two studies' interventions related to the first component of Recommendation 2, and both focused on phonemic awareness, including identifying initial phonemes.[238] For example, in one study, teachers asked students to identify the pictures of words that had the same first phoneme as a word spoken aloud by the class.[239] One study also included activities focused on rhyming skills.[240] Both studies' comparison groups received math or drawing instruction.

Finally, two studies' interventions related to the third component of Recommendation 2.[241] Teachers in one study provided explicit links between instruction on letter–sound correspondence and phonemic awareness.[242] The second intervention provided students with manipulative letters to help with word-building within the *University of Florida Literacy Initiative* tutoring model.[243] One study's comparison group received instruction on printed letters and on blending and segmenting phonemes; however, the teacher did not make explicit links between the two topics during instruction.[244] The second study compared students receiving different variations of the *University of Florida Literacy Initiative* tutoring program to each other.[245]

Twelve studies implemented interventions with groups of two to eight students.[246] In one study, teachers implemented the intervention with the whole class, although some activities were completed by small groups of students,[247] and in another study the implementation was not described.[248] In the three remaining studies, students received one-on-one tutoring.[249] Three studies involved computer-based interventions,[250] while one study examined an intervention implemented during a remedial-assistance program.[251] Although the supporting studies typically implement instruction in small groups, the panel believes—consistent with other studies that meet WWC group design standards—that the practices will be effective in both whole-class instruction and individual instruction.

Most of the interventions supplemented regular literacy instruction, but all the studies took place at schools. Nine of the interventions occurred as a supplement to regular literacy instruction.[252] Three studies occurred during regular literacy instruction time,[253] and the five remaining studies were not clear about the exact timing of sessions.[254] One study took place in the regular reading classroom,[255] one took place in a computer lab,[256] and three other studies took place in rooms adjacent to the students' normal classroom.[257] The remaining studies did not explicitly state the location of the intervention sessions.

Most interventions lasted at least 20 sessions. Intervention sessions typically lasted about 20 to 35 minutes, although three interventions were shorter than 20 minutes[258] and three were longer than 35 minutes.[259]

The study samples were composed of diverse students in kindergarten and 1st grade. Six studies targeted students at risk for reading difficulties,[260] while 11 included readers at all levels.[261] None of the studies had samples composed of a majority of English learners or students with a disability. Eleven studies included kindergartners,[262] five studies included 1st-graders,[263] and one study examined students in 1st through 4th grades.[264] The studies took place across the United States or Canada.[265] The studies as a whole provide strong external validity.

The panel and staff determined there is strong evidence for Recommendation 2. The 17 studies contributing evidence for the recommendation have strong internal and external validity, and they demonstrate consistent positive effects in phonology and letter names and sounds.

Table D.5. Studies providing evidence for Recommendation 2

Study and design	Participants and location	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Meets WWC Group Design Standards Without Reservations						
Hagans and Good (2013) *Randomized controlled trial*	50 1st-graders in the Pacific Northwest region of the United States	Graduate students implemented a phonological awareness intervention for groups of 3 to 7 students. Lessons focused on initial- and final-phoneme identity, segmenting and blending phonemes, and letter–sound correspondence. The intervention involved 20- to 25-minute sessions 4 times a week for 12 weeks.	Graduate students implemented supplemental mathematics instruction for groups of 3 to 7 students.	Phonology = 1.36*	1, 2

(continued)

Table D.5. Studies providing evidence for Recommendation 2 *(continued)*

Study and design	Participants and location	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Lane et al. (2007) *Randomized controlled trial*	24 at risk 1st-graders, who demonstrated externalizing or internalizing behaviors, in the southeastern United States	Paraprofessionals implemented the *Phonological Awareness Training for Reading (PATR)* for small groups of 3 to 4 students outside the normal literacy instruction period. Sessions focused on rhyming, blending and segmenting phonemes; reading; and spelling. The intervention involved 30-minute sessions 3 times a week for 10 weeks.	Teachers taught their regular lessons.	Phonology = 0.74*	1, 3
Mitchell and Fox (2001) *Randomized controlled trial*	48 at risk kindergartners and 1st-graders in the southeastern United States	Groups of 6 students used the *Daisy Quest* and *Daisy's Castle* software programs. *Daisy Quest* emphasized the identification of rhymes, as well as beginning, middle, and ending sounds in words. *Daisy's Castle* focused on individual phonemes and blending. The student received feedback and demonstrated mastery by responding to a series of multiple-choice questions. The intervention involved 20-minute sessions over 5 weeks, for a total of 5 hours.	Groups of 6 students used drawing and mathematics software programs.	Phonology = 0.82*	1
Nelson, Benner, and Gonzales (2005) *Randomized controlled trial*	36 kindergartners, who were also at risk for emotional disturbances, in a medium-sized city in the Midwest region of the United States[c]	Paraprofessional tutors implemented the *Stepping Stones to Literacy* intervention one-on-one with students. The intervention focused on sounds, letter names, sentence meanings, phonological and phonemic awareness, and serial processing or rapid automatic naming (the ability to quickly name colors, letters, numbers, and objects as they are displayed). The intervention involved 10- to 20-minute sessions daily for 25 days.	Teachers taught their regular lessons.	Phonology = 0.90* Letter names and sounds = 0.38	1, 2
Nelson et al. (2005) *Randomized controlled trial*	63 kindergartners, who were also at risk for behavioral disturbances, in the Midwest region of the United States[d]	Paraprofessional tutors implemented the *Stepping Stones to Literacy* intervention one-on-one to students. The intervention focused on sounds, letter names, sentence meanings, phonological and phonemic awareness, and serial processing or rapid automatic naming. The intervention involved 10- to 20-minute sessions daily for 25 days.	Teachers taught their regular lessons.	Phonology = 0.56 Letter names and sounds = 1.18*	1, 2
Oudeans (2003) *Randomized controlled trial*	41 kindergartners in the Pacific Northwest region of the United States	Teachers led groups of 3 to 4 students in 40 lessons on printed letters. For half of the lesson, teachers implemented activities to teach the names and sounds of letters. The second half of the lesson consisted of activities involving blending and segmenting phonemes. Teachers made explicit, direct connections and links between letter–sound awareness and phonological awareness. The intervention involved 15-minute sessions 4 times a week for 10 weeks.	Teachers led groups of 3 to 4 students in 40 lessons on using the same approach as the intervention condition, except teachers did not make explicit references connecting both sets of activities.	Phonology = 0.30[e] Letter names and sounds = 0.03	3

(continued)

Table D.5. Studies providing evidence for Recommendation 2 *(continued)*

Study and design	Participants and location	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Ouellette and Senechal (2008) *Randomized controlled trial*	46 kindergartners in a large city in Canada	Teachers conducted 9 sessions on phonological awareness for groups of 3 to 6 students. Each session began with letter–sound training. Teachers then read a word four times, and the students said the word together once in unison. Next, teachers gave students a sheet with four pictures, and the students matched the pictures based on shared initial and final sounds. The intervention involved 25-minute sessions over 4 weeks.	Teachers implemented a drawing-based intervention for groups of 3 to 6 students. Teachers read a word four times, and the students said the word together once in unison. Then the teacher asked students to draw the word.	Phonology = 0.62* Letter names and sounds = 0.16	1
Rashotte, MacPhee, and Torgesen (2001) *Randomized controlled trial*	82 at risk 1st-, 2nd-, 3rd-, and 4th-graders in Newfoundland, Canada[f]	Teachers that were not the students' normal reading teachers implemented *Spell Read Phonological Auditory Training (Spell Read PAT)* with groups of 3 to 5 students. Each lesson included three activities: (1) students completed phonemic activities to practice blending and segmenting words, (2) students took turns reading aloud, and (3) students wrote about what they read. The intervention involved 50-minute sessions daily for 8 weeks.	Teachers taught their regular lessons.	Phonology = 1.03*[g]	1, 2, 3
Savage et al. (2009)[h] *Randomized controlled trial*	101 1st-graders in Montreal, Canada	A trained facilitator led groups of 4 students on the computer-based *ABRACADABRA* program with analytic phonics. The intervention introduced letter sounds slowly to allow students to explore the sounds more in depth. The intervention involved 20-minute sessions 4 times a week for 20 weeks.	Teachers taught their regular lessons.	Phonology = 0.25[i] Letter names and sounds = 0.41*	1, 2, 3
Scanlon et al. (2005)[j] *Randomized controlled trial*	319 at risk kindergartners in Albany, New York	Teachers implemented a remedial-assistance program for groups of 3 students. The program focused on reading to and with students, phonemic awareness, letter names and sounds, and writing. The intervention involved 30-minute sessions twice a week from mid-October to early June.	Teachers taught their regular lessons, and students could access remedial assistance normally available within the schools.	Letter names and sounds = 0.25	1, 2, 3
Torgesen et al. (2010)[k] *Randomized controlled trial*	74 at risk 1st-graders in Tallahassee, Florida	Teachers led groups of 3 students through the computer-based *Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (LiPS®)*. Sessions occurred either outside reading instructional time or during time dedicated to small-group work in the typical reading classroom. Students learned how to articulate phonemes, used manipulatives to represent phonemes in words, used software that mimicked teachers' instructional activities and provided feedback, and read text both on and off the computer. The intervention involved 50-minute sessions 4 times a week for a full school year.	Teachers taught their regular lessons during small-group time in their reading classes, and students had access to typical additional support from resource teachers.	Phonology = 0.69*[l]	1, 2, 3

(continued)

Table D.5. Studies providing evidence for Recommendation 2 *(continued)*

Study and design	Participants and location	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Walton et al. (2001), Experiment 1 *Randomized controlled trial*	21 kindergartners on a Native American reservation in British Columbia, Canada	An interventionist instructed groups of 2 to 4 students on a rime-analogy reading strategy, rhyming, initial-phoneme identity, and letter–sound knowledge. After direct instruction on these topics, students played cooperative games with hand puppets, focusing on the skills taught in the direct instruction. The intervention took place outside regular classroom time and involved 25-minute sessions twice a week for 10 weeks.	An interventionist read storybooks to groups of 2 to 4 students.	Phonology = 0.59 Letter names and sounds = 0.50	1, 2, 3
Meets WWC Group Design Standards With Reservations					
Frechtling, Zhang, and Silverstein (2006)[m] *Quasi-experimental design*	398 kindergartners in an urban setting in the United States (location not reported)	Teachers implemented the *Voyager Universal Literacy System* with their whole class. The *Voyager* intervention addressed phonemic awareness, phonics, fluency, vocabulary, and listening and reading comprehension. Some activities were completed in small groups. The intervention involved 2-hour instructional blocks for 8 months.	Teachers taught their regular lessons.	Letter names and sounds = 0.28	1, 2, 3
Gunn, Smolkowski, and Vadasy (2011)[n] *Randomized controlled trial that needs to demonstrate equivalence*	1,405 kindergartners in suburban and rural settings in New Mexico and Oregon[o]	Teachers implemented the *Read Well Kindergarten* reading program with groups of 2 to 8 students. Sessions included decoding practice and story reading. They also focused on vocabulary, phonological awareness, alphabetic understanding, and decoding. The intervention involved 20-minute sessions daily for 7 months.	Teachers taught their regular lessons.	Letter names and sounds = 0.17* Phonology = 0.00	1, 2
Hecht (2003) *Quasi-experimental design*	213 kindergartners in Orange County, Florida	Teachers implemented the *Voyager Universal Literacy System*. The intervention lasted for about 5 months.	Teachers taught their regular lessons.	Letter names and sounds = 0.32	1, 2, 3
Lane et al. (2009)[p] *Randomized controlled trial that needs to demonstrate equivalence*	35 at risk 1st-graders in the southeastern United States	Tutors implemented one-on-one sessions using the full *University of Florida Literacy Initiative (UFLI)* tutoring model. Tutoring sessions included reading a familiar book, using manipulative letters, using encoding and decoding skills, writing sentences based on the familiar book students had read, and reading an unfamiliar book. The intervention also introduced a new genre of text and taught strategies to read that genre (extended literacy activities). The sessions included a running record of reading progress. The intervention involved 38-minute sessions 3 to 4 times a week for 35 to 40 sessions.	Tutors implemented one-on-one sessions using the *UFLI* tutoring model without the manipulative-letters component. The intervention involved 35-minute sessions.	Phonology = 0.33	3

(continued)

Table D.5. Studies providing evidence for Recommendation 2 *(continued)*

Study and design	Participants and location	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Walton and Walton (2002)[q] *Randomized controlled trial that needs to demonstrate equivalence*	32 kindergartners in British Columbia, Canada	The research team led groups of 2 to 4 students in an intervention focusing on a rime-analogy reading strategy and the prereading skills of rhyming, initial-phoneme identity, and letter–sound knowledge. Each session began with 2 minutes of direct instruction, followed by a cooperative game that addressed the skill taught in the direct instruction. Equal time was spent on rhyming, initial phoneme identification, and letter–sound knowledge. The intervention took place outside regular classroom time and involved 25-minute sessions twice a week for 10 weeks.	Teachers taught their regular lessons.	Letter names and sounds = 1.61*	1, 2, 3

[a] The duration of the comparison condition was the same as the duration of the intervention condition, unless otherwise noted.

[b] All effect sizes and statistical-significance levels are calculated by the WWC unless otherwise noted. WWC calculations sometimes differ from author-reported results due to WWC adjustments for baseline differences, clustering, or multiple comparisons. Effect sizes that were statistically significant ($p \leq 0.05$) are marked with an asterisk (*). For brevity, this table reports the domain average effect size and statistical significance, and does not include findings for each outcome measure in the domain. The key domains for Recommendation 2 are phonology, and letter names and sounds.

[c] To be eligible to participate, students had to meet the behavioral requirements, and correctly segment fewer than 18 phonemes and identify 27 or fewer letter names on the Dynamic Indicators of Basic Early Literacy Skills Phoneme Segmentation Fluency (DIBELS-PSF) and Letter Naming Fluency (DIBELS-LNF) probes, indicating they were at risk for reading problems.

[d] To be eligible to participate, students had to meet the behavioral disturbance requirements, and identify seven or fewer letters on the Dynamic Indicators of Basic Early Literacy Skills Letter Naming probe (DIBELS-LNF), indicating they were at risk for reading difficulties.

[e] A follow-up ($n = 41$) was also administered 10 days after the intervention ended. The WWC-calculated effect sizes are 0.23 for the phonology domain and 0.11 for the letter names and sounds domain. Neither effect size is statistically significant. The study also reported effects of a maintenance test ($n = 41$) administered six weeks after the intervention. The WWC-calculated effect sizes on the maintenance test are 0.23 for the phonology domain and 0.26 for the letter names and letter sounds domain. Neither effect is statistically significant.

[f] The authors presented analyses for students in two grade-level groups of interest to this practice guide: grades 1–2 and grades 3–4. The WWC-calculated effect size combines results all four grades. While the study also included 5th- and 6th-grade students, those students are not included in the results reported here because this practice guide targets kindergarten through grade 3.

[g] For one of the three outcomes in this domain, the authors only reported outcomes for 2nd-, 3rd-, and 4th-graders.

[h] This study also included another relevant contrast that compared a different intervention group to the same comparison group (*ABRACADABRA* with synthetic phonics vs. typical instruction). The findings are different for this contrast: there were no discernible effects in the letter names and sounds domain, but there were positive effects in the phonology domain. The *ABRACADABRA* with synthetic phonics vs. typical instruction contrast contributed to the level of evidence for Recommendation 3.

[i] A follow-up ($n = 81$) was administered seven months after the intervention ended. The WWC-calculated effect sizes are −0.02 for the letter names and sounds domain and 0.03 for the phonology domain. Neither effect is statistically significant.

[j] This study also contributed to the level of evidence for Recommendation 3. In addition, this study included two contrasts with 1st-grade students: phonological skills emphasis vs. typical instruction and phonological skills emphasis vs. text emphasis. While both of these contrasts meet WWC group design standards and are relevant to Recommendation 2, neither have outcomes in the key domains for this recommendation so are not included in the table. The contrast between text emphasis and phonological skills emphasis among the 1st-grade sample contributed to the level of evidence for Recommendation 4.

[k] This study also included another relevant contrast that compared a different intervention group to the same comparison group (*Read, Write, and Type* vs. typical instruction); the findings are similar at immediate posttest. For the follow-up one year after the intervention, the study found no discernible effects in the phonology domain for this contrast. The *Read, Write, and Type* vs. typical instruction contrast contributed to the level of evidence for Recommendation 3.

[l] A follow-up ($n = 74$) was administered one year after the intervention. The WWC-calculated effect size for the phonology domain is 0.37, and the effect is not statistically significant.

[m] This study also contributed to the level of evidence for Recommendation 3.

[n] The study is a cluster randomized controlled trial that presents analyses focused on student performance and includes students who were not present at the time of randomization. Accordingly, this design must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*. This study also contributed to the level of evidence for Recommendation 3.

[o] The reported sample sizes varied throughout the study. All WWC calculations were based on the most conservative sample sizes presented by the authors.

^p This study is a randomized controlled trial with high attrition, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*. The study also included two other relevant contrasts that compared different intervention groups to the same comparison group (*UFLI* without extended literacy vs. *UFLI* without manipulative letters; *UFLI* without sentence writing vs. *UFLI* without manipulative letters). The results are different for these contrasts: the study found no discernible effects in the phonology domain for either contrast. In addition, another contrast (using a different intervention and comparison group) contributed to the level of evidence for Recommendation 4.

^q This study is a randomized controlled trial with high attrition, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*. The study also included three other relevant contrasts that compared different intervention groups to different comparison groups (initial phoneme identity and letter–sound knowledge vs. rime-analogy reading strategy; rhyming, initial-phoneme identity, and letter–sound knowledge vs. rime-analogy reading strategy; rhyming and letter–sound knowledge vs. rime-analogy reading strategy); the findings are similar for these three contrasts.

Recommendation 3. Teach students to decode words, analyze word parts, and write and recognize words.

Level of evidence: Strong Evidence

WWC staff and the panel assigned an evidence level of *strong* based on 18 relevant studies that meet WWC group design standards and had outcomes in the key domains (see Table D.6).[266] Thirteen studies had positive effects in the word reading and/or encoding domains,[267] and no study that meets WWC group design standards examined an outcome in the third key domain (morphology). The studies with positive effects collectively demonstrate high external and internal validity: seven studies meet WWC group design standards without reservations,[268] and the studies include diverse student samples in varied school settings.

Of the 13 studies with positive impacts in key domains, 11 studies had positive impacts in the word reading domain,[269] and four studies had positive impacts in the encoding domain.[270] Seven studies that examined only word reading outcomes found positive effects,[271] and the one study that examined only encoding outcomes found positive effects.[272] Of the five studies with positive effects that examined outcomes in both the encoding and word reading domains,[273] two studies found positive impacts in the word reading domain only,[274] one study found positive impacts in the encoding domain only,[275] and two studies found positive impacts in both domains.[276] Five studies that meet WWC group design standards and measured only word reading outcomes found no discernible effects.[277] No studies found negative impacts in any of the key domains. Together, these studies show consistent positive evidence in two of the key domains for this recommendation.

No study that meets WWC group design standards examined an outcome in the morphology domain (the third key domain for this recommendation). Morphology outcomes are directly associated with the third recommendation component about recognizing common word parts. However, six studies with interventions that included the third recommendation component had positive effects on outcomes in the word reading domain. Because word reading outcomes should also be affected by the third recommendation component, the panel and staff determined that there was positive evidence in support of that component.

The panel attributes the number of studies that found no discernible effects to the interventions not providing at risk students with enough instruction on the alphabetic principle, the concept that letters represent individual phonemes in written words. The remaining paragraphs in this section describe the 13 studies that found positive effects in at least one domain (i.e., the studies that contribute to the strong level of evidence).

Collectively, the studies demonstrate a high level of internal validity. Seven are well-implemented randomized controlled trials that meet WWC group design standards without reservations.[278] Six studies meet WWC group design standards with reservations:[279] four use quasi-experimental designs,[280]

and two are randomized controlled trials in which baseline equivalence had to be demonstrated.[281]

Eight studies used standardized outcomes to measure effect sizes,[282] while five studies used a combination of standardized and researcher-developed outcomes.[283]

Consistent with the panel's recommendation to integrate instruction of the recommendation components, most study interventions implemented some or all of the recommendation's six components (blending letter sounds and sound–spelling patterns from left to right within words; recognizing common sound-spelling patterns; recognizing common word parts, reading decodable words; recognizing regular and irregular high-frequency words; and introducing non-decodable words as whole words).

Three studies showed that interventions closely aligned with all six components of Recommendation 3 had positive effects.[284] These studies provide evidence for implementing all six components of the recommendation together. In addition, three studies with positive effects had interventions closely aligned with five of the recommendation components: two interventions aligned with the first, second, fourth, fifth, and sixth components,[285] and one intervention aligned with the first, second, third, fourth, and fifth components.[286] All six of these studies compared students in the intervention group to students engaged in normal classroom activities.

Three studies included interventions with the first, second, and fourth components of Recommendation 3,[287] and two of these interventions also included the third component.[288] Relevant to the first component, two interventions included lessons on phonemic awareness,[289] and all three interventions taught letter–sound correspondence. For example, in one study teachers instructed students on how to spell 40 phonemes, and students would type words that contained these phonemes.[290] Each study also focused

on common sound–spelling patterns, the second component of Recommendation 3. For example, one intervention asked students to sort words into categories based on their spelling patterns and to search for additional words that fit the spelling pattern.[291] Two of the studies taught students to recognize common word parts, the third component of Recommendation 3.[292] For example, one intervention taught suffixes and prefixes, as well as encouraging students to use strategies to decode and read multisyllabic words.[293] All three studies included practice in reading decodable words, the fourth component of Recommendation 3. For example, students in one intervention would quickly and accurately read words in insolation; then, as their word-reading skills improved, they would read words within text passages.[294] Two of the three studies compared intervention students to students engaged in normal classroom activities,[295] and the third study compared students receiving the intervention to students receiving math instruction.[296]

Two studies had interventions relevant to two components of Recommendation 3: one study was relevant to the first and second components,[297] and the other was relevant to the first and fifth components.[298] The study relevant to the first and second components included teaching phonics lessons on letter–sound rules, and it compared students receiving the intervention to students receiving additional reading time using Big Books. The study relevant to the first and fifth action steps included instruction on letter–sound correspondence, phoneme decoding, irregular words, and oral reading practice. Students in this intervention were compared to students receiving regular classroom instruction.

The remaining two studies with positive effects evaluated interventions aligned with one component of Recommendation 3.[299] One study examined an intervention relevant to the first component.[300] In this intervention, students reviewed letter–sound correspondence and practiced blending phonemes into words. The study compared the intervention

group to a group of students receiving an accelerated letter training that matched pictures and words. Another study's intervention was relevant to the second component of Recommendation 3, recognizing common sound-spelling patterns.[301] The intervention included three elements: (1) fictionalized explanations of the origins of certain phonological rules (for example, the silent *e* at the end of a word is silent because it cannot reach the vowel with its arms), (2) instruction on formulating logical plans to approach reading and spelling, and (3) instruction on chunking and phonological awareness. The comparison group students received only the chunking and phonological instruction.

Of the 13 studies relevant to Recommendation 3 with positive impacts in key domains, eight were implemented in groups of two to eight students.[302] Four additional studies examined one-on-one interventions,[303] and one study's intervention was implemented with the whole class.[304] Although the supporting studies typically implement instruction in small groups, the panel believes—consistent with other studies that meet WWC group design standards—that the practices are applicable for both whole-class instruction and individual instruction. One study examined a computer-based intervention,[305] while another study examined an intervention implemented during a remedial-assistance program.[306]

About half of the studies implemented the interventions as supplements to regular literacy instruction, and all of the studies took place at schools. Seven of the interventions supplemented regular literacy instruction,[307] and one study occurred during regular literacy instruction time.[308] In one study, half of the students were taken out of regular reading instruction time, and half were taken from non-reading instruction or recreation time to participate in the intervention.[309] The four other studies did not explicitly describe the timing of the sessions.[310]

Although all instruction occurred in schools, only three studies identified the exact setting of the intervention sessions.[311] One study took place in the regular reading classroom;[312] one took place in a quiet portion of the students' regular classroom, in an empty adjacent classroom, or at a table in the hallway;[313] and one study implemented the intervention in classrooms or literacy resource rooms.[314]

All 13 interventions lasted at least 10 weeks, and nine of the interventions were six months or longer.[315] For eight of the interventions, sessions lasted 20 to 30 minutes,[316] and three studies had interventions lasting 50–55 minutes per session.[317] The two other studies either had 15-minute intervention sessions[318] or occurred during a two-hour instructional block.[319]

The study samples included students of various ability levels in kindergarten through 3rd grade. Four studies targeted kindergartners or 5-year-olds,[320] three studies examined 1st-grade samples,[321] two studies had a 2nd-grade sample,[322] and one study focused on 8-year-olds.[323] The three remaining studies had samples that spanned multiple grades.[324] Eight studies examined only students at risk for reading difficulties,[325] and the other five studies included students of all ability levels.[326] In no study did English learners or students in special education make up most of the sample.

Most studies occurred in the United States, three studies took place in New Zealand,[327] England,[328] or Scotland,[329] and two studies occurred in an unspecified urban location.[330] Of the eight studies in the United States, four studies were conducted in the Pacific Northwest region;[331] one took place in Tallahassee, Florida;[332] two took place in upstate New York;[333] and one was conducted in urban neighborhoods outside of Washington, DC.[334] As a whole, the study samples and setting provide high external validity. The panel and staff determined there is strong evidence for

Recommendation 3. Thirteen studies with interventions related to the recommendation have strong internal and external validity, and demonstrate consistently positive effects in the word reading and encoding domains.

Table D.6. Studies providing evidence for Recommendation 3

Study and design	Participants	Intervention condition as imple-mented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recom-mendation components
Meets WWC Group Design Standards Without Reservations					
Coyne et al. (2004a) *Randomized controlled trial*	59 at risk 1st-graders in western Oregon	Teachers and educational assistants implemented a supplemental intervention for groups of 3 to 5 students. The first half of each session used instruction from the *Write Well* program that reviewed letter–sound associations, orally segmenting words into phonemes, and spelling. The second half of each session focused on word reading, as well as group and partner reading of storybooks. The intervention involved 30-minute sessions daily for 10 weeks.	Teachers taught their regular lessons.	Word reading = 0.05	2, 4, 5
Gunn et al. (2005) *Randomized controlled trial*	245 students who were at risk or had aggressive social behaviors in kindergarten through 3rd grade in Oregon	Instructional assistants implemented a supplemental reading instruction intervention for small groups of students. The study does not describe the instruction in kindergarten. Students in 1st and 2nd grade received instruction from *Reading Mastery*, which focused on phonemic awareness, sound–letter correspondence, blending sounds, and reading words using decodable text. Students in 3rd grade received instruction from *Corrective Reading*, which focused on phonic and structural analysis, decoding, comprehension, and reading fluency and accuracy. The intervention involved 30-minute sessions daily over 4 to 5 months in the first year and 9 months in the second year.	Teachers taught their regular lessons.	Word reading = 0.41*[c]	1, 2, 3, 4, 5, 6
Savage et al. (2009)[d] *Randomized controlled trial*	100 at risk 1st-graders in Montreal, Canada	A trained facilitator led groups of 4 students on the computer-based *ABRACADABRA* program with synthetic phonics. The intervention focused on developing students' skills in blending and segmenting words using phonemes. The intervention involved 20-minute sessions 4 times a week for 20 weeks.	Teachers taught their regular lessons.	Word reading = 0.12[e]	1, 2, 4
Scanlon et al. (2005)[f] *Randomized controlled trial*	319 at risk kinder-gartners in Albany, New York	Teachers provided remedial assistance to groups of 3 students. In each session, the teacher focused on reading, phonemic awareness, letter–sound knowledge, and writing. The intervention involved 30-minute sessions twice a week for about 8 months.	Students received the typical instruction available to them. For some students, this included additional assistance on literacy skills, outside the classroom.	Word reading = 0.25*	1, 2, 4, 5, 6

(continued)

Table D.6. Studies providing evidence for Recommendation 3 *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Torgesen et al. (2006)[g] *Randomized controlled trial*	79 at risk 3rd-graders near Pittsburgh, Pennsylvania[h]	Teachers implemented 140 lessons from the decoding strand of the *Corrective Reading* curriculum for groups of 3 students. The lessons focused on word identification and oral reading fluency. The intervention involved 55-minute sessions daily over 7 months.	Teachers taught their regular lessons.	Word reading = 0.22[i]	1, 2, 3, 4, 5, 6
Torgesen et al. (2010)[j] *Randomized controlled trial*	73 at risk 1st-graders in Tallahassee, Florida	Teachers implemented the computer-based *Read, Write, and Type* program for groups of 3 students outside normal classroom time. Teachers introduced students to graphemes and phonemes and to proper typing techniques. Students completed computer activities on phonetic spelling and writing, and then practiced typing words with the phonemes the teacher had introduced. Students also read their own writing and the writing of other students. The intervention involved 50-minute sessions 4 times a week for a full school year.	Teachers taught their regular lessons.	Word reading = 0.40[k] Encoding = 0.54*	1, 2, 4
Tse and Nicholson (2014)[l] *Randomized controlled trial*	47 2nd-graders in South Auckland, New Zealand[m]	Tutors implemented phonics instruction and Big Book reading for groups of 4 students. Each session began with phonics instruction on letter–sound rules. Then the tutor read aloud a Big Book, with large print that the whole class could see while listening to the story. The intervention involved 30-minute sessions once a week for 12 weeks.	Tutors implemented Big Book reading for groups of 4 students. The tutor read aloud a Big Book but did not conduct any phonics instruction.	Word reading = 0.75* Encoding = 0.21	1, 2
Vadasy and Sanders (2011) *Randomized controlled trial*	89 at risk 1st-graders, who only spoke English at home, in the Pacific Northwest region of the United States	Paraprofessionals implemented 108 scripted, one-on-one lessons on phonics. The lessons focused on letter–sound correspondence, phoneme decoding, irregular words, spelling, and oral reading practice. The intervention involved 30-minute sessions 4 days a week from fall to spring.	Teachers taught their regular lessons.	Word reading = 0.51*[n] Encoding = 0.75*	1, 5
Vadasy, Sanders, and Tudor (2007) *Randomized controlled trial*	43 at risk 2nd- and 3rd-graders in the northwestern United States	Paraprofessionals led one-on-one supplemental phonics-based instruction. In the first 10 weeks, half of each session was spent on phonics instruction and half on oral reading. In the final 5 weeks, the sessions focused solely on oral reading using repeated reading instruction. The intervention involved 30-minute sessions 4 times a week for 15 weeks.	Teachers taught their regular lessons.	Word reading = 0.47 Encoding = 0.23	1, 2, 3, 4, 5

(continued)

Table D.6. Studies providing evidence for Recommendation 3 *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recom- mendation components
Wright and Jacobs (2003) *Randomized controlled trial*	46 at risk students with an average age of 8 years, 8 months, in northwestern England	Teachers implemented an intervention focused on phonological awareness and metalinguistic and metacognitive concepts for groups of 4 to 5 students. The phonological awareness portion of the intervention focused on dividing words into chunks, or rime units: the teacher would write the chunk, the teacher and students would read the chunk together, and then the students would use plastic letters to write the chunk. The metalinguistic component consisted of fictionalized explanations of the origins of certain phonological rules (e.g., the silent *e* at the end of a word is silent because it cannot reach the vowel with its arms). The metacognitive component taught students to develop a logical plan to approach reading and spelling. The intervention involved 30-minute sessions twice a week for 40 sessions.	Teachers implemented only the phonological awareness component of the intervention condition with groups of 4 to 5 students.	Word reading = 0.14[o] Encoding = 0.63*	2
Meets WWC Group Design Standards With Reservations					
Blachman et al. (2004) *Quasi-experimental design*	69 at risk 2nd- and 3rd-graders in upstate New York	Teachers implemented a one-on-one tutoring intervention. Each tutoring session included the following: reviewing letter–sound associations; blending, segmenting, and replacing phonemes using cards with letters and letter clusters; reading irregular and regular words; reading text aloud; and writing words and sentences dictated by the tutor. The intervention involved 50-minutes sessions daily for 8 months.	Teachers taught their regular lessons.	Word reading = 0.88*[p]	1, 2, 3, 4, 5, 6
Frechtling, Zhang, and Silverstein (2006)[q] *Quasi-experimental design*	398 kindergartners in an unspecified urban location	Teachers implemented *Voyager Universal Literacy System*. The intervention included the following: a core reading curriculum that emphasized phonemic awareness, phonics, fluency, comprehension, and vocabulary; progress monitoring to identify struggling readers; additional instruction time for struggling readers; professional development for teachers, principals, and specialists; a home-study curriculum; and technology enhancement activities. The intervention involved 2-hour instructional blocks daily for 8 months.	Teachers taught their regular lessons.	Word reading = 0.40[r]	1, 2, 3, 4

(continued)

Table D.6. Studies providing evidence for Recommendation 3 *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Fuchs et al. (2001)[s] *Randomized controlled trial that needs to demonstrate equivalence*	269 kindergartners in metro Nashville, Tennessee	Teachers implemented 48 sessions of the *Peer-Assisted Learning Strategies (PALS)* intervention for the whole class. During the *PALS* sessions, paired students took turns reading aloud. The students corrected any errors made by their partner and focused on using correct sounds for letters. The *PALS* intervention involved 20-minute sessions 3 times a week for 16 weeks. In addition to *PALS*, this group also received additional 15-minute sessions with 15 activities from the *Ladders to Literacy* intervention 3 times a week for 20 weeks.	Teachers taught their regular lessons. In addition to regular instruction, this group also received additional 15-minute sessions with 15 activities from the *Ladders to Literacy* intervention 3 times a week for 20 weeks.	Word reading = n.r.[t]	1, 4, 5
Graham, Harris, and Chorzempa (2002)[u] *Randomized controlled trial that needs to demonstrate equivalence*	54 at risk 2nd-graders in urban neighborhoods outside Washington, DC	Graduate students implemented 48 spelling lessons with pairs of students. Lessons focused on memorizing the spellings of specific words as well as letter–sound combinations, sound segmentation, and spelling patterns. The intervention involved 20-minute lessons 3 times a week from November to April.	Graduate students implemented mathematics instruction to pairs of students.	Word reading = n.r.*[v]	1, 2, 3, 4
Gunn, Smolkowski, and Vadasy (2011)[w] *Randomized controlled trial that needs to demonstrate equivalence*	1,405 kindergartners in New Mexico and Oregon	Teachers implemented the *Read Well Kindergarten* reading program with small groups of 2 to 8 students. Sessions included decoding practice and story reading, and they focused on vocabulary, phonological awareness, alphabetic understanding, and decoding. The intervention involved 20-minute sessions daily for 7 months.	Teachers taught their regular lessons.	Word reading = 0.35*	1, 2, 4, 5, 6
Hecht (2003) *Quasi-experimental design*	113 kindergartners in Orange County, Florida	Teachers implemented the *Voyager Universal Literacy System* with struggling readers. The intervention lasted for about 5 months.	Teachers taught their regular lessons.	Word reading = 0.00	1, 2, 3, 4
Jenkins et al. (2004)[x] *Quasi-experimental design*	59 at risk 1st-graders in an unspecified urban location in the United States	Paraprofessionals implemented one-on-one tutoring in phonics with storybooks. Sessions focused on practicing letter–sound relations, reading decodable and non-decodable words, spelling, and text reading of more-decodable storybooks. The intervention involved 30-minute sessions 4 times a week for 25 weeks.	Teachers taught their regular lessons.	Word reading = 0.69*	1, 2, 3, 4, 5, 6

(continued)

Table D.6. Studies providing evidence for Recommendation 3 *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Johnston and Watson (2004)[y] **Experiment 2** *Quasi-experimental design*	59 5-year olds in Clackmannanshire and Fife, Scotland	Interventionists implemented a synthetic phonics intervention for groups of 4 to 5 students. Sessions focused on identifying letter names and sounds as well as blending phonemes. The intervention involved 15-minute sessions twice a week for 10 weeks.	Interventionists implemented accelerated letter training for groups of 4 to 5 students. The interventionist showed students a picture and asked them to identify the object. Next, the interventionist showed the students the written word associated with the object. Then, the interventionist asked the students to identify words that started with a particular letter and to repeat the letter sound on its own.	Encoding = 1.19*[z]	1

[a] The duration of the comparison condition was the same as the duration of the intervention condition, unless otherwise noted.

[b] All effect sizes and statistical-significance levels are calculated by the WWC unless otherwise noted. WWC calculations sometimes differ from author-reported results due to WWC adjustments for baseline differences, clustering, or multiple comparisons. Effect sizes that were statistically significant ($p \leq 0.05$) are marked with an asterisk (*). Effect sizes marked "n.r." were not reported. For brevity, this table reports the domain average effect size and statistical significance, and does not include findings for each outcome measure in the domain. The key domains for Recommendation 3 are word reading, encoding, and morphology.

[c] A follow-up ($n = 195$) was also administered two years after the intervention ended. The WWC-calculated effect size for the word reading domain is 0.25. This effect is not statistically significant.

[d] This study also contributed to the level of evidence for Recommendation 2. However, the contrast supporting Recommendation 2 involves a different intervention group than this contrast.

[e] A follow-up ($n = 81$) was administered seven months after the intervention ended. The WWC-calculated effect size for the word reading domain is −0.05. This effect is not statistically significant.

[f] This study also contributed to the level of evidence for Recommendation 2. In addition, this study included contrasts with 1st-grade students. The text emphasis vs. phonological skills contrast among the 1st-grade sample contributed to the level of evidence for Recommendation 4.

[g] This study also included another relevant contrast that compared the same intervention group to a different comparison group (*Corrective Reading* vs. *Failure Free Reading*), as well as another relevant contrast that compared a different intervention group to the same comparison group (*Wilson Reading System* vs. typical instruction). Neither of these contrasts had immediate posttest outcomes that meet WWC group design standards, and the study found no discernible effects on word reading outcomes one year after the intervention ended. An additional contrast, *Wilson Reading System* vs. *Failure Free Reading*, was relevant to Recommendation 3 and met WWC group design standards with reservations as a randomized controlled trial with high attrition, but did not have any outcomes in key domains. The *Spell Read PAT* vs. typical instruction and *Spell Read PAT* vs. *Failure Free Reading* contrasts from this study support multiple recommendations and appear in Table D.3.

[h] The 5th-grade students in the study are not included in the findings reported in this table. For this comparison, the study reports separate analyses for eight subgroups; the WWC reports a pooled analysis for all subgroups.

[i] A follow-up ($n = 79$) was also administered one year after the intervention ended, reported in **Torgesen et al. (2007)**. The WWC-calculated effect size for the word reading domain is 0.24. This effect is not statistically significant.

[j] This study also included another relevant contrast that compared a different intervention group to the same comparison group (*LiPS* vs. typical instruction); the findings are similar for this contrast. The *LiPS* vs. typical instruction contrast contributed to the level of evidence for Recommendation 2.

[k] A follow-up ($n = 74$) was also administered one year after the intervention ended. The WWC-calculated effect sizes are 0.28 for the word reading domain and 0.32 for the encoding domain. Neither effect is statistically significant.

l This study also included another relevant contrast that compared a different intervention group to the same comparison group (phonics instruction vs. Big Book reading), another contrast that compared the same intervention group to a different comparison group (Big Book reading and phonics instruction vs. math instruction), and still another contrast that compared a different intervention group to a different comparison group (phonics instruction vs. math instruction). The results are different for these contrasts: for the phonics instruction vs. Big Book reading contrast and the phonics instruction vs. math instruction contrast, the study found no discernible effects in word reading or encoding; for the Big Book reading and phonics instruction vs. math instruction contrast, the study found positive effects in both the word reading and the encoding domains.

m For some outcomes, the sample size was 48 students.

n A follow-up ($n = 85$) was also administered in the spring of 2nd grade. The WWC-calculated effect sizes on this follow-up are 0.40 for the word reading domain and 0.21 for the reading comprehension domain. Neither effect is statistically significant. A second follow-up ($n = 80$) was administered in the spring of 3rd grade. The WWC-calculated effect sizes on the second follow-up are 0.36 for the word reading domain and 0.06 for the reading comprehension domain. Neither effect is statistically significant.

o A follow-up ($n = 46$) was also administered 6 months after the intervention. The WWC-calculated effect sizes on this follow-up are 0.49 for the word reading domain and 0.00 for the encoding domain. Neither effect is statistically significant. The study also reported effects on a second follow-up ($n = 46$) administered 12 months after the intervention. The WWC-calculated effect sizes on the second follow-up are 0.42 for the word reading domain and –0.15 for the encoding domain. Neither effect is statistically significant.

p A follow-up ($n = 69$) was also administered one year after the intervention. The WWC-calculated effect size for the word reading domain is 0.74. The effect is statistically significant.

q This study also contributed to the level of evidence for Recommendation 2.

r This is the two-year follow-up effect size, reported in **Frechtling, Silverstein, and Wang (2004)**. No immediate posttest outcomes in the key domains met WWC group design standards.

s This study is a cluster randomized controlled trial with compromised randomization, which means the study must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

t For all outcomes in this comparison, the authors reported effect sizes and statistical significance for three subgroups based on achievement level (high-achieving, average-achieving, and low-achieving students). These three subgroup comparisons did not meet WWC group design standards. Although the WWC combined the three subgroups to calculate a full sample effect size, the effect size is not reported, because it was calculated using teacher-level standard deviations. The statistical significance of this finding was considered when determining the level of evidence. This finding was not statistically significant.

u This study is a randomized controlled trial with high attrition, which means it must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*.

v The authors reported cluster-level standard deviations for the student pairs and not standard deviations for individual students. This effect size was not used when determining the level of evidence for this recommendation, but the statistical significance of this finding was considered when determining the level of evidence.

w This study is a cluster randomized controlled trial that presents analyses focused on student performance and includes students who were not present at the time of randomization. Under current guidance, this design must demonstrate equivalence and is not eligible for the rating of *meets WWC group design standards without reservations*. The study also contributed to the level of evidence for Recommendation 2.

x This study also included another relevant contrast that compared a different intervention group to the same comparison group (phonics with less-decodable storybooks vs. typical instruction); the findings are similar.

y Another contrast from this study, synthetic phonics instruction vs. picture identification, supports multiple recommendations and appears in Table D.3.

z This is a nine-month follow-up outcome. No immediate posttest outcomes met WWC group design standards.

Recommendation 4. Ensure that each student reads connected text every day to support reading accuracy, fluency, and comprehension.

Level of evidence: Moderate Evidence

WWC staff and the panel assigned an evidence level of *moderate* based on 22 relevant studies that meet WWC group design standards and had outcomes in the key domains (see Table D.7).[335] These studies demonstrated high internal validity—17 studies meet WWC group design standards without reservations[336]—and include diverse students in kindergarten through grade 3. The recommendation was not assigned a *strong* level of evidence, because of the inconsistent pattern of positive effects. Specifically, although 18 studies showed positive effects in at least one key outcome domain,[337] eight of these studies reported no discernible effects in other key domains.[338] In addition, three studies found no discernible effects in

any domain,[339] and one study found a negative effect in one domain.[340]

Eighteen studies that examined the recommended practices found positive effects in at least one key outcome domain for this recommendation: oral reading fluency, oral reading accuracy, reading comprehension, and word reading.[341] Specifically, in the oral reading fluency domain, eight studies showed positive effects,[342] and four studies showed no discernible effects.[343] Two studies showed positive effects in the oral reading accuracy domain.[344] For outcomes in the reading comprehension domain, seven studies showed positive effects,[345] and six studies found no discernible effects.[346] Finally, of the 16 studies that examined outcomes in the word reading domain, 11 studies found positive effects,[347] six studies showed no discernible effects,[348] and one study reported a negative effect.[349]

The study that found negative effects on a word reading outcome also found no discernible effects on measures of oral reading fluency and reading comprehension.[350] The study contrasted two intensive small-group reading interventions. In *Responsive Reading* (the intervention condition), students learn to apply strategies to decode words in context, while students in *Proactive Reading* (the comparison condition) read words and learn about word-reading skills in isolation. The panel believes that the *Proactive Reading* students performed better on the word reading outcome because those students received more instruction and practice on word reading skills than the *Responsive Reading* students. Both *Proactive Reading* and *Responsive Reading* promote fluency equally well in the early stages of reading acquisition.

The panel attributes the number of studies that found no discernible effects to insufficient mastery of alphabetic skills by beginning readers. For reading fluency interventions to be effective, students must have consolidated the alphabetic principle (as described in Recommendations 2 and 3).

As a whole, the study findings provide a preponderance of evidence of positive effects. The remaining paragraphs in this section describe the 18 studies that found positive effects in at least one domain (i.e., the studies that contribute to the moderate level of evidence).[351] Sixteen of these studies used standardized tests,[352] and two studies used researcher-developed measures.[353] Consistent with the panel's recommendation to ensure that each student reads connected text every day, most study interventions implement two or all three of the recommendation's components (supporting word identification; self-monitoring and self-correction of errors; and using feedback to develop fluency).

Mostly positive effects were reported in the nine studies that examined interventions implementing all three components of Recommendation 4.[354] In all these studies, students read connected text and received support or feedback from a more able reader when they had difficulty identifying a word (aligning with the first component of Recommendation 4). In addition, teachers dedicated instructional time to sound–spelling patterns, word parts, or sight-word recognition prior to connected-text reading. The study interventions also included instruction in self-monitoring (aligning with the second component of Recommendation 4). In all nine studies, students who made word-reading errors were prompted to reread the word and consider whether it made sense in the sentence. Students were also encouraged to pay attention to the meaning of the text. All nine studies also implemented fluency instruction that connected reading familiar or unfamiliar texts with feedback to develop fluency (aligning with the third component of Recommendation 4). Each of the studies compared intervention students to students engaged in regular classroom activities.

Five studies tested interventions aligned with two components of Recommendation 4.[355] The interventions in four studies relate to the first and third components,[356] while the intervention in a fifth study relates to the first and

second components.[357] The first two studies implemented *Quick Reads* instruction with feedback to promote accurate word reading, as well as text-reading practice to develop oral reading fluency.[358] In the third study, tutors provided students with cues to read passages with fluency and comprehension.[359] The fourth study included repeated reading, vocabulary, comprehension questions, and progress monitoring with feedback.[360] The fifth study assessed the practice of providing feedback to promote word reading and the practice of self-monitoring.[361] All studies compared the students in the intervention group to students engaged in regular classroom activities.

Four studies examined only the third component of Recommendation 4, reading connected text with feedback to develop fluency.[362] Two studies tested the impact of feedback and practice in reading familiar texts (*repeated reading*).[363] For example, in one intervention, tutors led individual students to read the same text three times during the same session.[364] In the other two studies, students read a wider range of texts with feedback and did not reread any texts.[365] For example, in one intervention, as students read novel passages, the adult listeners corrected errors by providing missed words.[366] Three of the four studies compared the students in the intervention group to students engaged in regular classroom activities.[367] The remaining study compared students who read aloud in the intervention group—with the whole class, chorally, and with a partner—to students who mostly read silently.[368]

Collectively the studies demonstrate high internal validity. Fifteen studies are randomized controlled trials with low sample attrition that meet WWC group design standards without reservations.[369] Three studies meet WWC group design standards with reservations:[370] two studies are randomized controlled trials with high sample attrition that demonstrated baseline equivalence,[371] and one study is a quasi-experimental design that demonstrated equivalence on baseline characteristics.[372]

The study samples included students in kindergarten through grade 3. Participants in 11 studies were all at risk for reading difficulties,[373] and seven studies drew student samples from general education classrooms and schools.[374]

The interventions lasted from 10 weeks to eight months, and they were implemented by diverse instructors. The delivery of the intervention varied. The interventions in 11 studies were delivered one-on-one,[375] the interventions in six studies were administered in small groups,[376] and one intervention used a combination of small groups and whole-class instruction.[377] Although the supporting studies typically implemented instruction individually or in small groups, the panel believes—consistent with other studies that meet WWC group design standards—that the practices are also applicable to whole-class instruction.

Six of the interventions were delivered by tutors,[378] six were delivered by teachers,[379] two were delivered by interventionists,[380] one was delivered by graduate students,[381] another was delivered by adult listeners,[382] one was a software program,[383] and another was delivered by parents.[384] Sixteen studies occurred in the United States (including the Southwest, Southeast, Midwest, Northeast, and Mid-Atlantic regions),[385] and two studies were conducted in the United Kingdom.[386] The studies as a whole, including a large number of students, provide moderate to high external validity.

The panel and staff determined there is moderate evidence for Recommendation 4. Eighteen studies with interventions related to the recommendation have strong internal and external validity and demonstrated positive effects in at least one of the four key domains. However, the positive effects were inconsistent: eight of these studies also reported no discernible effects on other outcomes in these areas, three studies found no discernible effects for any outcome, and one study found a negative effect for one outcome.

Table D.7. Studies providing evidence for Recommendation 4

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Meets WWC Group Design Standards Without Reservations					
Begeny et al. (2010)[c] *Randomized controlled trial*	46 2nd-graders in the south-eastern United States	Tutors implemented the *Helping Early Literacy with Practice Strategies (HELPS)* program individually with students. Students completed repeated readings of passages three times and orally recounted the content of the passages. Tutors provided students with cues to read the passages with fluency and comprehension. The intervention involved 8- to 10-minute sessions 3 times a week for 3 months.	Teachers taught their regular lessons.	Word reading = 0.46 Oral reading fluency = 0.61 Reading comprehension = 0.75	1, 3
Case et al. (2010) *Randomized controlled trial*	30 at risk 1st-graders in a suburban school district in the Mid-Atlantic region of the United States	Graduate students implemented 24 scripted lessons for groups of 3 to 4 students. Each lesson included activities on phonics, sight-word recognition and vocabulary, and reading fluency and comprehension. The intervention involved 40-minute sessions 3 times a week for 11 weeks.	Teachers taught their regular lessons.	Word reading = 0.76	1, 2, 3
Case et al. (2014) *Randomized controlled trial*	123 at risk 1st-graders in a suburban school district in the Mid-Atlantic region of the United States	Tutors implemented 25 scripted lessons for groups of 2 to 4 students. Each lesson included activities on phonics, sight-word recognition and vocabulary, and reading fluency and comprehension. The intervention involved 40-minute sessions 3 times a week for approximately 12 weeks.	Teachers taught their regular lessons, which consisted of *Peer Assisted Learning Strategies*.	Word reading = 0.12 Oral reading fluency = 0.27	1, 2, 3
Christ and Davie (2009) *Randomized controlled trial*	105 at risk 3rd-graders in the midwestern United States[d]	Students received instruction from the *Read Naturally Software Edition* (SE) as a supplement to regular reading instruction. Students used the software in computer labs or other school rooms with no more than 6 students at a time and a teacher supervising. *Read Naturally SE* primarily targets reading accuracy and fluency, and involves repeated reading, vocabulary, comprehension questions, and progress monitoring with feedback. The sessions were scheduled to not conflict with existing reading instruction. The intervention involved daily, on average, 20-minute sessions for 10 weeks.	Students engaged in non-reading activities while the intervention was being implemented and received regular reading instruction.	Word reading = 0.13 Oral reading fluency = 0.28 Oral reading accuracy = 0.43* Reading comprehension = –0.07	1, 3

(continued)

Table D.7. Studies providing evidence for Recommendation 4 *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recom-mendation components
Denton et al. (2013) *Randomized controlled trial*	71 at risk 2nd-grad-ers in the southwest-ern United States[e]	Interventionists implemented a Tier 3 intervention with groups of 2 or 3 students. Sessions focused on phono-logical awareness, letter–sound corre-spondence, high-frequency words, oral reading fluency, and reading compre-hension. Instruction was guided by students' results on interim testing. The intervention involved 45-minute sessions daily for 24 to 26 weeks.	Teachers taught their regular lessons.[f]	Word reading = 0.49* Oral reading fluency = 0.17 Reading compre-hension = 0.24	1, 2, 3
Martens et al. (2007) *Randomized controlled trial*	30 2nd- and 3rd-graders in an urban school in the North-east region of the United States	Tutors implemented a fluency-based reading intervention with individual students or small groups of students during an after-school program. First, students read passages of increasing difficulty until they reached a passage that they could not read fluently. The tutor then provided training on the passage, focusing on error correction, repeated reading with modeling, and repeated readings. Finally, the stu-dent was asked to read the same pas-sage again before moving onto a more challenging passage. The intervention involved 30-minute sessions 3 times a week for 5 weeks (for 2nd-graders) or 6 weeks (for 3rd-graders).	Students par-ticipated in the typical after-school program, which involved work-sheet activities in language arts and a snack.	Oral reading fluency = 0.01[g]	3
Mathes et al. (2005) *Randomized controlled trial*	163 1st-graders in Texas	Teachers implemented the *Responsive Reading* intervention with groups of 3 students. In each lesson, the teacher targeted instruction to an individual student, so that each student was a focal student once every 3 days. Each session included fluency building through passage reading, assessments of the focal student's reading performance, phonological awareness instruction, supported reading of new books, and writing sentences about the new book. The intervention involved 40-minute sessions daily for 8 months.	Teachers imple-mented the *Proactive Reading* intervention with groups of 3 stu-dents. Lessons in the intervention covered letter–sound correspon-dence, sounding out words, spell-ing, reading decod-able connected text, and compre-hension strategies.	Oral reading fluency= n.r.[h] Reading compre-hension = n.r. Word reading = n.r.* (negative effect)	2
May et al. (2013) *Randomized controlled trial*	866 at risk 1st-graders in elemen-tary schools throughout the United States	Teachers who were not the normal reading teacher implemented *Reading Recovery* individually with students. The intervention was a supplement to regular classroom reading instruction. In each lesson, the student reread familiar books, conducted word or letter activi-ties, composed a story, assembled a sentence from words, and previewed and read a new book. The intervention involved 30-minute sessions daily for 12–20 weeks.	Students partici-pated in another reading inter-vention, if avail-able, and received regular reading instruction.	Reading compre-hension = 0.55*	1, 2, 3

(continued)

Table D.7. Studies providing evidence for Recommendation 4 *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
O'Connor, Swanson, and Geraghty (2010)[i] *Randomized controlled trial*	43 2nd-graders in the south-western United States[j]	Interventionists led students one-on-one in reading aloud difficult texts (texts with expected word reading accuracy in the range of 80 to 90 percent).The interventionists provided guidance on the pronunciation or definition of words the student did not know, but they did not provide specific decoding strategies. The intervention involved 15-minute sessions 3 times a week for 20 weeks.	Teachers taught their regular lessons.	Word reading = 0.41 Oral reading fluency = 0.98* Reading comprehension = 0.40	3
O'Connor, White, and Swanson (2007)[k] *Randomized controlled trial*	10 2nd-graders in an unspeci-fied location[l]	Tutors led students one-on-one through a repeated reading intervention. Students read the same text three times during each session. The intervention involved 15-minute sessions 3 times a week for 14 weeks.	Teachers taught their regular lessons.	Word reading = 0.63[m] Oral reading fluency = 0.93 Reading comprehension = 0.88	3
Reutzel, Fawson, and Smith (2008) *Randomized controlled trial*	72 3rd-graders in the United States	Students read books aloud as a whole class, with some form of choral reading. Then, the students read aloud the assigned text with a partner. The intervention involved daily 60-minute small-group instruction and daily 60-minute whole-class instruction for 36 weeks.	Students silently read books from different genres. Teachers periodically asked students to read part of the book aloud and briefly discussed the reading.	Oral reading fluency = −0.14 Reading comprehension = 0.41	3
Scanlon et al. (2005)[n] *Randomized controlled trial*	114 at risk 1st-graders in Albany, New York	Teachers led a one-on-one intervention with an emphasis on reading and rereading text. The majority of each session was spent on reading new text and rereading familiar text. Additionally, the teacher implemented 5-minute instruction on each of the following topics: phonological skills, sight words, and writing. The intervention involved 30-minute sessions daily from mid-October to early June.	Teachers taught their regular lessons.	Word reading = 0.44* Reading comprehension = 0.49*	1, 2, 3
Schwartz (2005) *Randomized controlled trial*	74 at risk 1st-graders in 14 dif-ferent U.S. states	Teachers implemented the *Reading Recovery* program one-on-one with students. The intervention involved daily 30-minute sessions that occurred for 20 weeks or until the student met set criteria.	Teachers taught their regular lessons.	Word reading = 1.15* Oral reading fluency = 2.00* Reading comprehension = 0.14	1, 2, 3
Swanson and O'Connor (2009)[o] *Randomized controlled trial*	155 at risk 2nd-graders in Southern California[p]	Students read text aloud to adult listeners continuously for 15 minutes. No passages of text were repeated; the adult listeners corrected errors by giving missed words but did not teach decoding or vocabulary. The intervention involved 15-minute sessions 3 times a week for 20 weeks.	Teachers taught their regular lessons using the *Houghton Mifflin* curriculum.	Word reading = 0.43[q] Oral reading fluency = 0.07 Reading comprehension = 0.14	3

(continued)

Table D.7. Studies providing evidence for Recommendation 4 *(continued)*

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Sylva et al. (2008) *Randomized controlled trial*	102 5- and 6-year-olds at risk for behavioral problems in London, United Kingdom	Interventionists implemented the *Supporting Parents on Kids' Education in Schools (SPOKES)* program with parents. There were 12 sessions on behavior management, 10 sessions on literacy, and 6 sessions combining both behavior management and literacy. The literacy training taught the "pause, prompt, and praise" approach as well as a whole-language approach based on *Reading Recovery*. The intervention also included 2 home visits. The sessions were 150 minutes long and occurred over 3 school terms (semesters).	Parents had access to a parental helpline, which provided referrals to relevant existing services in the community and listened to parental concerns.	Word reading = 0.35	1, 2
Vadasy and Sanders (2008) *Randomized controlled trial*	162 2nd- and 3rd-graders in the United States[r]	Tutors led pairs of students in the *Quick Reads* fluency program. Each session included letter and sound practice, reading nonfiction passages, and reading comprehension activities. Nearly all the words used in the passages were high-frequency words. The intervention involved 30-minute sessions 4 days a week for 15 weeks.	Teachers taught their regular lessons.	Word reading = 0.19 Oral reading fluency = 0.28 Reading comprehension = 0.17	1, 3
Vadasy and Sanders (2009) *Randomized controlled trial*	202 2nd- and 3rd-graders in an unspecified location[s]	Tutors led pairs of students in the *Quick Reads* fluency program. Each session included letter and sound practice, reading nonfiction passages, and reading comprehension activities. Nearly all the words used in the passages were high-frequency words. The intervention involved 30-minute sessions 4 days a week for 15 weeks.	Teachers taught their regular lessons.	Word reading = 0.07 Oral reading fluency = 0.28 Reading comprehension = 0.12	1, 3
Meets WWC Group Design Standards With Reservations					
Burroughs-Lange and Douetil (2007) *Quasi-experimental design*	145 year 1 at risk students in London, United Kingdom	Teachers implemented the *Reading Recovery* intervention one-on-one with students. The intervention focused on reading and writing strategies. The intervention involved 30-minute sessions daily.	Teachers taught their regular lessons.[t]	Oral reading accuracy = 1.22*	1, 2, 3
Cheatham, Allor, and Roberts (2014)[u] *Randomized controlled trial that needs to demonstrate equivalence*	*Advanced decoders*				
	26 2nd-graders with advanced decoding skills in the southwestern United States	During their independent reading time, students read books designed to be highly decodable. The books systematically introduced irregular sight words over time. Icons were printed below irregular words to help students read them. The intervention involved 30-minute sessions daily for 10 weeks.	Students completed independent reading of books based on their reading level. The books had more non-decodable words than the intervention condition books.	Word reading = −0.06	1
	Developing decoders				
	36 2nd-graders with developing decoding skills in the southwestern United States	During their independent reading time, students read books designed to be highly decodable. The books systematically introduced irregular sight words over time. Icons were printed below irregular words to help students read them. The intervention involved 30-minute sessions daily for 10 weeks.	Students completed independent reading of books based on their reading level. The books had more non-decodable words than the intervention condition books.	Word reading = 0.10	1

(continued)

Table D.7. Studies providing evidence for Recommendation 4 (continued)

Study and design	Participants	Intervention condition as implemented in the study	Comparison condition as implemented in the study[a]	Outcome domain and effect size[b]	Related recommendation components
Denton et al. (2010)[v] *Randomized controlled trial that needs to demonstrate equivalence*	422 at risk 1st-graders in a south-western U.S. state[w]	Teachers implemented the *Responsive Reading* intervention with groups of 3 to 4 students. The intervention provided explicit instruction on phonemic aware-ness, letter–sound correspondence, sight-word recognition, decoding, and spelling. In addition, teachers modeled oral reading and implemented sup-ported reading and writing activities. The intervention involved 40-minute sessions daily for 25 weeks.	Teachers taught their regular lessons.[x]	Word reading = 0.42* Reading compre-hension = 0.51*	1, 2, 3
Lane et al. (2009)[y] *Randomized controlled trial that needs to demonstrate equivalence*	43 at risk 1st-graders in the southeast-ern United States	Tutors implemented one-on-one ses-sions using the *University of Florida Literacy Initiative* tutoring model without the sentence writing components. Tutor-ing sessions included reading a familiar book, using manipulative letters, using encoding and decoding skills, reading an unfamiliar book, and extending literacy skills by introducing a new genre of text and strategies to read the genre well. The sessions also included a running record of reading progress. The inter-vention involved 32-minute sessions 3 to 4 times a week for 35 to 40 sessions.	Teachers taught their regular lessons.	Word reading = 0.47	1, 2, 3

[a] The duration of the comparison condition was the same as the duration of the intervention condition, unless otherwise noted.

[b] All effect sizes and statistical-significance levels are calculated by the WWC unless otherwise noted. WWC calculations some-times differ from author-reported results due to WWC adjustments for baseline differences, clustering, or multiple comparisons. Effect sizes that were statistically significant ($p \leq 0.05$) by WWC calculations or author calculations where no WWC adjust-ments were required are marked with an asterisk (*). Effect sizes marked "n.r." were not reported. For brevity, this table reports the domain average effect size and statistical significance, and does not include findings for each outcome measure in the domain. The key domains for Recommendation 4 are word reading, oral reading accuracy, oral reading fluency, and reading comprehension.

[c] Another contrast from this study, Great Leaps vs. typical instruction, supports multiple recommendations and appears in Table D.3.

[d] For some outcomes, 106 students had outcome data.

[e] For some outcomes, 72 students had outcome data.

[f] Some students in the comparison group received school-provided alternative interventions.

[g] The effect sizes and statistical significance calculated by WWC for all outcomes are based on author-reported results disaggregated by student grade level. The disaggregated data for 2nd- and 3rd-grade students showed no discernible effects for any outcome for either grade.

[h] The authors reported a statistically significant negative effect ($p < 0.05$) on one word-reading outcome but did not report effect sizes. The study did not report the data necessary for the WWC to calculate effect sizes or statistical significance for any reported outcomes. The WWC requested the data from the study authors, but the data was not available.

[i] This study also included another relevant contrast that compared a different intervention group to the same comparison group (independent-reading-level reading vs. typical classroom instruction); the findings are similar.

[j] While the study also included 4th-grade students, those students are not included in the results reported here, because this practice guide targets kindergarten through grade 3.

[k] Another contrast from this study, continuous reading vs. typical instruction, is relevant to Recommendation 4 and meets WWC group design standards, but does not include outcomes in any of the key domains.

[l] While the study also included 4th-grade students, those students were not included in the results reported here because this practice guide targets kindergarten through grade 3.

[m] Effect sizes and statistical significance were calculated based on information provided by the authors.

[n] This study also included another relevant contrast that compared the same intervention group to a different comparison group (text emphasis vs. phonological skills emphasis). The results are different for this contrast: the study found no discernible

effects in the word reading and reading comprehension domains. This study also contributed to the level of evidence for Recommendations 2 and 3. However, for Recommendations 2 and 3, the contrast of interest is the kindergarten sample, which compared students in a remedial assistance program to students receiving typical instruction.

[o] This study also included another relevant contrast that compared a different intervention group to the same comparison group (repeated reading vs. typical classroom instruction). The results are different: the study found no discernible effects in the word reading and reading comprehension domains, and found a negative effect in the oral reading fluency domain.

[p] While the study also included 4th-grade students, those students are not included in the results reported here because this practice guide targets kindergarten through grade 3.

[q] Effect sizes and statistical significance were calculated based on information provided by the authors.

[r] The authors defined their eligible sample as students whose performance fell between the 10th and 60th percentile for their grade level on the DIBELS oral reading fluency subtest. The average performance for the sample was the 34th percentile.

[s] The authors defined their eligible sample as students whose performance fell between the 10th and 60th percentile for their grade level on the DIBELS oral reading fluency subtest. The authors did not indicate the average performance for this sample.

[t] Students in the comparison group attended the schools that were implementing Reading Recovery, but they did not receive the intervention.

[u] The authors did not present impacts for the full sample of students, instead presenting impacts for two subgroups on students' level of decoding skills. Using standard WWC practices, the WWC calculated an impact for the full sample; however, the full sample analysis did not meet WWC group design standards. Therefore, the two subgroup findings are presented here. The two subgroup analyses are randomized controlled trials with compromised randomization, which means they must demonstrate equivalence and are not eligible for the rating of meets WWC group design standards without reservations.

[v] This study is a randomized controlled trial with different probabilities of assignment to the intervention condition, and the study does not account for the different probabilities. Accordingly, this design must demonstrate equivalence and is not eligible for the rating of meets WWC group design standards without reservations.

[w] Students were eligible to participate if they failed the Texas Primary Reading Inventory letter sounds, blending phonemes, and word reading screens; had a score of 8 (3 in the second study year) or less on the Woodcock-Johnson Letter-Word Identification subtest; and had oral reading fluency rates of 8 or fewer correct words per minute (5 correct words in the second study year).

[x] Some students in the comparison group received school-provided alternative interventions.

[y] This study is a randomized controlled trial with high attrition, which means it must demonstrate equivalence and is not eligible for the rating of meets WWC group design standards without reservations. This study also contributed to the level of evidence for Recommendation 2.

References[a]

Amendum, S. J., Vernon-Feagans, L., & Ginsberg, M. C. (2011). The effectiveness of a technologically facilitated classroom-based early reading intervention. *Elementary School Journal, 112*(1), 107–131.

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (1999). *The Standards for Educational and Psychological Testing* (2nd ed.). Washington, DC: American Educational Research Association.

Apthorp, H., Randel, B., Cherasaro, T., Clark, T., McKeown, M., & Beck, I. (2012). Effects of a supplemental vocabulary program on word knowledge and passage comprehension. *Journal of Research on Educational Effectiveness, 5*(2), 160–188.

Archer, A. L., Gleason, M. M., & Vachon, V. L. (2003). Decoding and fluency: Foundation skills for struggling older readers. *Learning Disability Quarterly, 26*(2), 89–101.

Arra, C. T., & Aaron, P. G. (2001). Effects of psycholinguistic instruction on spelling performance. *Psychology in the Schools, 38*(4), 357–363.

Baker, S., Lesaux, N., Jayanthi, M., Dimino, J., Proctor, C. P., Morris, J., … Newman-Gonchar, R. (2014). *Teaching academic content and literacy to English learners in elementary and middle school* (NCEE 2014-4012). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov/ncee/wwc/publications_reviews.aspx#pubsearch

Baker, S. K., Santoro, L. E., Chard, D. J., Fien, H., Park, Y., & Otterstedt, J. (2013). An evaluation of an explicit read aloud intervention taught in whole-classroom formats in first grade. *Elementary School Journal, 113*(3), 331–358.

Beck, I. L. (2006). *Making sense of phonics: The hows and whys*. New York: Guilford Press.

Begeny, J. C., Laugle, K. M., Krouse, H. E., Lynn, A. E., Tayrose, M. P., & Stage, S. A. (2010). A control-group comparison of two reading fluency programs: The *Helping Early Literacy with Practice Strategies (HELPS)* program and the *Great Leaps* K–2 reading program. *School Psychology Review, 39*(1), 137–155.

Biemiller, A. (2009). *Words worth teaching*. Columbus, OH: SRA/McGraw-Hill.

Blachman, B. A., Fletcher, J. M., Schatschneider, C., Francis, D. J., Clonan, S. M., Shaywitz, B. A., & Shaywitz, S. E. (2004). Effects of intensive reading remediation for second and third graders and a 1-year follow-up. *Journal of Educational Psychology, 96*(3), 444–461.

Borman, G. D., & Dowling, N. M. (2009). Student and teacher outcomes of the Superkids quasi-experimental study. *Journal of Education for Students Placed at Risk, 14*(3), 207–225.

Borman, G. D., Dowling, N. M., & Schneck, C. (2008). A multisite cluster randomized field trial of *Open Court Reading*. *Educational Evaluation and Policy Analysis, 30*(4), 389–407.

Burroughs-Lange, S., & Douetil, J. (2007). Literacy progress of young children from poor urban settings: A *Reading Recovery* comparison study. *Literacy Teaching and Learning, 12*(1), 19–46.

Buckingham, J., Wheldall, K., & Beaman, R. (2012). A randomised control trial of a tier-2 small-group intervention ('MiniLit') for young struggling readers. *Australian Journal of Learning Difficulties, 17*(2), 79–99.

Case, L. P., Speece, D. L., Silverman, R., Ritchey, K. D., Schatschneider, C., Cooper, D. H., … Jacobs, D. (2010). Validation of a supplemental reading intervention for first-grade children. *Journal of Learning Disabilities, 43*(5), 402–417.

Case, L., Speece, D., Silverman, R., Schatschneider, C., Montanaro, E., & Ritchey, K. (2014). Immediate and

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[a] Eligible studies that meet WWC design standards or meet design standards with reservations are indicated by **bold** text in the endnotes and references pages. For more information about these studies, please see Appendix D.

long-term effects of tier 2 reading instruction for first-grade students with a high probability of reading failure. *Journal of Research on Educational Effectiveness, 7*(1), 28–53.

Chambers, B., Slavin, R. E., Madden, N. A., Abrami, P. C., Karanzalis, M., & Gifford, R. (2011). Small-group computer-assisted tutoring to improve reading outcomes for struggling first and second graders. *Elementary School Journal, 111*(4), 625–640.

Cheatham, J. P., Allor, J. H., & Roberts, J. K. (2014). How does independent practice of multiple-criteria text influence the reading performance and development of second graders? *Learning Disability Quarterly, 37*(1), 3–14.

Christ, T. J., & Davie, J. (2009). *Empirical evaluation of* Read Naturally *effects: A randomized control trial*. Unpublished manuscript, University of Minnesota, Minneapolis. Retrieved from https://www.readnaturally.com/userfiles/ckfiles/files/UofMnReadNaturallyStudy.pdf

Coxhead, A. (2000). A new academic word list. *TESOL Quarterly, 34*, 213–238.

Coyne, M. D., Kame'enui, E. J., Simmons, D. C., & Harn, B. A. (2004a). Beginning reading intervention as inoculation or insulin: First-grade reading performance of strong responders to kindergarten intervention. *Journal of Learning Disabilities, 37*(2), 90–104.

Coyne, M. D., Little, M., Rawlinson, D., Simmons, D., Kwok, O., Kim, M., … Civetelli, C. (2013). Replicating the impact of a supplemental beginning reading intervention: The role of instructional context. *Journal of Research on Educational Effectiveness, 6*(1), 1–23.

Denton, C. A., Kethley, C., Nimon, K., Kurz, T. B., Mathes, P. G., Shih, M., & Swanson, E. A. (2010). Effectiveness of a supplemental early reading intervention scaled up in multiple schools. *Exceptional Children, 76*(4), 394–416.

Denton, C. A., Tolar, T. D. Fletcher, J. M., Barth, A. E., Vaughn, S., & Francis, D.

J. (2013). Effects of tier 3 intervention for students with persistent reading difficulties and characteristics of inadequate responders. *Journal of Educational Psychology, 105*(3), 633–648.

Duff, F. J., Hayiou-Thomas, M. E., & Hulme, C. (2012). Evaluating the effectiveness of a phonologically based reading intervention for struggling readers with varying language profiles. *Reading and Writing, 25*(3), 621–640.

Duff, F. J., Hulme, C., Grainger, K., Hardwick, S. J., Miles, J. N. V., & Snowling, M. J. (2014). Reading and language intervention for children at risk of dyslexia: A randomised controlled trial. *Journal of Child Psychology and Psychiatry, 55*(11), 1234–1243.

Ehri, L. C. (2005). Learning to read words: Theory, findings, and issues. *Scientific Studies of Reading, 9*(2), 167–188.

Ehri, L. C., Dreyer, L. G., Flugman, B., & Gross, A. (2007). Reading rescue: An effective tutoring intervention model for language-minority students who are struggling readers in first grade. *American Educational Research Journal, 44*(2), 414–448.

Florida Center for Reading Research. (2008). *Student center activities, grades K–1*. Retrieved from http://www.fcrr.org/curriculum/studentcenteractivities.shtm

Foorman, B. R., Chen, D., Carlson, C., Moats, L., Francis, D. J., & Fletcher, J. M. (2003). The necessity of the alphabetic principle to phonemic awareness instruction. *Reading and Writing, 16*(4), 289–324.

Frechtling, J. A., Zhang, X., & Silverstein, G. (2006). The *Voyager Universal Literacy System*: Results from a study of kindergarten students in inner-city schools. *Journal of Education for Students Placed at Risk, 11*(1), 75–95.
Additional source:
Frechtling, J., Silverstein, G., & Wang, L. W. (2004). *Evaluation of the Voyager Universal Literacy System: Year 2*. Retrieved from the Voyager Learning website in 2007.

Fuchs, D., Fuchs, L. S., Thompson, A., Otaiba, S. A., Yen, L., Yang, N. J., … O'Connor, R. E. (2001). Is reading important in reading-readiness programs? A randomized field trial with teachers as program implementers. *Journal of Educational Psychology, 93*(2), 251–267.

Gersten, R., Compton, D., Connor, C. M., Dimino, J., Santoro, L., Linan-Thompson, S., & Tilly, W. D. (2009). *Assisting students struggling with reading: Response to Intervention (RtI) and multi-tier intervention for reading in the primary grades. A practice guide* (NCEE 2009-4045). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov

Gilbert, J. K., Compton, D. L., Fuchs, D., Fuchs, L. S., Bouton, B., Barquero, L. A., & Cho, E. (2013). Efficacy of a first-grade responsiveness-to-intervention prevention model for struggling readers. *Reading Research Quarterly, 48*(2), 135–154.

Goodson, B., Wolf, A., Bell, S., Turner, H., & Finney, P. B. (2010). *The effectiveness of a program to accelerate vocabulary development in kindergarten* (VOCAB) (NCEE 2010-4014). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Graham, S., Bollinger, A., Booth Olson, C., D'Aoust, C., MacArthur, C., McCutchen, D., & Olinghouse, N. (2012). *Teaching elementary school students to be effective writers: A practice guide* (NCEE 2012-4058). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov

Graham, S., Harris, K. R., & Chorzempa, B. F. (2002). Contribution of spelling instruction to the spelling, writing, and reading of poor spellers. *Journal of Educational Psychology, 94*(4), 669–686.

Gunn, B., Smolkowski, K., Biglan, A., Black, C., & Blair, J. (2005). Fostering the development of reading skill through supplemental instruction: Results for Hispanic and non-Hispanic students. *The Journal of Special Education, 39*(2), 66–85.

Additional sources:

Gunn, B., Biglan, A., Smolkowski, K., & Ary, D. (2000). The efficacy of supplemental instruction in decoding skills for Hispanic and non-Hispanic students in early elementary school. *The Journal of Special Education, 34*(2), 90–103.

Gunn, B., Smolkowski, K., Biglan, A., & Black, C. (2002). Supplemental instruction in decoding skills for Hispanic and non-Hispanic students in early elementary school: A follow-up. *The Journal of Special Education, 36*(2), 69–79.

Gunn, B., Smolkowski, K., & Vadasy, P. (2011). Evaluating the effectiveness of *Read Well Kindergarten. Journal of Research on Educational Effectiveness, 4*(1), 53–86.

Hagans, K., & Good, R. (2013). Decreasing reading differences in children from disadvantaged backgrounds: The effects of an early literacy intervention. *Contemporary School Psychology, 17*(1), 103–117.

Hamilton, L., Halverson, R., Jackson, S., Mandinach, E., Supovitz, J., & Wayman, J. (2009). *Using student achievement data to support instructional decision making* (NCEE 2009-4067). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov

Hecht, S. A. (2003). A study between *Voyager* and control schools in Orange County, Florida 2002-2003. Retrieved from Voyager Learning website in 2007.

Hecht, S. A., & Close, L. (2002). Emergent literary skills and training time uniquely predict variability in responses to phonemic awareness training in disadvantaged kindergartners. *Journal of Experimental Child Psychology, 82*(2), 93–115.

Heistad, D. (2008). The effects of *Read Naturally* on fluency and reading comprehension: A supplemental service

intervention (four-school study). St. Paul, MN. Retrieved from http://www.readnaturally.com/userfiles/ckfiles/files/heistad-study_4schools.pdf
Additional source:
Read Naturally. (n.d.). *Case 3: Third-grade students, Minneapolis, MN.* St. Paul, MN. Retrieved from http://www.readnaturally.com/research/studies

Jenkins, J. R., Peyton, J. A., Sanders, E. A., & Vadasy, P. F. (2004). Effects of reading decodable texts in supplemental first-grade tutoring. *Scientific Studies of Reading, 8*(1), 53–85.

Johnston, R. S., & Watson, J. E. (2004). Accelerating the development of reading, spelling, and phonemic awareness skills in initial readers. *Reading and Writing, 17*(4), 327–357.

Joseph, L. M. (2000). Using word boxes as a large group phonics approach in a first grade classroom. *Reading Horizons, 41*(2), 117–127.

Justice, L. M., Meier, J., & Walpole, S. (2005). Learning new words from storybooks: An efficacy study with at-risk kindergartners. *Language, Speech, and Hearing Services in Schools, 36*(1), 17–32.

Kim, Y.-S., Petscher, Y., Foorman, B. R., & Zhou, C. (2010). The contributions of phonological awareness and letter-name knowledge to letter–sound acquisition: A cross-classified multilevel model approach. *Journal of Educational Psychology, 102*(2), 313–326.

Lane, H. B., Pullen, P. C., Hudson, R. F., & Konold, T. R. (2009). Identifying essential instructional components of literacy tutoring for struggling beginning readers. *Literacy Research and Instruction, 48*(4), 277–297.

Lane, K. L., Fletcher, T., Carter, E. W., Dejud, C., & DeLorenzo, J. (2007). Paraprofessional-led phonological awareness training with youngsters at risk for reading and behavioral concerns. *Remedial and Special Education, 28*(5), 266–276.

Little, M. E., Rawlinson, D., Simmons, D. C., Kim, M., Kwok, O., Hagan-Burke, S., … Coyne, M. D. (2012). A comparison of responsive interventions on kindergarteners' early reading achievement. *Learning Disabilities Research and Practice, 27*(4), 189–202. doi:10.1111/j.1540-5826.2012.00366.

Martens, B., Eckert, T., Begeny, J., Lewandowski, L., Digennaro, F., Montarello, S., … Fiese, B. (2007). Effects of a fluency-building program on the reading performance of low-achieving second and third grade students. *Journal of Behavioral Education, 16*(1), 38–53.

Mathes, P. G., Denton, C. A., Fletcher, J. M., Anthony, J. L., Francis, D. J., & Schatschneider, C. (2005). The effects of theoretically different instruction and student characteristics on the skills of struggling readers. *Reading Research Quarterly, 40*(2), 148–182.

May, H., Gray, A., Gillespie, J. N., Sirinides, P., Sam, C., Goldsworthy, H., Armijo, M., & Tognatta, N. (2013). *Evaluation of the i3 scale-up of* Reading Recovery *year one report, 2011–12*. Philadelphia, PA: Consortium for Policy Research in Education. DOI: 10.12698/cpre.2013.rr76

Mitchell, M. J., & Fox, B. J. (2001). The effects of computer software for developing phonological awareness in low-progress readers. *Reading Research and Instruction, 40*(4), 315–332.

Moats, L. C. (2011). *Speech to print, Language essentials for teachers* (2nd ed.). Baltimore, MD: Brookes Publishing.

National Center for Educational Statistics. (2013). *The nation's report card: Reading 2013*. Retrieved from http://nces.ed.gov/nationsreportcard/reading/

National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). Common Core State Standards for English Language Arts. Washington, D.C. Retrieved from http://www.corestandards.org/assets/CCSSI_ELA%20Standards.pdf

National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: Reports of the subgroups* (NIH Publication No. 00-4754). Washington, DC: U.S. Department of Health and Human Services.

Nelson, J. R., Benner, G. J., & Gonzales, J. (2005). An investigation of the effects of a prereading intervention on the early literacy skills of children at risk of emotional disturbance and reading problems. *Journal of Emotional and Behavioral Disorders, 13*(1), 3–12.

Nelson, J. R., Stage, S. A., Epstein, M. H., & Pierce, C. D. (2005). Effects of a prereading intervention on the literacy and social skills of children. *Exceptional Children, 72*(1), 29–45.

O'Connor, R. E., Swanson, H. L., & Geraghty, C. (2010). Improvement in reading rate under independent and difficult text levels: Influences on word and comprehension skills. *Journal of Educational Psychology, 102*(1), 1–19.

O'Connor, R. E., White, A., & Swanson, H. L. (2007). Repeated reading versus continuous reading: Influences on reading fluency and comprehension. *Exceptional Children, 74*(1), 31–46.

Oudeans, M. K. (2003). Integration of letter–sound correspondences and phonological awareness skills of blending and segmenting: A pilot study examining the effects of instructional sequence on word reading for kindergarten children with low phonological awareness. *Learning Disability Quarterly, 26*(4), 258–280.

Additional source:

Oudeans, M. K. (2000). Integration of letter–sound correspondences and phonological awareness skills of blending and segmenting: An examination of the effects of instructional sequence on word reading for kindergarten children with low phonological awareness. *Dissertation Abstracts International, Section A. Humanities and Social Sciences, 61*(9), 163.

Ouellette, G., & Senechal, M. (2008). Pathways to literacy: A study of invented spelling and its role in learning to read. *Child Development, 79*(4), 899–913.

Phillips, B. M., Clancy-Menchetti, J., Lonigan, C. J. (2008). Successful phonological awareness instruction with preschool children: Lessons from the classroom. *Topics in Early Childhood Special Education, 28*(1), 3–17.

Powers, S., & Price-Johnson, C. (2006). *Evaluation of the* Waterford Early Reading Program *in kindergarten 2005–06*. Tucson, AZ: Creative Research Associates.

Rashotte, C. A., MacPhee, K., & Torgesen, J. K. (2001). The effectiveness of a group reading instruction program with poor readers in multiple grades. *Learning Disability Quarterly, 24*(2), 119–134.

Reutzel, D. R., Fawson, P. C., & Smith, J. A. (2008). Reconsidering silent sustained reading: An exploratory study of scaffolded silent reading. *Journal of Educational Research, 102*(1), 37–50.

Savage, R. S., Abrami, P., Hipps, G., & Deault, L. (2009). A randomized controlled trial study of the *ABRACADABRA* reading intervention program in grade 1. *Journal of Educational Psychology, 101*(3), 590–604.

Additional source:

Deault, L., Savage, R., & Abrami, P. (2009). Inattention and response to the *ABRACADABRA* web-based literacy intervention. *Journal of Research on Educational Effectiveness, 2*(3), 250–286.

Savage, R., Carless, S., & Stuart, M. (2003). The effects of rime- and phoneme-based teaching delivered by learning support assistants. *Journal of Research in Reading, 26*(3), 211–233.

Savage, R., Piquette, N., Deleveaux, G., Abrami, P. C., Wood, E., Sanghera-Sidhu, S., & Burgos, G. (2013). A (pan-Canadian) cluster randomized control effectiveness trial of the *ABRACADABRA* web-based literacy program. *Journal of Educational Psychology, 105*(2), 310–328. doi:10.1037/a0031025

Scanlon, D. M., Vellutino, F. R., Small, S. G., Fanuele, D. P., & Sweeney, J. M. (2005). Severe reading difficulties—can they be prevented? A comparison of prevention and intervention approaches. *Exceptionality, 13*(4), 209–227.

Schuele, C. M., Justice, L. M., Cabell, S. Q., Knighton, K., Kingery, B., & Lee, M. W. (2008). Field-based evaluation of two-tiered instruction for enhancing kindergarten phonological awareness. *Early*

Education and Development, 19(5), 726–752.

Schwartz, R. M. (2005). Literacy learning of at-risk first-grade students in the *Reading Recovery* early intervention. *Journal of Educational Psychology, 97*(2), 257–267.

Senechal, M., Ouellette, G., Pagan, S., & Lever, R. (2012). The role of invented spelling on learning to read in low-phoneme awareness kindergartners: A randomized-control-trial study. *Reading and Writing: 25*(4), 917–934. doi:10.1007/s11145-011-9310-2.

Shanahan, T., Callison, K., Carriere, C., Duke, N. K., Pearson, P. D., Schatschneider, C., & Torgesen, J. (2010). *Improving reading comprehension in kindergarten through 3rd grade: A practice guide* (NCEE 2010-4038). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from the NCEE website: http://ies.ed.gov

Simmons, D. C., Coyne, M. D., Hagan-Burke, S., Oi-Man, K., Simmons, L., Johnson, C., … Crevecoeur, Y. C. (2011). Effects of supplemental reading interventions in authentic contexts: A comparison of kindergarteners' response. *Exceptional Children, 77*(2), 207–228.

Simmons, D. C., Kame'enui, E. J., Harn, B., Coyne, M. D., Stoolmiller, M., Santoro, L. E., Kaufman, N. K. (2007). Attributes of effective and efficient kindergarten reading intervention: An examination of instructional time and design specificity. *Journal of Learning Disabilities, 40*(4), 331–347.

Additional source:

Coyne, M. D., Simmons, D. C., Kame'enui, E. J., & Stoolmiller, M. (2004b). Teaching vocabulary during shared storybook readings: An examination of differential effects. *Exceptionality, 12*(3), 145–162.

Skindrud, K., & Gersten, R. (2006). An evaluation of two contrasting approaches for improving reading achievement in a large urban district. *Elementary School Journal, 106*(5), 389–407.

Swanson, H. L., & O'Connor, R. (2009). The role of working memory and fluency practice on the reading comprehension of students who are dysfluent readers. *Journal of Learning Disabilities, 42*(6), 548–575.

Sylva, K., Scott, S., Totsika, V., Ereky-Stevens, K., & Crook, C. (2008). Training parents to help their children read: A randomized control trial. *British Journal of Educational Psychology, 78*(3), 435–455.

Torgesen, J., Myers, D., Schirm, A., Stuart, E., Vartivarian, S., Mansfield, W., … Haan, C. (2006). *National assessment of Title I interim report to Congress: Volume 2. Closing the reading gap: First year findings from a randomized trial of four reading interventions for striving readers.* Washington, DC: Institute of Education Sciences, U.S. Department of Education.

Additional source:

Torgesen, J., Schirm, A., Castner, L., Vartivarian, S., Mansfield, W., Myers, D., … Haan, C. (2007). *National assessment of Title I, final report: Volume 2. Closing the reading gap: Findings from a randomized trial of four reading interventions for striving readers* (NCEE 2008-4013). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Herron, J., & Lindamood, P. (2010). Computer-assisted instruction to prevent early reading difficulties in students at risk for dyslexia: Outcomes from two instructional approaches. *Annals of Dyslexia, 60*(1), 40–56.

Tse, L., & Nicholson, T. (2014). The effect of phonics-enhanced Big Book reading on the language and literacy skills of six-year-old pupils of different reading ability attending lower SES schools. *Frontiers in Psychology, 5.* doi: 10.3389/fpsyg.2014.01222.

Vadasy, P. F., & Sanders, E. A. (2008). Repeated reading intervention: Outcomes and interactions with readers' skills and classroom instruction. *Journal of Educational Psychology, 100*(2), 272–290.

Vadasy, P. F., & Sanders, E. A. (2009). Supplemental fluency intervention and determinants of reading outcomes. *Scientific Studies of Reading, 13*(5), 383–425.

Vadasy, P. F., & Sanders, E. A. (2010). Efficacy of supplemental phonics-based instruction for low-skilled kindergarteners in the context of language minority status and classroom phonics instruction. *Journal of Educational Psychology, 102*(4), 786–788.

Vadasy, P. F., & Sanders, E. A. (2011). Efficacy of supplemental phonics-based instruction for low-skilled first graders: How language minority status and pretest characteristics moderate treatment response. *Scientific Studies of Reading, 15*(6), 471–497.

Additional source:

Vadasy, P. F., & Sanders, E. A. (2013). Two-year follow-up of a code-oriented intervention for lower-skilled first-graders: the influence of language status and word reading skills on third-grade literacy outcomes. *Reading and Writing, 26*(6), 821–843.

Vadasy, P. F., Sanders, E. A., & Peyton, J. A. (2006a). Code-oriented instruction for kindergarten students at risk for reading difficulties: A randomized field trial with paraeducator implementers. *Journal of Educational Psychology, 98*(3), 508–528.

Vadasy, P. F., Sanders, E. A., & Peyton, J. A. (2006b). Paraeducator-supplemented instruction in structural analysis with text reading practice for second and third graders at risk for reading problems. *Remedial and Special Education, 27*(6), 365–378.

Vadasy, P. F., Sanders, E. A., & Tudor, S. (2007). Effectiveness of paraeducator-supplemented individual instruction: Beyond basic decoding skills. *Journal of Learning Disabilities, 40*(6), 508–525.

Walton, P. D., Bowden, M. E., Kurtz, S. L., & Angus, M. (2001). Evaluation of a rime-based reading program with Shuswap and Heiltsuk First Nations prereaders. *Reading and Writing, 14*(3), 229–264.

Walton, P. D., & Walton, L. M. (2002). Beginning reading by teaching in rime analogy: Effects on phonological skills, letter–sound knowledge, working memory, and word-reading strategies. *Scientific Studies of Reading, 6*(1), 79–115.

Walton, P. D., Walton, L. M., & Felton, K. (2001). Teaching rime analogy or letter recoding reading strategies to prereaders: Effects on prereading skills and word reading. *Journal of Educational Psychology, 93*(1), 160–180.

Wanzek, J., & Vaughn, S. (2008). Response to varying amounts of time in reading intervention for students with low response to intervention. *Journal of Learning Disabilities, 41*(2), 126–142.

Williams, J. P., Nubla-Kung, A., Pollini, S., Stafford, K. B., Garcia, A., & Snyder, A. E. (2007). Teaching cause-effect text structure through social studies content to at-risk second graders. *Journal of Learning Disabilities, 40*(2), 111–120.

Williams, J. P., Pollini, S., Nubla-Kung, A. M., Snyder, A. E., Garcia, A., Ordynans, J. G., & Grant Atkins, J. (2014). An intervention to improve comprehension of cause/effect through expository text structure instruction. *Journal of Educational Psychology, 106*(1), 1–17.

Williams, J. P., Stafford, K. B., Lauer, K. D., Hall, K. M., & Pollini, S. (2009). Embedding reading comprehension training in content-area instruction. *Journal of Educational Psychology, 101*(1), 1–20.

Wise, B. W., & Ring, J. (2000). Individual differences in gains from computer-assisted remedial reading. *Journal of Experimental Child Psychology, 77*(3), 197.

Wright, J., & Jacobs, B. (2003). Teaching phonological awareness and metacognitive strategies to children with reading difficulties: A comparison of two instructional methods. *Educational Psychology, 23*(1), 17–24.

Ziegler, J. C., Stone, G. O., & Jacobs, A. M. (1997). What's the pronunciation for -*ough* and the spelling for /u/? A database for computing feedforward and feedback inconsistency in English. *Behavior Research Methods, Instruments, and Computers, 29*(4), 600–618.

Endnotes[a]

1 National Center for Educational Statistics (2013).

2 National Institute of Child Health and Human Development (2000).

3 The panel for this guide defines *fluency* and *alphabetics* differently than did the National Reading Panel; *fluency* includes the automaticity and speed of decoding skills as well as reading accuracy and expression, while *alphabetics* includes additional attention to morphologic skills.

4 National Institute of Child Health and Human Development (2000).

5 The review protocol is available via the WWC website at http://www.whatworks.ed.gov.

6 Shanahan et al. (2010).

7 Baker et al. (2014) for English learners and Gersten et al. (2009) for students with identified disabilities.

8 Baker et al. (2014).

9 Graham et al. (2012).

10 Baker et al. (2014).

11 Gersten et al. (2009).

12 Hamilton et al. (2009).

13 **Justice, Meier, and Walpole (2005)**.

14 Baker et al. (2014).

15 **Apthorp et al. (2012)**; **Baker et al. (2013)**; **Duff et al. (2014)**; **Goodson et al. (2010)**; **Justice, Meier, and Walpole (2005)**; **Simmons et al. (2007)**; **Williams et al. (2009)**.

16 **Baker et al. (2013)**; **Goodson et al. (2010)**; **Justice, Meier, and Walpole (2005)**.

17 **Duff et al. (2014)**; **Simmons et al. (2007)**; **Williams et al. (2009)**.

18 **Baker et al. (2013)**; **Justice, Meier, and Walpole (2005)**.

19 **Baker et al. (2013)**; **Goodson et al. (2010)**.

20 **Justice, Meier, and Walpole (2005)**.

21 **Apthorp et al. (2012)**; **Baker et al. (2013)**; **Duff et al. (2014)**; **Goodson et al. (2010)**.

22 **Baker et al. (2013)**.

23 **Apthorp et al. (2012)**; **Baker et al. (2013)**; **Coyne et al. (2004b)**; **Goodson et al. (2010)**; **Williams et al. (2009)** **[text-structure program vs. typical classroom instruction]**.

24 **Baker et al. (2013)**; **Coyne et al. (2004b)**; **Goodson et al. (2010)**.

25 **Baker et al. (2013)**; **Goodson et al. (2010)**.

26 **Goodson et al. (2010)**.

27 **Baker et al. (2013)**; **Coyne et al. (2004b)**; **Duff et al. (2014)**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. highly specified instruction]**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. moderately specified instruction]**.

28 **Baker et al. (2013)**; **Duff et al. (2014)**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. highly specified instruction]**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. moderately specified instruction]**.

29 **Baker et al. (2013)**.

30 **Duff et al. (2014)**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. highly specified instruction]**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. moderately specified instruction]**.

31 **Baker et al. (2013)**; **Duff et al. (2014)**.

32 **Baker et al. (2013)**.

33 **Coyne et al. (2004b)**; **Duff et al. (2014)**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. highly specified instruction]**; **Simmons et al. (2007)** **[highly specified instruction and storybook reading vs. moderately specified instruction]**.

34 **Baker et al. (2013)**.

35 **Baker et al. (2013)**; **Coyne et al. (2004b)**; **Duff et al. (2014)**.

36 Shanahan et al. (2010).

37 **Apthorp et al. (2012)**; **Baker et al. (2013)**; **Coyne et al. (2004b)**; **Duff et al. (2014)**; **Goodson et al. (2010)**; **Justice, Meier,**

[a] Eligible studies that meet WWC design standards or meet design standards with reservations are indicated by **bold** text in the endnotes and references pages. For more information about these studies, please see Appendix D.

and Walpole (2005); Simmons et al. (2007) [highly specified instruction and storybook reading vs. highly specified instruction]; Simmons et al. (2007) [highly specified instruction and storybook reading vs. moderately specified instruction]; Williams et al. (2009) [text-structure program vs. typical classroom instruction]; Williams et al. (2009) [content-only program vs. typical classroom instruction].

38 Apthorp et al. (2012); Justice, Meier, and Walpole (2005).

39 For examples, see Biemiller (2009); Coxhead (2000).

40 Apthorp et al. (2012); Coyne et al. (2004b); Justice, Meier, and Walpole (2005); Williams et al. (2009) [text-structure program vs. typical classroom instruction]; Williams et al. (2009) [content-only program vs. typical classroom instruction].

41 Apthorp et al. (2012); Baker et al. (2013); Coyne et al. (2004b); Goodson et al. (2010); Justice, Meier, and Walpole (2005); Simmons et al. (2007) [highly specified instruction and storybook reading vs. highly specified instruction]; Simmons et al. (2007) [highly specified instruction and storybook reading vs. moderately specified instruction]; Williams et al. (2009) [text-structure program vs. typical classroom instruction]; Williams et al. (2009) [content-only program vs. typical classroom instruction].

42 Coyne et al. (2004b); Simmons et al. (2007) [highly specified instruction and storybook reading vs. highly specified instruction]; Simmons et al. (2007) [highly specified instruction and storybook reading vs. moderately specified instruction].

43 Apthorp et al. (2012); Baker et al. (2013); Coyne et al. (2004b); Duff et al. (2014); Goodson et al. (2010); Simmons et al. (2007) [highly specified instruction and storybook reading vs. highly specified instruction]; Simmons et al. (2007) [highly specified instruction and

storybook reading vs. moderately specified instruction]; Williams et al. (2009) [text-structure program vs. typical classroom instruction]; Williams et al. (2009) [content-only program vs. typical classroom instruction].

44 Goodson et al. (2010).

45 Apthorp et al. (2012); Coyne et al. (2004b); Goodson et al. (2010); Simmons et al. (2007) [highly specified instruction and storybook reading vs. highly specified instruction]; Simmons et al. (2007) [highly specified instruction and storybook reading vs. moderately specified instruction].

46 Apthorp et al. (2012).

47 National Institute of Child Health and Human Development (2000).

48 Ziegler, Stone, and Jacobs (1997).

49 Kim et al. (2010).

50 Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Hecht (2003); Lane et al. (2007); Lane et al. (2009); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

51 Hagans and Good (2013); Lane et al. (2007); Lane et al. (2009); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1].

52 Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Savage et al. (2009); Scanlon et al. (2005); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

53 **Frechtling, Zhang, and Silverstein (2006); Hecht (2003); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).**

54 **Hagans and Good (2013); Lane et al. (2007); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Oullette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1].**

55 **Lane et al. (2007); Lane et al. (2009); Mitchell and Fox (2001); Rashotte, MacPhee, and Torgesen (2001); Scanlon et al. (2005); Torgesen et al. (2010).**

56 **Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Hecht (2003); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Savage et al. (2009); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).**

57 **Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Lane et al. (2007); Mitchell and Fox (2001); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).**

58 **Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Hecht (2003); Lane et al. (2007); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009) [*ABRACADABRA* with synthetic phonics vs. typical instruction]; Savage et al. (2009) [*ABRACADABRA* with analytic phonics vs. typical instruction]; Scanlon et al. (2005); Torgesen et al. (2010)** [*Read, Write, Type* vs. typical instruction]; Torgesen et al. (2010) [*LIPS* vs. typical instruction]; Walton et al. (2001) [Experiment 1]; Walton and Walton (2002) [rime analogy reading strategy and pre-reading skills vs. typical instruction]**.

59 Phillips, Clancy-Menchetti, and Lonigan (2008).

60 Adapted from Phillips, Clancy-Menchetti, and Lonigan (2008). Additional sources: Beck (2006); Florida Center for Reading Research (2008); National Governors Association Center for Best Practices, Council of Chief State School Officers (2010).

61 **Ouellette and Senechal (2008).**

62 **Nelson, Benner, and Gonzales (2005).**

63 **Hagans and Good (2013).**

64 Adapted from Phillips, Clancy-Menchetti, and Lonigan (2008). Additional sources: Beck (2006); Florida Center for Reading Research (2008); National Governors Association Center for Best Practices, Council of Chief State School Officers (2010).

65 ibid.

66 **Nelson, Benner, and Gonzales (2005); Nelson et al. (2005).**

67 **Hagans and Good (2013).**

68 **Lane et al. (2007); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005).**

69 **Lane et al. (2007).**

70 **Mitchell and Fox (2001); Ouellette and Senechal (2008).**

71 **Hagans and Good (2013); Mitchell and Fox (2001); Ouellette and Senechal (2008); Walton et al. (2001).**

72 **Nelson, Benner, and Gonzales (2005); Walton and Walton (2002) [rime analogy reading strategy and pre-reading skills vs. typical instruction].**

73 **Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Hecht (2003); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009) [*ABRACADABRA* with synthetic phonics**

vs. typical instruction]; Savage et al. (2009) [*ABRACADABRA* with analytic phonics vs. typical instruction]; Scanlon et al. (2005); Torgesen et al. (2010) [*Read, Write, Type* vs. typical instruction]; Torgesen et al. (2010) [*LIPS* vs. typical instruction]; Walton et al. (2001) [Experiment 1]; Walton and Walton (2002) [rime analogy reading strategy and pre-reading skills vs. typical instruction].

74 Teachers can refer to their classroom curriculum materials for a suggested sequence for teaching phonemes. Most published curricula with lessons in explicit phonemic awareness provide this.

75 **Scanlon et al. (2005)**.

76 **Walton et al. (2001) [Experiment 1]; Walton and Walton (2002) [rime analogy reading strategy and pre-reading skills vs. typical instruction]**.

77 **Torgesen et al. (2010) [*Read, Write, Type* vs. typical instruction]**.

78 **Frechtling, Zhang, and Silverstein (2006); Hecht (2003); Lane et al. (2007); Lane et al. (2009) [*University of Florida Literacy Initiative (UFLI)* vs. *UFLI* without manipulative letters]; Lane et al. (2009) [Comparison 2]; Lane et al. (2009) [*UFLI* without extended literacy vs. *UFLI* without manipulative letters]; Oudeans (2003); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009) [*ABRACADABRA* with synthetic phonics vs. typical instruction]; Savage et al. (2009) [*ABRACADABRA* with analytic phonics vs. typical instruction]; Scanlon et al. (2005); Torgesen et al. (2010) [*Read, Write, Type* vs. typical instruction]; Torgesen et al. (2010) [*LIPS* vs. typical instruction]; Walton et al. (2001) [Experiment 1]; Walton and Walton (2002) [rime analogy reading strategy and pre-reading skills vs. typical instruction]; Walton and Walton (2002) [rhyming, initial-phoneme identity, and letter–sound knowledge vs. rime-analogy reading strategy]; Walton and Walton (2002) [rhyming and letter–sound knowledge vs. rime-analogy**

reading strategy]; Walton and Walton (2002) [initial phoneme identity and letter–sound knowledge vs. rime-analogy reading strategy]**.

79 **Rashotte, MacPhee, and Torgesen (2001)**.

80 Foorman et al. (2003).

81 Ehri (2005).

82 National Institute of Child Health and Human Development (2000).

83 **Blachman et al. (2004); Coyne et al. (2004a); Frechtling, Zhang, and Silverstein (2006); Fuchs et al. (2001); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Jenkins et al. (2004); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Torgesen et al. (2006); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003)**.

84 **Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003)**.

85 **Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007)**.

86 **Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Torgesen et al. (2010); Vadasy and Sanders (2011); Wright and Jacobs (2003)**.

87 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

88 Blachman et al. (2004); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Scanlon et al. (2005); Vadasy, Sanders, and Tudor (2007).

89 Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Torgesen et al. (2010).

90 Gunn et al. (2005); Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

91 Blachman et al. (2004); Graham, Harris, and Chorzempa (2002); Jenkins et al. (2004); Scanlon et al. (2005); Torgesen et al. (2010); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

92 Frechtling, Zhang, and Silverstein (2006); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Johnston and Watson (2004); Tse and Nicholson (2014).

93 Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Wright and Jacobs (2003).

94 Blachman et al. (2004); Jenkins et al. (2004); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007).

95 Frechtling, Zhang, and Silverstein (2006).

96 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Fuchs et al. (2001); Graham, Harris, and Chorzempa (2002); Gunn, Smolkowski, and Vardasy (2011); Hecht (2003); Jenkins et al. (2004) [phonics with less-decodable storybooks vs. typical instruction]; Jenkins et al. (2004) [phonics with more-decodable storybooks vs. typical instruction]; Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Savage et al. (2009) [*ABRACADABRA* with synthetic phonics vs. typical classroom instruction]; Scanlon et al. (2005); Torgesen et al. (2006) [*Corrective Reading* vs. *Failure Free Reading*]; Torgesen et al. (2006) [*Corrective Reading* vs. typical instruction]; Torgesen et al. (2010) [*Read, Write, Type* vs. typical instruction]; Torgesen et al. (2010) [*LIPS* vs. typical instruction]; Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. math instruction)]; Tse and Nicholson (2014) [phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [phonics instruction vs. math instruction]; Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007).

97 Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. math instruction)]; Tse and Nicholson (2014) [phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [phonics instruction vs. math instruction].

98 Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

99 Fuchs et al. (2001); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

100 Blachman et al. (2004); Coyne et al. (2004a); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Jenkins et al. (2004) [phonics with less-decodable storybooks

vs. typical instruction]; **Jenkins et al. (2004) [phonics with more-decodable storybooks vs. typical instruction]; Savage et al. (2009) [*ABRACADABRA* with synthetic phonics vs. typical instruction]; Scanlon et al. (2005); Torgesen et al. (2006) [*Wilson Reading System* vs. typical instruction]; Torgesen et al. (2006) [*Corrective Reading* vs. *Failure Free Reading*]; Torgesen et al. (2006) [*Corrective Reading* vs. typical instruction]; Torgesen et al. (2010) [*LIPS* vs. typical instruction]; Torgesen et al. (2010) [*Read, Write, Type* vs. typical instruction]; Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. math instruction)]; Tse and Nicholson (2014) [phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [phonics instruction vs. math instruction]; Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003)**.

101   Moats (2011); National Governors Association Center for Best Practices, Council of Chief State School Officers (2010).

102   **Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [Big Book reading and phonics instruction vs. math instruction)]; Tse and Nicholson (2014) [phonics instruction vs. Big Book reading]; Tse and Nicholson (2014) [phonics instruction vs. math instruction]**.

103   **Blachman et al. (2004)**.

104   **Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Hecht (2003); Torgesen et al. (2006) [*Corrective Reading* vs. *Failure Free Reading*]; Torgesen et al. (2006) [*Corrective Reading* vs. typical instruction]; Torgesen et al. (2006) [*Wilson Reading System* vs. typical instruction]; Vadasy, Sanders, and Tudor (2007)**.

105   **Blachman et al. (2004); Coyne et al. (2004a); Gunn et al. (2005); Jenkins et al. (2004) [phonics with more-decodable**

storybooks vs. typical instruction]; Torgesen et al. (2006) [*Corrective Reading* vs. *Failure Free Reading*]; Torgesen et al. (2006) [*Corrective Reading* vs. typical instruction].

106   **Wright and Jacobs (2003)**.

107   Adapted from Archer, Gleason, and Vachon (2003).

108   **Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Fuchs et al. (2001); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Jenkins et al. (2004) [phonics with more-decodable storybooks vs. typical instruction]; Savage et al. (2009) [*ABRACADABRA* with synthetic phonics vs. typical classroom instruction]; Scanlon et al. (2005); Torgesen et al. (2006) [*Corrective Reading* vs. *Failure Free Reading*]; Torgesen et al. (2006) [*Corrective Reading* vs. typical instruction]; Torgesen et al. (2010) [*LIPS* vs. typical instruction]; Torgesen et al. (2010) [*Read, Write, Type* vs. typical instruction]; Vadasy, Sanders, and Tudor (2007)**.

109   **Vadasy and Sanders (2011)**.

110   **Fuchs et al. (2001); Gunn, Smolkowski, and Vadasy (2011); Scanlon et al. (2005); Vadasy and Sanders (2011)**.

111   **Scanlon et al. (2005)**.

112   **Vadasy and Sanders (2011)**.

113   **Blachman et al. (2004); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004) [phonics with less-decodable storybooks vs. typical instruction]; Jenkins et al. (2004) [phonics with more-decodable storybooks vs. typical instruction]; Scanlon et al. (2005); Torgesen et al. (2006) [*Corrective Reading* vs. typical instruction]**.

114   National Institute of Child Health and Human Development (2000).

115   ibid.

116   Shanahan et al. (2010).

117   **Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Cheatham,**

Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); Martens et al. (2007); Mathes et al. (2005); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

118 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

119 Case et al. (2014); Christ and Davie (2009); Denton et al. (2013); Reutzel, Fawson, and Smith (2008); Schwartz (2005); Swanson and O'Connor (2009); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

120 Cheatham, Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Martens et al. (2007).

121 Mathes et al. (2005). The panel believes that the comparison students performed better on the word reading outcome because those students received more instruction and practice on word reading skills than the intervention students. For more information, see Appendix D.

122 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009);

May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

123 Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); Scanlon et al. (2005); Schwartz (2005).

124 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Christ and Davie (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

125 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2013); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

126 Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Chris and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009).

127 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

128 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Christ and Davie (2009); Burroughs-Lange and Douetil (2007); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and

Swanson (2007); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008). Students in **Christ and Davie (2009)** received individual computer-based instruction.

129 **Case et al. (2010); Case et al. (2014); Denton et al. (2010); Denton et al. (2013); Vadasy and Sanders (2008); Vadasy and Sanders (2009).**

130 **Reutzel, Fawson, and Smith (2008).**

131 **Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Vadasy and Sanders (2008); Vadasy and Sanders (2009).**

132 **Burroughs-Lange and Douetil (2007); Sylva et al. (2008).**

133 **Cheatham, Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Denton et al. (2013).**

134 **Cheatham, Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Denton et al. (2010).**

135 **Burroughs-Lange and Douetil (2007); Cheatham, Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Denton et al. (2010); Denton et al. (2013); Mathes et al. (2005); May et al. (2013); Schwartz (2005); Sylva et al. (2008); Vadasy and Sanders (2009).**

136 **Vadasy and Sanders (2008); Vadasy and Sanders (2009).**

137 **Denton et al. (2013).**

138 **Burroughs-Lange and Douetil (2007); Christ and Davie (2009); Mathes et al. (2005); May et al. (2013); Schwartz (2005); Vadasy and Sanders (2008); Vadasy and Sanders (2009).**

139 See Shanahan et al. (2010) for a more thorough description of gradual release of responsibility.

140 **Case et al. (2010); Case et al. (2014); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009) [*UFLI* without extended literacy vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without manipulative letters vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without sentence writing vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* vs. typical classroom instruction]; Mathes et al. (2005); Sylva et al. (2008).**

141 **Denton et al. (2013).**

142 **Denton et al. (2013); Sylva et al. (2008).**

143 **Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Denton et al. (2010); Lane et al. (2009) [*UFLI* without extended literacy vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without manipulative letters vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without sentence writing vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* vs. typical classroom instruction]; Martens et al. (2007); May et al. (2013); O'Connor, Swanson, and Geraghty (2010) [difficult-level reading vs. typical classroom instruction (*Houghton Mifflin*)]; O'Connor, Swanson, and Geraghty (2010) [independent-level reading vs. typical classroom instruction (*Houghton Mifflin*)]; O'Connor, White, and Swanson (2007) [repeated reading vs. typical classroom instruction]; Reutzel, Fawson, and Smith (2008); Schwartz (2005); Swanson and O'Connor (2009) [continuous reading vs. typical classroom instruction (*Houghton Mifflin*)]; Swanson and O'Connor (2009) [repeated reading vs. typical classroom instruction (*Houghton Mifflin*)]; Vadasy and Sanders (2008); Vadasy and Sanders (2009).**

144 **Burroughs-Lange and Douetil (2007); Christ and Davie (2009); Denton et al. (2013); Martens et al. (2007); Mathes et**

al. (2005); May et al. (2013); Schwartz (2005); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

145 **Lane et al. (2009) [*UFLI* vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without manipulative letters vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without sentence writing vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without extended literacy vs. typical classroom instruction]; Mathes et al. (2005).**

146 **Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2013); Lane et al. (2009) [*UFLI* vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without manipulative letters vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without sentence writing vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without extended literacy vs. typical classroom instruction]; Martens et al. (2007).**

147 **Case et al. (2010); Case et al. (2014).**

148 **Reutzel, Fawson, and Smith (2008).**

149 **Christ and Davie (2009); Denton et al. (2013).**

150 **Denton et al. (2013).**

151 **Christ and Davie (2009).**

152 **Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2013); Lane et al. (2009) [*UFLI* without extended literacy vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without manipulative letters vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without sentence writing vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* vs. typical classroom instruction]; Martens et al. (2007); Mathes et al. (2005); May et al. (2013); O'Connor, White, and Swanson (2007) [repeated reading vs. typical classroom instruction]; Reutzel, Fawson, and Smith (2008); Schwartz (2005); Swanson and O'Connor (2009) [repeated reading vs. typical classroom instruction (*Houghton Mifflin*)]; Vadasy and Sanders (2008); Vadasy and Sanders (2009).**

153 **Swanson and O'Connor (2009) [continuous reading vs. typical classroom instruction (*Houghton Mifflin*)].**

154 **Lane et al. (2009) [*UFLI* vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without manipulative letters vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without sentence writing vs. typical classroom instruction]; Lane et al. (2009) [*UFLI* without extended literacy vs. typical classroom instruction]; Vadasy and Sanders (2008); Vadasy and Sanders (2009).**

155 **Burroughs-Lange and Douetil (2007); May et al. (2013); Schwartz (2005).**

156 Following WWC guidelines, improved outcomes are indicated by either a positive statistically significant effect or a positive substantively important effect size. The WWC defines substantively important, or large, effects on outcomes to be those with effect sizes greater than or equal to 0.25 standard deviations. See the WWC guidelines at http://whatworks.ed.gov.

157 For more information, see the WWC Frequently Asked Questions page for practice guides at http://whatworks.ed.gov.

158 This includes randomized control trials (RCTs) and quasi-experimental design studies (QEDs). Studies not contributing to levels of evidence include single-case designs (SCDs) evaluated with WWC pilot SCD standards and regression discontinuity designs (RDDs) evaluated with pilot RDD standards.

159 The research may include studies meeting WWC group design standards and supporting the effectiveness of a program, practice, or approach with small sample sizes and/or other conditions of implementation or analysis that limit generalizability. The research may include studies that support the generality of a relation but do not meet WWC group design standards; however, they have no major flaws related to internal validity other than lack of demonstrated equivalence at pretest for QEDs. QEDs without equivalence must include a pretest covariate as a statistical control for selection bias. These

studies must be accompanied by at least one relevant study meeting WWC group design standards. For this practice guide, the latter studies did not need to be considered because a sufficient number of studies met WWC group design standards for each recommendation.

160 American Educational Research Association, American Psychological Association, and National Council on Measurement in Education (1999).

161 Baker et al. (2014).

162 **Coyne et al. (2004a)**; **Coyne et al. (2004b)**; **Simmons et al. (2007)**.

163 **Denton et al. (2010)**; **Mathes et al. (2005)**.

164 **Lane et al. (2009)**.

165 Three studies were previously reviewed for other WWC products and received a different final rating than reported in this practice guide. **Goodson et al. (2010)** was previously reviewed in a single study review using WWC group design standards version 2.1 and received the rating of *meets WWC group design standards without reservations*. Using WWC group design standards version 3.0, the study received the rating of *meets WWC group design standards with reservations* in this practice guide because it is a cluster randomized controlled trial that presents analyses focused on student performance and includes students who were not present at the time of randomization. **Mathes et al. (2005)** was previously reviewed for the *Assisting Students Struggling with Reading: Response to Intervention (RtI) and Multi-Tier Intervention in the Primary Grades* practice guide using standards version 1.0 and received the rating of *meets WWC group design standards with reservations*. Using WWC group design standards version 3.0, the study received the rating of *meets WWC group design standards without reservations* in this practice guide because the attrition standard changed. **Hecht and Close (2002)** was previously reviewed for a grant competition using standards version 2.0 under the *Beginning Reading* protocol and received the rating of *does not meet WWC group design standards*. Under the *Foundational Reading Practice Guide*

protocol, however, the study meets WWC group design standards with reservations because the requirements for demonstrating baseline equivalence are different under the *Beginning Reading* and *Foundational Reading Practice Guide* protocols.

166 A statistically significant finding is a finding that is unlikely to occur by chance.

167 Substantively important findings are defined as those with an effect size greater than 0.25 or less than −0.25, as measured by Hedge's *g*.

168 Performance below grade level could be indicated by low scores on screening measures of reading (relative to standardized norms or classroom performance) or the instructor's perception of students' abilities.

169 If a study has both immediate posttest outcomes and follow-up outcomes (administered after the immediate posttest) that meet WWC group design standards, the effects on follow-up outcomes are presented in the notes of the appendix tables. If a study does not have immediate posttest outcomes that meet WWC group design standards, but does have follow-up outcomes that meet WWC group design standards, then the follow-up outcomes are listed in the appendix tables, as the outcomes closest to the end of the intervention that meet WWC group design standards.

170 **Arra and Aaron (2001)**; **Hecht and Close (2002)**; **Heistad (2008)**; **Joseph (2000)**; **Schuele et al. (2008)**; **Senechal et al. (2012)**; **Williams et al. (2007)**; **Williams et al. (2014)**; **Wise and Ring (2000)**.

171 **Frechtling, Zhang, and Silverstein (2006)**; **Gunn, Smolkowski, and Vadasy (2011)**; **Hecht (2003)**; **Scanlon et al. (2005)**. Other studies have different contrasts that support different recommendations.

172 Three of these studies include a different contrast that can support a recommendation: **Begeny et al. (2010)**; **Johnston and Watson (2004)**; and **Torgesen et al. (2006)**. Two of these citations are listed in the table twice—**Vadasy, Sanders, and Peyton (2006b)** and **Walton, Walton, and Fenton (2001)**—because they have two studies that meet WWC group design standards.

173 Throughout Appendix D, all endnote citations refer to the study contrast reported in the tables, unless otherwise noted.

174 This recommendation is well-aligned with the WWC's *Teaching Academic Content and Literacy to English Learners in Elementary and Middle School* practice guide's first recommendation ("Teach a set of academic vocabulary words intensively across several days using a variety of instructional activities"). That recommendation was assigned a strong level of evidence, but most of the supporting studies for that guide are not eligible for review in this guide, because this guide excludes studies with samples that are more than half English learners as well as older elementary students. See http://ies.ed.gov for more information.

175 **Apthorp et al. (2012); Baker et al. (2013); Duff et al. (2014); Goodson et al. (2010); Justice, Meier, and Walpole (2005); Simmons et al. (2007); Williams et al. (2009).**

176 **Baker et al. (2013); Goodson et al. (2010); Justice, Meier, and Walpole (2005).**

177 **Duff et al. (2014); Simmons et al. (2007); Williams et al. (2009).**

178 **Apthorp et al. (2012); Baker et al. (2013); Duff et al. (2014); Goodson et al. (2010).**

179 **Baker et al. (2013); Goodson et al. (2010); Justice, Meier, and Walpole (2005).**

180 **Goodson et al. (2010).**

181 **Baker et al. (2013); Justice, Meier, and Walpole (2005).**

182 **Apthorp et al. (2012); Baker et al. (2013); Duff et al. (2014); Goodson et al. (2010).**

183 **Apthorp et al. (2012); Goodson et al. (2010).**

184 **Baker et al. (2013).**

185 **Duff et al. (2014).**

186 **Baker et al. (2013); Duff et al. (2014); Justice, Meier, and Walpole (2005); Simmons et al. (2007); Williams et al. (2009).**

187 **Apthorp et al. (2012); Goodson et al. (2010).**

188 **Baker et al. (2013).**

189 **Apthorp et al. (2012); Goodson et al. (2010); Williams et al. (2009).**

190 **Williams et al. (2009).**

191 **Apthorp et al. (2012).**

192 **Goodson et al. (2010).**

193 **Duff et al. (2014); Simmons et al. (2007).**

194 **Duff et al. (2014).** This study also found no discernible effects on listening comprehension.

195 **Simmons et al. (2007).**

196 **Justice, Meier, and Walpole (2005).**

197 **Apthorp et al. (2012); Baker et al. (2013); Goodson et al. (2010); Justice, Meier, and Walpole (2005); Simmons et al. (2007); Williams et al. (2009).**

198 **Duff et al. (2014).**

199 **ibid**.

200 **Apthorp et al. (2012); Baker et al. (2013); Goodson et al. (2010); Williams et al. (2009).**

201 **Apthorp et al. (2012); Baker et al. (2013); Duff et al. (2014); Goodson et al. (2010); Justice, Meier, and Walpole (2005); Williams et al. (2009).**

202 **Simmons et al. (2007).**

203 **Apthorp et al. (2012); Baker et al. (2013); Goodson et al. (2010); Williams et al. (2009).**

204 **Simmons et al. (2007).**

205 **Duff et al. (2014).**

206 **Justice, Meier, and Walpole (2005).**

207 **Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Hecht (2003); Lane et al. (2007); Lane et al. (2009); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).**

208 **Hagans and Good (2013); Lane et al. (2007); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005);**

Torgesen et al. (2010); Walton et al. (2001) [Experiment 1].

209 Frechtling, Zhang, and Silverstein (2006); Hecht (2003); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

210 Hagans and Good (2013); Lane et al. (2007); Lane et al. (2009); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1].

211 Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Savage et al. (2009); Scanlon et al. (2005); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

212 Hagans and Good (2013); Lane et al. (2007); Lane et al. (2009); Mitchell and Fox (2001); Rashotte, MacPhee, and Torgesen (2001); Torgesen et al. (2010).

213 Frechtling, Zhang, and Silverstein (2006); Hecht (2003); Scanlon et al. (2005); Walton and Walton (2002).

214 Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Savage et al. (2009); Walton et al. (2001) [Experiment 1].

215 Oudeans (2003); Ouellette and Senechal (2008).

216 Gunn, Smolkowski, and Vadasy (2011).

217 Frechtling, Zhang, and Silverstein (2006); Hagans and Good (2013); Lane et al. (2007); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010).

218 Hecht (2003); Lane et al. (2009); Walton and Walton (2002).

219 Gunn, Smolkowski, and Vadasy (2011); Ouellette and Senechal (2008); Walton et al. (2001) [Experiment 1].

220 Hagans and Good (2013); Lane et al. (2007); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]. One contrast of **Lane et al. (2009)** that compared *UFLI* without sentence writing to *UFLI* without manipulative letters meets WWC group design standards without reservations, but that study is not included because the panel and staff determined that this study's main contrast of interest for this recommendation was *UFLI* vs. *UFLI* without manipulative letters, which meets WWC group design standards with reservations.

221 Frechtling, Zhang, and Silverstein (2006); Hecht (2003).

222 Gunn, Smolkowski, and Vadasy (2011); Lane et al. (2009); Walton and Walton (2002).

223 Frechtling, Zhang, and Silverstein (2006); Hecht (2003); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

224 Savage et al. (2009); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

225 Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

226 Walton et al. (2001) [Experiment 1].

227 Rashotte, MacPhee, and Torgesen (2001).

228 Frechtling, Zhang, and Silverstein (2006); Hecht (2003); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton and Walton (2002).

229 Walton et al. (2001) [Experiment 1].

230 Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005).

231 ibid.

232 Nelson, Benner, and Gonzales (2005); Nelson et al. (2005).

233 Hagans and Good (2013).

234 Gunn, Smolkowski, and Vadasy (2011).

235 Gunn, Smolkowski, and Vadasy (2011); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005).

236 Hagans and Good (2013).

237 Lane et al. (2007).

238 Mitchell and Fox (2001); Ouellette and Senechal (2008).

239 Ouellette and Senechal (2008).

240 Mitchell and Fox (2001).

241 Lane et al. (2009); Oudeans (2003).

242 Oudeans (2003).

243 Lane et al. (2009).

244 Oudeans (2003).

245 Lane et al. (2009).

246 Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Lane et al. (2007); Mitchell and Fox (2001); Oudeans (2003); Ouellette and Senechal (2008); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

247 Frechtling, Zhang, and Silverstein (2006).

248 Hecht (2003).

249 Lane et al. (2009); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005).

250 Mitchell and Fox (2001); Savage et al. (2009); Torgesen et al. (2010).

251 Scanlon et al. (2005).

252 Hagans and Good (2013); Lane et al. (2007); Lane et al. (2009); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Scanlon et al. (2005); Torgesen et al. (2010); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

253 Frechtling, Zhang, and Silverstein (2006); Rashotte, MacPhee, and Torgesen (2001); Savage et al. (2009).

254 Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Oudeans (2003); Ouellette and Senechal (2008); Mitchell and Fox (2001).

255 Frechtling, Zhang, and Silverstein (2006).

256 Mitchell and Fox (2001).

257 Lane et al. (2007); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

258 Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003).

259 Rashotte, MacPhee, and Torgesen (2001); Torgesen et al. (2010); Frechtling, Zhang, and Silverstein (2006).

260 Lane et al. (2007); Lane et al. (2009); Mitchell and Fox (2001); Rashotte, MacPhee, and Torgesen (2001); Scanlon et al. (2005); Torgesen et al. (2010).

261 Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hagans and Good (2013); Hecht (2003); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Savage et al. (2009); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

262 Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Mitchell and Fox (2001); Nelson, Benner, and Gonzales (2005); Nelson et al. (2005); Oudeans (2003); Ouellette and Senechal (2008); Scanlon et al. (2005); Walton et al. (2001) [Experiment 1]; Walton and Walton (2002).

263 Hagans and Good (2013); Lane et al. (2007); Lane et al. (2009); Savage et al. (2009); Torgesen et al. (2010).

264 Rashotte, MacPhee, and Torgesen (2001).

265 Frechtling, Zhang, and Silverstein (2006) took place in an urban setting, but the location was not reported.

266 Blachman et al. (2004); Coyne et al. (2004a); Frechtling, Zhang, and Silverstein (2006); Fuchs et al. (2001); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Hecht (2003); Jenkins et al. (2004); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Savage et al. (2009); Scanlon et al. (2005); Torgesen et al. (2006); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

267 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

268 Gunn et al. (2005); Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

269 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007).

270 Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Torgesen et al. (2010); Vadasy and Sanders (2011); Wright and Jacobs (2003).

271 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Scanlon et al. (2005).

272 Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

273 Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

274 Tse and Nicholson (2014); Vadasy, Sanders, and Tudor (2007).

275 Wright and Jacobs (2003).

276 Torgesen et al. (2010); Vadasy and Sanders (2011).

277 Coyne et al. (2004a); Fuchs et al. (2001); Hecht (2003); Savage et al. (2009); Torgesen et al. (2006).

278 Gunn et al. (2005); Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

279 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

280 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Jenkins et al. (2004); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

281 Graham, Harris, and Chorzempa (2002); Gunn, Smolkowski, and Vadasy (2011).

282 Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Torgesen et al. (2010); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

283 Blachman et al. (2004); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Scanlon et al. (2005); Tse and Nicholson (2014).

284 Blachman et al. (2004); Gunn et al. (2005); Jenkins et al. (2004).

285 Gunn, Smolkowski, and Vadasy (2011); Scanlon et al. (2005).

286 Vadasy, Sanders, and Tudor (2007).

287 Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Torgesen et al. (2010).

288 Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002).

289 ibid.

290 Torgesen et al. (2010).

291 Graham, Harris, and Chorzempa (2002).

292 Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002).

293 Frechtling, Zhang, and Silverstein (2006).

294 ibid.

295 Frechtling, Zhang, and Silverstein (2006); Torgesen et al. (2010).

296 Graham, Harris, and Chorzempa (2002).

297 Tse and Nicholson (2014).

298 Vadasy and Sanders (2011).

299 Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Wright and Jacobs (2003).

300 Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

301 Wright and Jacobs (2003).

302 Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Wright and Jacobs (2003).

303 Blachman et al. (2004); Jenkins et al. (2004); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007).

304 Frechtling, Zhang, and Silverstein (2006).

305 Torgesen et al. (2010).

306 Scanlon et al. (2005).

307 Blachman et al. (2004); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training]; Scanlon et al. (2005);

308 Frechtling, Zhang, and Silverstein (2006).

309 Vadasy, Sanders, and Tudor (2007).

310 Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Tse and Nicholson (2014); Wright and Jacobs (2003).

311 Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Wright and Jacobs (2003).

312 Frechtling, Zhang, and Silverstein (2006).

313 Graham, Harris, and Chorzempa (2002).

314 Wright and Jacobs (2003).

315 Blachman et al. (2004); Frechtling, Zhang, and Silverstein (2006); Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Scanlon et al. (2005); Torgesen et al. (2010); Tse and Nicholson (2014); Vadasy and Sanders (2011).

316 Graham, Harris, and Chorzempa (2002); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Jenkins et al. (2004); Scanlon et al. (2005); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

317 Blachman et al. (2004); Torgesen et al. (2010); Tse and Nicholson (2014).

318 Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

319 Frechtling, Zhang, and Silverstein (2006).

320 Frechtling, Zhang, and Silverstein (2006); Gunn, Smolkowski, and Vadasy (2011); Scanlon et al. (2005); Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

321 Jenkins et al. (2004); Torgesen et al. (2010); Vadasy and Sanders (2011).

322 Graham, Harris, and Chorzempa (2002); Tse and Nicholson (2014).

323 Wright and Jacobs (2003).

324 Blachman et al. (2004); Gunn et al. (2005); Vadasy, Sanders, and Tudor (2007).

325 Blachman et al. (2004); Graham, Harris, and Chorzempa (2002); Jenkins et al.

(2004); Scanlon et al. (2005); Torgesen et al. (2010); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007); Wright and Jacobs (2003).

326 Frechtling, Zhang, and Silverstein (2006); Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Johnston and Watson (2004); Tse and Nicholson (2014).

327 Tse and Nicholson (2014).

328 Wright and Jacobs (2003).

329 Johnston and Watson (2004) [synthetic phonics vs. accelerated letter training].

330 Frechtling, Zhang, and Silverstein (2006); Jenkins et al. (2004).

331 Gunn et al. (2005); Gunn, Smolkowski, and Vadasy (2011); Vadasy and Sanders (2011); Vadasy, Sanders, and Tudor (2007).

332 Torgesen et al. (2010).

333 Blachman et al. (2004); Scanlon et al. (2005).

334 Graham, Harris, and Chorzempa (2002).

335 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Cheatham, Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); Martens et al. (2007); Mathes et al. (2005); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

336 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2013); Martens et al. (2007); Mathes et al. (2005); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005);

Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

337 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

338 Case et al. (2014); Christ and Davie (2009); Denton et al. (2013); Reutzel, Fawson, and Smith (2008); Schwartz (2005); Swanson and O'Connor (2009); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

339 Cheatham, Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Martens et al. (2007).

340 Mathes et al. (2005).

341 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

342 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al. (2014); Christ and Davie (2009); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Schwartz (2005); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

343 Denton et al. (2013); Martens et al. (2007); Reutzel, Fawson, and Smith (2008); Swanson and O'Connor (2009).

344 Burroughs-Lange and Douetil (2007); Christ and Davie (2009).

345 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Denton et al. (2010); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005).

346 Christ and Davie (2009); Denton et al. (2013); Schwartz (2005); Swanson and O'Connor (2009); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

347 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al. (2010); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008).

348 Case et al. (2014); Cheatham, Allor, and Roberts (2014) [advanced decoders]; Cheatham, Allor, and Roberts (2014) [developing decoders]; Christ and Davie (2009); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

349 Mathes et al. (2005).

350 ibid.

351 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

352 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Burroughs-Lange and Douetil (2007); Case et al.

(2010); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

353 Case et al. (2014); Lane et al. (2009).

354 Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); Scanlon et al. (2005); Schwartz (2005).

355 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Christ and Davie (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

356 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Christ and Davie (2009); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

357 Sylva et al. (2008).

358 Vadasy and Sanders (2008); Vadasy and Sanders (2009).

359 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction].

360 Christ and Davie (2009).

361 Sylva et al. (2008).

362 O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Swanson and O'Connor (2009).

363 O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008).

364 O'Connor, White, and Swanson (2007).

365 O'Connor, Swanson, and Geraghty (2010); Swanson and O'Connor (2009).

366 Swanson and O'Connor (2009).

367 O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Swanson and O'Connor (2009).

368 Reutzel, Fawson, and Smith (2008).

369 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al.

(2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2013); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

370 Burroughs-Lange and Douetil (2007); Denton et al. (2010); Lane et al. (2009).

371 Denton et al. (2010); Lane et al. (2009).

372 Burroughs-Lange and Douetil (2007).

373 Burroughs-Lange and Douetil (2007); Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009).

374 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Sylva et al. (2008); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

375 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Christ and Davie (2009); Burroughs-Lange and Douetil (2007); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Sylva et al. (2008). Students in Christ and Davie (2009) received individual computer-based instruction.

376 Case et al. (2010); Case et al. (2014); Denton et al. (2010); Denton et al. (2013); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

377 Reutzel, Fawson, and Smith (2008).

378 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al. (2014); Lane et al. (2009); O'Connor, White, and Swanson (2007); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

379 Burroughs-Lange and Douetil (2007); Denton et al. (2010); May et al. (2013); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005).

380 Denton et al. (2013); O'Connor, Swanson, and Geraghty (2010).

381 Case et al. (2010).

382 Swanson and O'Connor (2009).

383 Christ and Davie (2009).

384 Sylva et al. (2008).

385 Begeny et al. (2010) [*HELPS* vs. typical classroom instruction]; Case et al. (2010); Case et al. (2014); Christ and Davie (2009); Denton et al. (2010); Denton et al. (2013); Lane et al. (2009); May et al. (2013); O'Connor, Swanson, and Geraghty (2010); O'Connor, White, and Swanson (2007); Reutzel, Fawson, and Smith (2008); Scanlon et al. (2005); Schwartz (2005); Swanson and O'Connor (2009); Vadasy and Sanders (2008); Vadasy and Sanders (2009).

386 Burroughs-Lange and Douetil (2007); Sylva et al. (2008).