A Research Alignment of

Macmillan/McGraw-Hill

Treasures

COMPREHENSIVE READING CURRICULUM

Synopsis of Findings (Westat) and
Technical Appendix (IESD)

If reading opens the door of opportunity, will all children be able to cross the threshold to reading success?

At Macmillan/McGraw-Hill, we have always answered Yes to this question. It is our tradition to help every child learn to read, *and* to help every instructor teach reading in the most effective manner possible – a practice that continues today with the *Treasures* Comprehensive Reading Curriculum.

The *Treasures* program will guide children across the literacy threshold to mastery of the skills and strategies they need to become successful readers – because *Treasures* is anchored in salient and consequential research about what works.

The Importance of Reading Research

The federal government commenced its most sustained commitment to literacy with the landmark Reading First initiative. Based on years of scientifically based research findings, the goal of Reading First is to provide children with effective reading instruction in the early grades, so that as a nation we may ensure that all children grow up to become literate adults.

Learning to read and teaching reading is work that requires the most effective materials because reading is foundational for all other learnings. In fact, The National Institute for Literacy's Partnership for Reading (2000) states that "Success in school starts with reading." Research is now available that suggests how to give each child a good start toward that success. Increasingly, federal, state, and local requirements in every area focus on the need for research-verified instructional strategies, methods, and approaches. Macmillan/McGraw-Hill has stepped up to this challenge by identifying highly-regarded research related t o effective reading instruction, summarizing relevant instructional recommendations based on that research, and then showing how those recommendations are incorporated into the Macmillan/McGraw-Hill *Treasures* Reading Curriculum.

This paper presents the results of the research-based alignment process for *Treasures* in two parts: Synopsis of Findings (Westat) and a Technical Appendix (IESD).

What Are the Components of Reading?

To meet Reading First guidelines, reading programs must be based on scientific evidence related to five elements that have been identified as essential in reading instruction:

1. **Phonemic awareness**
2. **Phonics**
3. **Fluency**
4. **Vocabulary**
5. **Comprehension**

This Westat Synopsis of Findings builds upon the IESD technical work in two ways. The Westat Synopsis presents a user-friendly précis of the key research findings across the five components of reading cited above, and it adds a *demonstration of alignment* by providing specific examples from grades K-6. We describe how Macmillan/McGraw-Hill Reading *(Treasures)* meets findings of scientific research related to these five areas, including research-based recommendations for assessment related to these areas.

Although the Westat Synopsis cites some research literature, the IESD Technical Appendix provides the reader with full technical detail.

This paper summarizes key research findings and research-based recommendations related to effective reading instruction from two key sources describing the body of research on which Reading First was based:

- *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (National Institute of Child Health and Human Development [NICHHD], 2000). This source presents an extensive, detailed research review related to five broad categories (see below under Reading First Content Focus). In cases where the data were of sufficient quality and uniformity, research results were summarized in a meta-analysis, a method for statistically combining research results across an entire body of research studies.

- *Preventing reading difficulties in young children*, a review of research on early childhood reading commissioned by the National Research Council (Snow, Burns, & Griffin, 1998). This source represents a broad-ranging research summary and review, but without inclusion of specific details of the research.

The Five Components of Reading Discussed

1 Components of Reading: *Phonemic Awareness*

"Phonemic awareness instruction helps children learn to read."

– *Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 6)

A. What is Phonemic Awareness?

"Phonemic awareness is the ability to hear, identify, and manipulate the individual sounds – phonemes – in spoken words" (Armbruster, Lehr, & Osborn, 2003, p. 10). It is the foundation for reading. It is the ability to detect individual speech sounds within words. This ability is a requirement for developing accurate decoding skills and strategies (McShane, 2006, p. 13). Phonemic awareness is often described as part of a broader category known as phonological awareness. Phonological awareness includes the ability to work with larger units in spoken language such as syllables and rhymes, which often include more than one phoneme. Children typically find it easier to work with these larger units (e.g., rhyming words) before proceeding to develop skills with individual phonemes (NICHHD, 2000, p. 2-10).

B. Why is Phonemic Awareness instruction important?

Strong phonemic awareness is considered an early indicator of eventual success in beginning reading. Phonemic awareness instruction helps children learn to read words, spell words, and comprehend text. The National Reading Panel reached three conclusions about phonemic awareness instruction in its Teaching Children to read document:

– *Phonemic awareness instruction has a positive overall effect on reading and spelling.*
– *Phonemic awareness instruction leads to lasting reading improvement.*
– *Phonemic awareness instruction can be effectively carried out by teachers.*

Source: *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (National Institute of Child Health and Human Development [NICHHD], 2000).

C. Who benefits from phonemic awareness instruction?

- Readers do. Phonemic awareness instruction has been shown to have a positive impact on reading skills across many student categories and grade levels. The National Reading Panel cited normally developing readers, children at risk for future reading problems and (later research) specifically for kindergartners at risk for developing dyslexia (Elbro & Petersen, 2004), disabled readers, preschoolers, kindergartners through sixth graders, children across various SES levels, and children learning to read in English as well as in other languages.

- Spellers do. Phonemic Awareness instruction has been shown to have a positive impact on spelling skills across many student categories and grade levels. The Reading panel cited kindergartners, first graders, children at risk for future reading problems, normally developing readers, children across various SES levels, and children learning to spell in English as well as in other languages.

D. Common Phonemic Awareness *Tasks and Examples*		E. Research Recommendations
Phoneme isolation– Recognizing individual sounds in words.	**E.g.:** What sound do you hear at the beginning of *pin*? (/p/)	**1. Range and scope of instruction** **Grade Levels** Research summarized by the NRP suggests that **Phonemics Awareness (PA) instruction** should be provided – At the kindergarten level – At the first-grade level – At elementary levels above first grade as supplemental instruction for students with special needs
Phoneme identification– Recognizing the common sound in different words.	**E.g.:** What sound do you hear that is the same in sat, *sun*, and *soup*? (/s/)	
Phoneme categorization– Recognizing the odd sound in a set of words.	**E.g.:** Listen to these words–hand, heart, sun. Which word begins with a different sound? (*sun*)	
Phoneme blending– Listening to a sequence of separately spoken sounds and then blending them naturally into a recognizable word.	**E.g.:** What word is /b/ - /a/ - /t/? (*bat*)	**2. Instructional methods and features** **Spoken and written versus spoken only.** Instruction that used letters to teach phoneme manipulation had a considerably greater impact on both reading and spelling than instruction that did not use letters but was limited to spoken sounds only
Phoneme segmenta-tion– Breaking a word into its sounds by tapping out or counting the sounds.	**E.g.:** How many sounds do you hear in *cat*? (three)	**Assessment for kindergarteners based on phoneme recognition.** Findings suggest that a group-administered assessment based on phoneme recognition can serve as a useful screening tool for identifying the general level of students' PA skills in kindergarten, which in turn is a useful indicator of students who might need targeted PA skills intervention.
Phoneme deletion– Recognizing the word that remains when a specific phoneme is removed.	**E.g.:** What word do we have when we say smile without the /s/? (*mile*)	**Guidance by initial and ongoing assessment in the first and second grades.** Based on the research findings, the NRP recommended a design in which assessment results drive PA instruction at the first- and second-grade levels, both initially and through ongoing formative assessments.
		– Assessments conducted before PA instruction begins should "indicate which children need the instruction and which do not, which children need to be taught rudimentary levels of PA (e.g., segmenting initial sounds in words), and which children need more advanced levels involving segmenting or blending with letters" (NICHHD, 2000, p. 2-6).
		– In order to determine the length of PA instruction, "What is probably most important is to tailor training time to student learning by assessing who has and who has not acquired the skills being taught as training proceeds" (NICHHD, 2000, p. 2-42). The NRC research review argued that "intensity of instruction should be matched to children's needs" (Snow, Burns, & Griffin, 1998, p. 321).

Demonstration of Phonemic Awareness in *Treasures*

Summary of Research Recommendations for Phonemic Awareness	Demonstration of Alignment
Kindergarten instruction is designed to provide practice with the sound structure of words and the recognition and production of letters.	**Kindergarten:** Phonemic awareness tasks begin with skills such as "concept of a word," "rhyme," and "count syllables." The tasks then progress to "oral blending" (with continuous first sounds) and "oral segmentation" (with continuous first sounds–2 letter words, then 3-letter words). Finally, tasks progress to "oral manipulation" and more complex blending and segmentation with words beginning with stop sounds and longer words (4 or more phonemes). **Sample of a Typical Kindergarten Lesson** Unit 4, Week 1–Phoneme Isolation: /n/ The teacher models the new sound using the corresponding Alphabet Card and Photo Card. Students practice listening to the sound and repeating it. Students then review previously introduced sounds such as /i/ and /t/ with Photo Cards. During guided practice, the teacher displays Photo Cards, and the children identify and pronounce the initial sounds.
Assessment for kindergarteners is based on phoneme recognition.	Phonemic awareness and phonics skills are assessed together in kindergarten, especially in the beginning units of this level. A new letter is introduced at the beginning of each unit and it is at this point that phoneme isolation is practiced. At the end of the unit, teachers assess these skills by using "Pencil and Paper Assessments." These assessments are a combination of Activity Book and Practice Book pages. For an example, see page 64 of Kindergarten Unit 1. In this typical unit, Activity Book page 12 and Practice Book pages 25-26 are suggested as a Pencil and Paper Assessment for the sound/letter /m/.
First-grade instruction is designed to provide explicit instruction and practice with sound structures that lead to phonemic awareness.	Phonemic awareness instruction and practice are incorporated into daily lessons. Teachers are prompted to explicitly model proper pronunciation of sound structures using visual cues such as letter and alphabet cards. After modeling, teachers guide students in group and individual practice of the new sound structure or letter. For additional phonemic awareness instruction, students may also be asked to independently complete complementary pages in the leveled Student Practice Book.
At elementary levels above first grade, phonemic awareness is provided as supplemental instruction for students with special needs.	**Sample from a Typical Second Grade Unit:** Unit 2, Weeks 1-5, features short /u/u, long /ū/ u_e; blends /sl/sl, /dr/ dr, /sk/ sk, /sp/sp, /st/ st; long /ā/ ay, ai; long /ī/ I, igh, ie, y; and long /ō/ o, oa, ow, oe. The correlating Phonemic Awareness skills are reinforced in the Leveled Reader Program, Leveled Practice Books, and the Intervention Anthology for Approaching Level, Beyond Level, and ELL students. Each lesson has a separate phonemic awareness plan, for example, Second Grade, Unit 2, Week 1, Day 1: (p. 155A) Phoneme Categorization–The teacher models words with the central /u/ sound. Guided practice and independent practice activities provide children with opportunities to learn the phoneme. Further practice and assessment is provided in Approaching Practice Book A. A similar procedure is followed for Day 2, and long u; Day 3, blending phonemes; Day 4, phoneme substitution; and Day 5, blending practice.

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At elementary levels above first grade, phonemic awareness is provided as supplemental instruction for students with special needs. *(continued)*	**End of Fourth Grade Example:** Students sort spelling word cards according to how the schwa + n sound is spelled. They take turns sorting cards and explaining their sorting system. **Fourth Grade ELL Example:** ELL students use phonics and multi-syllabic decoding to learn spelling and vocabulary words. In the section, "ELL: Access for All– Practice Spelling," the teacher supplies a list of words for each long i pattern in the spelling words. The teacher pronounces each word with the ELL students. Then she randomly says a word and has students repeat it and spell it aloud. After a few times, she covers the words after she says them and challenges students to spell them. **Individualized Intervention** For students with special needs, phonemic awareness skills instruction starts at the beginning of an individualized scope and sequence as determined through the examination of the most recent test score data. For example, upon analysis of post-test data, a third grade student may be diagnosed with a short vowel sound skill need. This student will engage in age-appropriate practices to learn those sounds even though the specific activities are typically found in first-grade level instruction.
Phonemic awareness Instruction is a part of both reading and spelling.	**Second Grade Example:** Each week, spelling words are taken from a decodable reader and reflect the skills emphasized in the phonemic awareness lessons. For example, in Unit 2, Week 1, Day 1, fifteen spelling words are introduced and pre-tested with the short u sound. The decodable reader, Luke's Tune, provides fluency practice when students echo-read words with the short- and long-u sounds. Students complete the activity in the Spelling Practice Book using these elements. On Day 3, students complete a word sort with the words. On Day 4, students work in pairs using the Spelling Word Cards. Day 5 brings review and assessment of phoneme blending and a spelling test with words that have short and long u
Assessment results drive phonemic awareness instruction at the first-and second-grade levels, both initially and through ongoing formative assessments.	The assessments in *Treasures* are designed to inform phonemic awareness instruction at Kindergarten, first- and second-grade levels. Therefore, assessment is ongoing, varied, and rigorous. Teachers use results to modify instruction. **Informal Assessment** Throughout the lessons, students are observed informally. Because lessons are highly interactive, and the student response rates are high, teachers have ample opportunity to check each student's daily phonemic progress. Daily "Quick Check" Observations in the Teacher's Guide (TE) remind teachers what to observe. If students encounter difficulties, immediate lesson modifications are provided via the "Corrective Feedback" suggestions. If additional phonemic awareness instruction and/or guided practice are required, the TE directs teachers to the "Additional Instruction" section. **Formal Assessment** Weekly Assessments and Unit Tests are used as ongoing formative assessments to monitor students' phonemic awareness acquisition. Additionally, the Daily Quick Check Observations are compiled and compared with the Quick Check Rubric to assess student skills, diagnose, and prescribe additional lessons or intervention instruction if necessary.

2 Components of Reading: *Phonics*

"Systematic and explicit phonics instruction significantly
improves children's reading comprehension."

– *Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 14)

A. What is Phonics?

Phonics instruction teaches children the relationship between letters (graphemes) and the sounds in spoken language (phonemes) and how to apply that knowledge in reading and spelling words.

Phonics instruction builds on phonemic awareness. Although it includes some types of phonemic awareness activities, in which students "use grapheme-phoneme correspondences to decode or spell words," it extends beyond such tasks to "include other activities such as reading decodable text or writing stories" (NICHHD, 2000, p. 2-11).

B. What is "systematic and explicit" phonics instruction?

Research recommendations favor phonics instruction that is "systematic and explicit." An explicit approach includes specific directions to teachers for teaching letter-sound correspondences. A systematic approach is one that incorporates a planned, sequential set of phonetic elements to master. These elements are explicitly and systematically introduced in meaningful reading and writing tasks.

Systematic and explicit phonics instruction includes teaching a full spectrum of key letter-sound correspondences: not just major correspondences between consonant letters and sounds, but also short and long vowel letters and sounds, and vowel and consonant digraphs such as oi, ea, ou, sh, and th.

Several different methods have been developed to teach phonics systematically and explicitly, including synthetic phonics, analytic phonics, embedded phonics, analogy phonics, onset-rime phonics, and phonics through spelling. Broadly speaking, these approaches are all effective (NICHHD, 2000, p. 2-89).

C. Why is phonics instruction important?

Phonics instruction leads to an understanding of the alphabetic principle–the set of systematic and predictable relationships between written letters and spoken sounds. For children to learn how to sound out word segments and blend these parts to form recognizable words, they must know how letters correspond to sounds. Three top-level examples:

– **Phonics instruction has a positive overall effect on reading.** A meta-analysis by the National Reading Panel (NRP) found that systematic and explicit phonics instruction had a significantly stronger effect on children's reading than every category of nonsystematic or non-phonics instruction that was studied.

– **Phonics instruction has positive overall effects on specific skill areas.** The NRP meta-analysis found that across grades K-6, phonics instruction was "most effective in improving children's ability to decode regularly spelled words . . . and pseudowords," but also helped students to read miscellaneous words (some of which were irregularly spelled) and read text orally (NICHHD, 2000, pp. 2-94, 2-159).

– **Phonics instruction has a lasting impact on reading.** Follow-up tests in the NRP meta-analysis found that the effects of phonics instruction were reduced, but still significant, several months after the instruction ended, "indicating that the impact of phonics instruction lasted well beyond the end of training" (NICHHD, 2000, pp. 2-113, 2-159, 2-161).

D. Who benefits from phonics instruction? *Grade Levels*		E. Research Recommendations *Range and scope of instruction*
The NRP meta-analysis found that kindergarten and first-grade students experienced significantly better improvement from phonics instruction than from other types of instruction in all six areas measured (decoding regular words, decoding pseudowords, reading miscellaneous words, spelling, reading text orally, and comprehending text), with a moderate to large effect size for all areas except reading text orally (NICHHD, 2000, p. 2-159).	**Students in grades 2–6 also experienced significantly better improvement from phonics instruction in four out of six areas** (decoding regular words, decoding pseudowords, reading miscellaneous words, and reading text orally), with effect sizes for the various areas ranging from small to moderate (NICHHD, 2000, p. 2-159).	**Grade Level.** The NRP finding that phonics instruction benefited students in kindergarten, first grade, and grades 2–6 (the majority of which were disabled readers) suggests a value to *including phonics instruction at the kindergarten and first-grade levels and beyond, particularly for disabled readers.* **Level at which phonics instruction begins.** The NRP meta-analysis found that *phonics instruction in kindergarten and first grade was "much more effective"* than phonics instruction that began in second grade or later, after students have learned to read independently. **Letter knowledge as precursor.** Two developmental studies, drawing on and extending a body of existing research, suggest that knowledge of letter names and/or letter sounds is an important precursor to the earliest stages of reading knowledge. Muter et al. (2004) found that students' ability to identify letter sounds and/or names on entering schooling (average age 4 years, 9 months) was one of two significant predictors, together with phoneme sensitivity, of word recognition ability a year later (pp. 671–672). **Instruction over multiple years.** Results of a few multi-year studies examined by the NRP "suggest that when phonics instruction is taught to children at the outset of learning to read and continued for 2 to 3 years, the children experience significantly greater growth in reading at the end of training than children who receive phonics instruction for only one year after first grade" (NICHHD, 2000, p. 2-118).

D. Who benefits from phonics instruction? *Grade Levels*		E. Research Recommendations *Range and scope of instruction*
Benefits by Student categories		*Instructional methods and features*
Phonics instruction has been shown to have a statistically significant positive impact across many student categories (NICHHD, 2000, p. 2-160):	**Kindergartners** at risk of developing future reading problems; **first graders** at risk; first grade normally achieving readers; **second to sixth graders**–normally achieving readers and disabled readers; and. **children** across various SES (socioeconomic status) levels.	**Spelling instruction**. An analysis of research commissioned by the NRC claimed that spelling instruction, in particular at the second-grade level, is important in building "phonemic awareness and knowledge of basic letter-sound correspondences" (Snow, Burns, & Griffin, 1998, p. 212). **Phonics instruction as means to an end.** Based on their interpretation of the research results, the NRP argued that phonics instruction (i.e., "the teaching of letter-sound relations") should not be pursued as an end in itself, but should be directed toward the goal of helping students in their "daily reading and writing activities" (NICHHD, 2000, p. 2-96). Students should understand that this is the goal of learning letter-sounds, and should have practice in putting their skills to use. **Variable, guided by assessment.** Based on their interpretation of the research results, the NRP argued that, ideally, phonics instruction should be variable based on the needs of individual students as determined through assessment (NICHHD, 2000, pp. 2-96, 2-97). Similarly, the NRC research review argued that "intensity of instruction should be matched to children's needs" in applying explicit instruction on the connection between phonemes and spellings (Snow, Burns, & Griffin, 1998, p. 321).

Demonstration of Phonics Alignment in *Treasures*

Summary of Research Recommendations for Phonics	**Demonstration of Alignment**
Phonics instruction begins before reading is introduced.	In kindergarten, each lesson begins with a phonemic awareness Warm Up that is followed by Oral Language. Next, the teacher uses the *Big Book* while students practice listening comprehension. Children talk about the story. In every lesson, students engage in phonemic awareness and phonics before reading is introduced.
Letter names and sounds are taught to students early in kindergarten.	Letter name identification and sound instruction begin on the first day of kindergarten. Throughout the Smart Start period (i.e., the first three weeks of kindergarten) the entire alphabet is introduced, and students are guided in letter names and sounds through individual practice and group participation. The "Sing, Talk, Rhyme Chart," Letter Cards, Alphabet and Sound Cards, and Big Book are resources used by teachers to reinforce letter and sound recognition skills throughout kindergarten.
Phonics instruction begins in kindergarten and continues regularly for 3 years.	Instruction begins with the continuous consonants m and s. After several consonants are learned, students are taught short vowel a and how to blend VC and CVC words with short *a* (beginning with continuous sounds). First grade follows this same pattern that continues through third grade.
Phonics instruction teaches students to convert letters into sounds and then to blend the sounds to form recognizable words.	Phonics follows a 'Smart' scope and sequence in which letter-sounds are introduced and then applied to simple VC and CVC words. As the sequence progresses, students encounter more sophisticated sound-spelling patterns and more complex words, including multi-syllabic words.

Kindergarten Example: In a typical lesson, the teacher models the sound for *T*. She places the Large Letter Card, *T*, in the pocket chart. Next to the *T*, she places the card i. She moves her hand from left to right below the letters as she sounds out the blending of the two sounds. Students practice blending the sounds. Next, she places the Letter Card m in the pocket next to the *Ti*. She moves her hand from left to right as she blends the three sounds. Students then blend the sounds with the teacher. This routine is repeated with other words.

Second Grade Example: In a typical lesson, the teacher places Letter Cards *c*, *h*, *e*, *e*, *r* in the chart pocket. Students and the teacher blend the sounds together and read the word. After blending the phonemes, they replace the letters to build a new word. Finally, students use their own Small Letter Cards to blend and build word pairs such as near/dear and year/fear.

Fourth Grade Example: By the fourth grade, students decode the words as a class. For example, they underline the long i syllable or syllables in each of their vocabulary words. They also underline clues that show how to pronounce the words. Following an activity such as this, partners play a game with spelling words having the long i sound.

Fifth Grade Example: By fifth grade, Students analyze words such as tractor pointing out the Latin root, tract, and the suffix, -or. They analyze attraction from "A Song for Makaio," their main reading selection. As they read the selection they identify clues that reveal the meanings and pronunciations of the vocabulary words. In fifth grade, ELL students practice sounds in isolation as well as within words that are difficult for them to pronounce.

In a typical lesson in grades 4-6, advanced phonics skills, such as prefixes, suffixes, and multi-syllabic words are taught in isolation via the blending lines and explicit instruction. Students then read words containing the skills in the connected text in their Student Anthologies and Student Workbooks. |

Spelling instruction is used to build phonemic awareness.	Primary Grades: Each week has a 5-Day Spelling plan: Day 1–pretest; word sort; Day 2–Teacher-modeled word sort; Day 3–Student word sort; game; Day 4–Test Practice: Dictation; and Day 5–Posttest. For example, in second grade, on the first day of each week, students are given the pretest for 10 spelling words, 2 review words (from pervious lessons), and 3 high-frequency words. Word cards are displayed for high-frequency words. The teacher says the words; the children read the words and use each one in a sentence in a "display, say, spell, read, and write" routine. Students then decode the words in the connected text (story in a Decodable Reader). Students complete sentences with each word in the On Level Pr actice Book O. (An "Approaching Practice Book A" and a "Beyond Practice Book B" are also provided depending on the student's level.)
	Second Grade Example: In a typical second grade lesson, students identify and make oral rhymes with the spelling words for phonemic awareness practice. On *Day Two*, Large Letter Cards are used to model blending sounds followed by Guided Practice/Practice and Cumulative Review. Students use Spelling Pattern Cards in a pocket chart to build word Automaticity followed by completing a page in their Spelling Practice Book. On *Day Three*, students work independently or in pairs with Spelling Cards to practice sorting the spelling words. They complete the next page in the Spelling Practice Book. On *Day Four* students work in pairs to take turns dictating the spelling words. They also use their Spelling Cards to practice reading each word quickly. They complete the next page in the Spelling Practice Book and write from a prompt using the words. On *Day Five* students repeat each word as the teacher pronounces it before they write it for the posttest. After the test, the new words are added to the Word Wall.
	Upper Grades Example: By fifth grade, spelling words fit a pattern such as "all of the words have a suffix," for example. Students learn that spelling sometimes changes when a suffix is added. They use spelling words in dictation sentences. They invent sorting schemes for Spelling Word Cards and participate in daily teacher and student word sorts. Students create graphics to identify definitions. They proofread and use spelling words in original writing.
Phonics instruction is direct-ed toward the goal of helping students in their daily reading and writing activities.	The *Treasures* curriculum provides checklists that help students understand specific elements of a piece of writing. Students use rubrics to identify their efforts to improve their own writing and to provide a framework for peer editing. The "Word Work" (phonics and spelling) objectives are reinforced in informal cross-curricular activities each week. For example, in small groups or pairs, second graders might play "Guess My Word" with current and past Spelling Word Cards.
	Fourth Grade Example: By the time students are in fourth grade, they use multi-syllabic decoding when reading words in all texts. For example, the teacher writes on the board *disunity*, *foolhardy*, *screwdriver*, *evolution*, and *uncooked*–words that are used in the students' main selection. The teacher models how to decode disunity, focusing on the long u sound and noting the prefix. Students decode the other words on the list, explaining how the sounds differ. Students use this technique when reading the main selection in the student text. Students also use these words in creative writing.
	Upper Grades: In fifth grade, students become even more sophisticated in their daily reading and writing activities. For example, they may read the words surrounding a homophone to decide on a definition for the homophone that is based on its contextual use. Or they may choose, based on clues gathered from the main selection, which suggested meaning makes the best sense.

Phonics instruction is integrated with other reading instruction.	Primary Grades: The "Word Work" portion of each reading lesson in the primary grades combines phonics, spelling, and vocabulary. Selected spelling words reinforce specified phonemic awareness strategies and the phonics skill highlighted each week. For example, in second grade, Unit 6, Week 1, phonemic awareness emphasizes the endings *–dge*, *–ge*, *–lge*, *–nge*, *–rge*. Phonics and spelling align with phonemic awareness.
	Upper Grades: A phonics instructional strategy used in fourth grade is the "Think Aloud." For example, while reading the main selection, the teacher may say, "I see that his word begins with or. That's probably pronounced /ô/. I know that *ph* often has the sound /*ff*/. If the last syllable is unaccented, I should pronounce it / n/. When I blend the sounds together, I get /ô f ǝn/. I know that word." Students learn to analyze words in this way.
Phonics instruction is variable and is based on students' needs as determined through assessment.	Weekly assessments and Daily Quick Check Observations are used in determining the need for differentiated phonics instruction. Based on results of the Weekly Assessments and observed student performance, teachers are provided leveled options (e.g., Approaching, On, and Beyond Level) to appeal to students' specific instructional needs.
	For students in need of phonics intervention, assessments are provided in the Phonics-QPS (Quick Phonics Screener). This assessment, developed by program author Jan Hasbrouck, evaluates each student's decoding skills and provides the teacher with valuable information to form small groups and to address decoding issues.

3 Components of Reading: *Fluency*

"Repeated and monitored oral reading improves reading fluency and overall reading achievement."

–*Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 24)

A. What is Fluency?

Fluency is the ability to read text quickly, accurately, and with expression. It provides a bridge between word recognition and comprehension. "Fluency is vital to comprehension" (McShane, p. 14). Fluency includes word recognition, but extends beyond knowledge of individual words to reflect the meaningful connections among words in a phrase or sentence. Fluent readers are able to recognize words and comprehend them simultaneously.

B. Why is Fluency Instruction Important?

Fluency is widely acknowledged to be a critical component of skilled reading. A study conducted by the National Assessment of Educational Progress (NAEP) found a "close relationship between fluency and reading comprehension" (NICHHD, 2000, p. 3-1, citing Pinnell et al., 1995). More generally, a National Research Council report stated that "Adequate progress in learning to read English beyond the initial level depends on . . . sufficient practice in reading to achieve fluency with different kinds of texts written for different purposes" (Snow, Burns, & Griffin, 1998, p. 223). Additional evidence of this link between fluency and the development of general reading ability, particularly reading comprehension, is provided by several studies that found student performance on fluency assessments was an effective predictor of their performance on other types of reading measures.

In reviewing the research on fluency instruction, the National Reading Panel (NRP) found value in approaches that incorporated repeated oral reading, guided or unguided, as opposed to less focused attempts to encourage reading in general. Three findings:

Repeated oral reading instruction has a positive overall effect on reading. A meta-analysis by the NRP found that fluency instruction in the form of repeated oral reading (guided or unguided) "had a consistent, and positive impact on word recognition, fluency, and comprehension as measured by a variety of test instruments and at a range of grade levels" (NICHHD, 2000, p. 3-3). The weighted average of these effect sizes resulted in a moderate effect on student reading (NICHHD, 2000, p. 3-16).

Repeated oral reading instruction has a positive impact on specific skill areas. The NRP meta-analysis found that repeated oral reading had a moderate effect on reading accuracy, a somewhat less strong effect on reading fluency, and a smaller effect on reading comprehension (NICHHD, 2000, pp. 3-3, 3-18).

In contrast, encouraging children to read on their own has no research-verified impact on reading achievement. The NRP reviewed research studies on attempts to build fluency through encouraging independent student reading; most of these were studies of sustained silent reading. It found that the body of research failed to confirm any positive effects (NICHHD, 2000, pp. 3-3, 3-24–3-26, citing 14 studies).

C. Who benefits from fluency instruction? Grade Levels

Analysis of grade levels covered by the studies in the NRP meta-analysis led to the conclusion that "repeated reading procedures have a clear impact" on reading ability among:
"Non-impaired readers at least through fourth grade"
"Students with various kinds of reading problems throughout high school" (NICHHD, 2000, p. 3-17)

D. Research Recommendations on Fluency

Range and scope of instruction	**Grade Level.** The NRP research findings suggest a value to including fluency instruction in the form of repeated oral reading procedures at least through the fourth-grade level, and possibly beyond in a supporting capacity for students with reading problems. A review of research on early childhood reading commissioned by the National Research Council (NRC) identified fluency instruction as a key component of first-grade instruction and argued that "Throughout the early grades, time, materials, and resources should be provided" for both daily independent reading and daily supported reading and rereading (Snow, Burns, & Griffin, 1998, p. 195).

Instructional methods and features	**Effective methods.** Some of the methods that produced "clear improvement"–albeit with small sample sizes within each catego-ry–(NICHHD, 2000, p. 3-15) included the following: →	**Repeated readings** (set number of repetitions, set amount of time, or until fluency criteria were reached) (NICHHD, 2000, p. 3
		Repeated readings "combined with other [guided] procedures such as a particular type of oral reading feedback . . . or phrasing support for the reader" (NICHHD, 2000, p. 3
		Practice of oral reading "while listening to the text being read simultaneously" (NICHHD, 2000, p.

	Oral reading practice. In the NRP's description of effective repeated oral reading programs, the NRP stated that many of these programs provided increased oral reading practice "through the use of one-to-one instruction, tutors, audiotapes, peer guidance, or other means," compared to earlier approaches (NICHHD, 2000, p. 3-11).
	Regular assessment. The NRP recommended that "teachers should assess fluency regularly," using both formal and informal methods (NICHHD, 2000, p. 3-4). Such informal methods can include "reading inventories . . . miscue analysis . . . pausing indices . . . running records . . . and reading speed calculations" (NICHHD, 2000, p. 3-9, citing 5 studies). Similarly, the NRC report recommended that "Because the ability to obtain meaning from print depends so strongly on the development of reading fluency," fluency "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).
	Validity of oral reading fluency measures. According to Hasbrouck and Tindal (2006), measuring student oral reading fluency in terms of words correct per minute "has been shown, in both theoretical and empirical research, to serve as an accurate and powerful indicator of overall reading competence, especially in its correlation with comprehension. The validity and reliability of these measures has been well established in a body of research extending over the past 25 years" (citing Fuchs, Fuchs, Hosp, & Jenkins, 2001; Shinn, 1998). For example, several studies have shown that third-grade tests of oral reading fluency from the DIBELS correlated well to high-stakes reading assessments from Arizona, Colorado, Florida, North Carolina, and Oregon.
	Oral reading fluency norms. Based on analysis of assessment data from a pool ranging from approximately 3,500 to over 20,000 students collected between 2000 and 2005, Hasbrouck and Tindal (2006) have developed a new set of oral reading fluency norms to replace the widely used norms that were published in 1992 (Hasbrouck & Tindal, 1992). The new norms "align closely with both those published in 1992, and also closely match the widely used DIBELS norms . . . with few exceptions." These new norms cover grades 1–8 and provide information for 90th, 75th, 50th, 25th, and 10th percentile rankings.

The researchers also provided specific norm-related recommendations for using oral reading results for screening, diagnosis, and monitoring student progress: **Screening.** "Fluency-based assessments have been proven to be efficient, reliable, and valid indicators of reading proficiency when used as screening measures" (citing Fuchs et al., 2001; Good, Simmons, & Kame'enui, 2001). **Diagnosis.** According to the authors, oral reading fluency norms "can play a useful role in diagnosing possible problems that are primarily fluency based." **Monitoring progress.** Oral reading fluency measures "have been found by many educators to be better tools for making decisions about students' progress than traditional standardized measures which can be time-consuming, expensive, are only administered infrequently, and have limited instructional utility" (citing Good et al., 2001; Tindal & Marston, 1990).

Demonstration of Phonics Alignment in *Treasures*

Summary of Research Recommendations for Fluency	Demonstration of Alignment
Fluency instruction is included in the form of repeated oral reading procedures through the fourth-grade level.	Primary Grades Example: Students read each story multiple times with varying degrees of 'scaffold' supports such as Choral Reading with the teacher providing modeling and corrective feedback; Partner Reading and Independent Reading with the teacher circulating and listening in to provide support and feedback; or Echo-Reading with the teacher modeling pronunciation and students reading back to the teacher one sentence at a time. Students also echo-read with a partner giving the partner feedback, such as, "sound out this word." Upper Grades Example: By the fourth grade level, students echo-read the main selection. They vary the intonation of their voices to make what is happening in the text clearer. For the same reason, they also pause at appropriate places. The teacher models reading aloud from a transparency that contains excerpts of the main selection. She reads one sentence at a time while students echo-read each sentence. Typically, students are divided into two groups to practice intonation and pauses.
In grades K-3, materials and resources are provided for daily independent reading as well as daily supported reading and rereading.	Students read multiple short passages and stories each week in both the Student Anthology and Student Workbook. Leveled Readers and Practice Books provide rich independent reading sources. Each week has its own theme and genre. For example, for Second Grade, Unit 6, Week 5, the weekly theme is "Other People, Other Places," and the genre is realistic fiction. The Decodable Reader is *How Bird Was Lured away from Fire*; the main selection is *Babu's Song*; the Vocabulary/Comprehension selection is *E-mails from Other Places*; and the Social Studies Link non-fiction article is "Where in the World is Tanzania?" Each Leveled Reader is realistic fiction with the same theme, vocabulary, and comprehension skills: Approaching Level, *Ice Cool*; On Level, *Lions at Last*; Beyond Level, *Jolly Good Hockey!*; and the ELL Reader is *The Soccer Team*. The books in the Classroom Library for the week are *George Washington*, *Jackie Robinson*, and *Harriet Tubman*.
Repeated readings are a part of instruction.	In the lower grades, students read each story multiple times with varying degrees of scaffolded support such as Choral Reading with the teacher providing modeling and corrective feedback. They also echo-read taking turns with the teacher or a partner. They do Partner Reading and Independent Reading with the teacher circulating and listening in to provide support and feedback. In the upper grades, students read aloud literary/narrative text accurately using appropriate phrasing. A typical fourth grade lesson example: The teacher tells students that good readers learn to read groups of words together in phrases. She uses Transparency 1 to show how the text has been marked with slashes that indicate pauses and stops. A single slash indicates a pause–usually between phrases. A double slash indicates a stop–usually between sentences. Students listen carefully to the teacher's pauses and intonation as the passage is modeled. Students read aloud the sentences paying close attention to the phrasing. Upper Grades Example: In fifth and sixth grades, typically one student reads aloud, and then a second joins in, then a third, and so on, until all students are reading aloud. Another approach is for pairs of students to read aloud marking the passage for speed, accuracy, and emphasis. They take turns reading aloud with appropriate phrasing and intonation.

Fluency instruction includes oral reading feedback and phrasing support.	Primary Grades Example: As a part of a primary grades weekly lesson, the teacher reads aloud a passage from the Leveled Reader Practice Book. Students note the teacher's pronunciation of the vocabulary words and her use of expression. The TE provides "Think Alouds" for the teacher to use to encourage student participation. For example, "If I see words I do not know how to pronounce, I can read slowly, sound out each word, and see if it makes sense in the sentence. If I can't figure it out, I can write it down and look it up later." Next, the teacher reads the passage one sentence at a time, and asks the students to echo-read. Later, partners take turns echo-reading the passage. Children write down any words that they could not pronounce and look them up later. There are variations of this procedure each week.
	Upper Grades Example: In the upper grades, typically students read a Practice Book selection aloud. They watch for commas and exclamation points. Pairs of students read aloud to each other while marking the passage for speed, accuracy, and emphasis. They take turns reading aloud with appropriate phrasing and intonation.
Students practice oral reading while listening to the text being read simultaneously. Increased oral reading practice is provided through the use of one-to-one instruction, tutors, audiotapes, and peer guidance.	Fluency Transparencies with single and double slashes that indicate phrasing are provided for choral reading. The transparencies contain several paragraphs from each week's main selection. Often choral reading is repeated to give students more practice with natural phrasing, tempo, and expression. Frequently, students read aloud with the teacher or a partner. For additional fluency practice, students use the passages in the Leveled Practice Book, or they follow along with the reader on the Fluency Solutions Audio CD's rendition of the weekly main selection.
Students read texts at the appropriate instructional level to supplement repeated oral reading.	Leveled Readers–Approaching Level, On Level, Beyond Level, and ELL Reader–highlight the weekly literature theme and genre and share the same theme, vocabulary, and comprehension skills. The Decodable Reader, Student Book with the main selection, Vocabulary/ Comprehension Selection. There are Social Studies or Science links in the pupil edition that serve as supplementary texts. The audio CD Listening Library contains main selections, level readers, and the Intervention Anthology for fluency solutions. Leveled Trade Books that reflect the week's theme and genre are available in the Classroom Library. There is also a Leveled Reader Database with available titles at www.macmillanmh.com.
Repeated oral reading occurs in the context of the overall program and not as a stand-alone intervention.	Leveled Readers are used to practice fluency as they also reinforce the weekly theme. There are transparencies specifically for teachers to use to model and have students practice fluency. The teacher uses Fluency Quick Checks each day to determine small group instruction. Through use of "Home-School Connection" stories, parents and other caregivers can help students become more fluent readers.

Fluency is assessed regularly using both formal and informal methods.	**Formal Methods:** One group of students per week is assessed using the timed readings in the Grades 1-6 Fluency Assessment Book. The Oral Fluency Record Sheet is used to track the number of words read correctly. **Informal Methods:** Students are regularly assessed in the classroom through informal reading inventories, miscue analyses, pausing indices, running records, and reading speed calculations. Leveled Practice Books are also used for fluency assessment. For example, in second grade, a fluency assessment strategy for Approaching Level Options is for students to read aloud the fluency passage in Practice Book A (page 215) paying close attention to the words inside quotation marks. Another strategy is to have students follow along as the teacher rereads the fluency passage from the main selection in the Practice Book modeling expressive reading. Students also practice fluency assessment with partners.
Students' oral reading fluency is measured in terms of words correct per minute.	In the Fluency Assessment Book for grades 1-6, text passages that are several paragraphs in length–not words from a list–are used along with the Oral Fluency Record Sheet to track the number of words read correctly. One group of students is assessed each week. By second grade, for example, the fluency goal for On Level students is 79-99 words correct per minute (WCPM). Approaching Level students are tested weeks 1, 3, and 5; On Level students are tested weeks 2 and 4; and Beyond Level students are tested in week 6. Using these assessments, the teacher is able to diagnose and prescribe. For example, if a student is reading 72-78 WCPM, the Audio CD, Fluency Solutions, is used for remediation, and if a student is reading 0-71 WCPM, the student is evaluated for intervention with the Dynamic Indicators of Basic Early Literacy Skills (DIBELS). By the end of fourth grade, students read a 179-word unfamiliar text with comprehension check. The teacher records first-read WPM, Number or Errors, and Words Correct Score; and second-read WPM, Number of Errors, and Words Correct Score.

4 ## Components of Reading: *Vocabulary*

"Of the many compelling reasons for providing students with instruction to build vocabulary, none is more important than the contribution of vocabulary knowledge to reading comprehension"

– Baumann, Kame'enui, & Ash, 2003.

A. What is vocabulary?

Vocabulary is knowledge of the meaning, use, and pronunciation of individual words. It includes both oral vocabulary–words we use in speaking or recognize in listening–and reading vocabulary–words we use or recognize in print. Vocabulary is a key component of comprehension. Before readers can understand the meaning of spoken or written text, they must know what most of the words mean.

B. Why is vocabulary instruction important?

Much of our vocabulary knowledge comes from simple exposure to new words in context. However, research has verified that direct instruction in vocabulary–specifically teaching the meaning of new words, and teaching strategies for vocabulary building–has a positive impact on students' language development. Two links (to comprehension and to specific skills) to vocabulary development are discussed below:

Link between vocabulary development and reading comprehension.

According to the National Reading Panel (NRP), although a direct causal link between vocabulary development and reading comprehension has not been established by research, still a variety of studies "underscore the notion that comprehension gains and improvement on semantic tasks are results of vocabulary learning" (NICHHD, 2000, pp. 4-15, 4-20, citing 7 studies). Similarly, a longitudinal study on early reading development among British school children found evidence that vocabulary knowledge, as tested at the start of the students' first year of school, was one of three predictors of reading comprehension during the first year, as tested at the start of the students' third year of school–a span of two school years (Muter et al., 2004).

Effects on specific skill areas.

According to a review of research on early childhood reading commissioned by the National Research Council (NRC), "Vocabulary instruction generally does result in measurable increase in students' specific word knowledge. Sometimes and to some degree it also results in better performance on global vocabulary measures, such as standardized tests, indicating that the instruction has evidently enhanced the learning of words beyond those directly taught. Second, pooling across studies, vocabulary instruction also appears to produce increases in children's reading comprehension" (Snow, Burns, & Griffin, 1998, p. 217).

C. Who benefits from vocabulary instruction?

At least five studies reviewed by the NRP supported vocabulary instruction by the third-grade level. The NRC report expanded the grade range of students who can benefit from vocabulary instruction, advocating direct instruction in vocabulary development for "children who have started to read independently, typically second graders and above" so that they will "sound out and confirm the identities of visually unfamiliar words" (Snow, Burns, & Griffin, 1998, p. 322). The NRP analysis underscored the fact that development of reading ability is dependent on oral vocabulary: in order for students to understand a word once it has been decoded, it must already be part of their vocabulary (NICHHD, 2000, p. 4-15). Similarly, the NRC report argues that "Learning new concepts and the words that encode them is essential for comprehension development" (Snow, Burns, & Griffin, 1998, p. 217). Based on these factors, it seems reasonable to conclude that even before students can read independently, direct methods for building oral vocabulary may help contribute to students' ultimate success in reading

D. Research Recommendations on Vocabulary Instruction

Range and Scope of Instruction	*Instructional Methods and Features*	
Grade Levels. Given the NRP research findings related to effectiveness of vocabulary instruction at third grade and above, and the NRC recommendations for direct instruction in vocabulary at the second-grade level, instruction in vocabulary seems appropriate by the second- and third-grade levels. Before that point, exposure to new words and concepts through oral vocabulary development is a worthwhile goal, since "Even at the youngest ages, the ability to understand and remember the meanings of new words depends quite strongly on how well developed one's vocabulary already is" (Snow, Burns, & Griffin, 1998, p. 217, citing Robbins & Ehri, 1994).	**Multiple strategies, incorporating direct and indirect vocabulary instruction.** Based on research surveyed by the NRP, "It is clear that vocabulary should be taught both directly and indirectly"–that is, using both explicit instruction in vocabulary and methods of decoding word meanings, on the one hand, and more contextual approaches to exposing students to vocabulary on the other (NICHHD, 2000, p. 4-24). Based on both the research results it reviewed and theoretical considerations, the NRP further recommended that reading instruction include a combination of different strategies, both direct and indirect, for building vocabulary, rather than relying on only one method (NICHHD, 2000, p. 4-27).	
Specific Instructional Methods	**Deriving meaning from context** (NICHHD, 2000, 4-23, citing 2 studies) and a combination of context-based and definitional approaches (NICHHD, 2000, p. 4-23, citing 2 studies) **"Restructuring the task"** of learning new words in a variety of different ways, such as providing redundant information and providing sample sentences along with definitions (NICHHD, 2000, pp. 4-22–4-23, citing 7 studies) Direct instruction in "vocabulary items that are required for a specific text to be read as part of the lesson" (NICHHD, 2000, pp. 4-24–4-25, citing 4 studies). This includes pre-instruction of vocabulary before the reading or lesson (p. 4-25, citing 3 studies).	
	Storybook reading. A body of research evidence shows that "reading story-books aloud to young children . . . results in reliable gains in incidental word acquisition" (Ewers & Brownson, 1999, p. 12, citing 5 a dditional studies).	
Characteristics of effective instructional methods.	**"Active student participation,"** including activities such as student-initiated talk in the context of listening to storybooks (NICHHD, 2000, pp. 4-21, 4-26, 4-27). This calls for active student participation, as in the findings of Ewers and Brownson (1999), who reported on a study in which a storybook with 10 targeted vocabulary words was read aloud individually to 66 kindergarteners. Pretest-posttest comparison found that students in both treatments learned a significant number of the targeted vocabulary words; however, students in the active (question-answering) treatment learned significantly more words than those in the passive treatment. This result was true both of students with a high phonological working memory and of those with a low phonological working memory.	**"Richness of context in which words are to be learned,"** including "extended and rich instruction of vocabulary (applying words to multiple contexts, etc.)" (NICHHD, 2000, pp. 4-22, 4-27). Along similar lines, the NRC report cites a review of studies in which "methods in which children were given both information about the words' definitions and examples of the words' usages in a variety of contexts resulted in the largest gains in both vocabulary and reading comprehension," compared to drill and practice (Snow, Burns, & Griffin, 1998, pp. 217–218, citing Stahl & Fairbanks, 1986). The NRP further recommended that vocabulary items should be "derived from content learning materials" and likely to appear in a variety of other contexts as well (NICHHD, 2000, p. 4-25).
	"High frequency and multiple, repeated exposures to vocabulary material" (NICHHD, 2000)	

Demonstration of Vocabulary Instruction in Treasures

Summary of Research Recommendations for Vocabulary Instruction	**Demonstration of Alignment**
Vocabulary development begins in kindergarten. Direct instruction in vocabulary begins at the second-grade level and continues in third grade and above.	Kindergarten and first grade: In kindergarten, vocabulary words are discussed in relation to the selection in the Read Aloud Anthology. Students draw pictures of the words. High-Frequency Word Cards are used for review and assessment of vocabulary words. In grades K-1, exposure to new words and concepts comes through oral vocabulary development. The Talk About It feature provides visual support for instruction in oral vocabulary. Those words are incorporated and repeated throughout the week to provide multiple exposure and understanding in context.
	Grades 2-3: In second and third grades, the words are taken directly from the main selection. For example in Second Grade, Unit 6, Week 1, the theme is "Creating Stories." After the teacher accesses prior knowledge, students make a graphic organizer of concept words that expands their prior knowledge vocabulary. Next, the teacher begins the routine (define, example, ask) for vocabulary introduction based upon prior knowledge. Then a vocabulary strategy is introduced. In this sample lesson, the strategy is to use word parts such as Greek and Latin roots to understand new words. The vocabulary words are highlighted in a selected text– for example, Vocabulary/Comprehension Selection, *Making Stories Happen*. On Day Two, students expand their vocabulary by categorizing the words in a graphic organizer. Next, students review the words in context using Vocabulary Transparency 53. The teacher uses guided practice first, and then students independently complete the exercise. Partners check each other's answers. After reading the main selection as a group, students typically use vocabulary words in a creative form of writing. On Day 3, students use a transparency to explore Latin roots, and then they complete a page in their Practice Book using Greek and Latin roots. During days four and five, students use vocabulary words in context and review and assess vocabulary words. This weekly procedure is typical for the second- and third-grade levels.
	Upper Grades: By the end of fifth grade, students use context clues, Greek and Latin roots, and prior knowledge to predict the meaning of difficult words. Students express orally and in writing why and how they used specific vocabulary strategies.
Reading instruction includes a combination of strategies, both direct and indirect, for building vocabulary.	Strategies used in *Treasures* include accessing prior knowledge of vocabulary words; making graphic organizers; and using words in context–both orally and in writing. Other strategies are introduced as a unit unfolds: recognizing antonyms, base words, comparatives and superlatives, compound words, and context clues. Students learn to recognize homophones, inflected nouns and verbs, multiple-meaning words, prefixes, suffixes, and synonyms. Students also use syntactic and semantic cues, word parts and families. They use dictionaries, thesauruses, and glossaries to find word meanings. Typically, by the end of fifth grade, students analyze words with opposite meanings and use a thesaurus or dictionary to find antonyms for words in the main selection. Students use vocabulary at the end of each unit in a cumulative research project. They investigate indices and glossaries to find pertinent information or confirm word meanings and to clarify shades of meaning.

Vocabulary is taught using a variety of specific instructional methods such as context-based approaches, restructuring, and pre-instruction in vocabulary before the reading lesson begins.	Pre-instruction in vocabulary before the reading lesson begins takes the form of accessing prior knowledge regarding vocabulary meaning. Students make graphic organizers at the beginning of the lesson and add to them as the lesson unfolds. The curriculum uses a context-based approach–students derive word meanings from context clues. Teachers provide a "kid friendly" definition and provide a context for students to understand words. A true "definitional" approach is not used (looking up words in a dictionary for meaning); however, students compose definitions from contextual information using vocabulary skills and strategies such as restructuring. Vocabulary does not come from lists of words that are unrelated to the reading selections. Teachers use questioning strategies that expose vocabulary words and definitions that are required for a specific text as part of the lesson. Spellings and definitions are confirmed by using reference materials.
Storybooks are read aloud to children.	In kindergarten, vocabulary words are discussed in relation to the selection in the Read Aloud Anthology, the Big Books and the Classroom Trade books. Students discuss the author and illustrator as well as the characters in the story. They analyze the illustrations and photographs. Their reading is done, for the most part, in the large group. Kindergartners draw pictures of the vocabulary words and recreate their own storybook scenarios. Students in first through third grades also enjoy hearing stories. They learn to emulate the teacher's oral expressions, inflections, and pauses. They read to each other in small groups, and they read as partners. Through the Home-School Connection, they are encouraged to read to those at home, and family members are encouraged to read to them.
Students are given both information about the words' definitions and examples of the words' usages in a variety of contexts.	Students apply words to multiple contexts beginning with what they already know about the words. They extend their knowledge through cross-curricular activities, research, and creative writing. They use vocabulary words in their personal journal entries. They add suffixes to base words to create new words that they use in creative writing. They locate the words in a variety of genres such as newspaper articles and song lyrics. Students learn to think of words in terms of cultural perspectives and applications.
Vocabulary items are derived from content learning materials.	Vocabulary words related to the weekly theme are taken directly from the weekly main selection. The words are also reinforced in the Vocabulary/ Comprehension selection. These words are applied in the selection that follows. The students' leveled Practice Books provide further word exploration. Leveled readers and the Classroom Library as well as selected trade books reinforce vocabulary development.
Vocabulary is taught through active (question-answering) student participation.	Students are given repeated exposure to vocabulary material. They participate in groups of student-initiated conversation in the context of listening to stories related to the theme and genre of the main selection. The leveled Practice Books contain sentence excerpts from the main selection that include targeted vocabulary words. Students substitute vocabulary words with synonyms. Their interaction with vocabulary is always active–not a passive treatment–beginning with prior knowledge and continuing with writing and research that uses words in context. They have repeated exposure to vocabulary material throughout the week as well as later in comprehensive review.
Word recognition is regularly assessed in multiple ways.	Assessment matches instructional context. In Leveled Practice Books, students choose vocabulary words from a list to complete each sentence. They write original sentences using the vocabulary words. Words are highlighted in the reading selections, and students stop at each word and identify clues to the meanings. Using transparencies, students model how to figure out word meanings. They suggest or review the meanings as well. They complete graphic organizers such as semantic webs, and they add words to the Word Wall. Students also use a Practice Book page each week to demonstrate pronunciation and comprehension of vocabulary words.

5 Components of Reading: *Comprehension*

"Text comprehension can be improved by instruction that helps readers
use specific comprehension strategies."

–*Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 49)

A. What is text comprehension?

Comprehension is often identified as the primary goal of reading: children and adults read in order to understand. If children can "read" words but cannot understand them, they are merely decoding. Real reading requires understanding. Over the past 30 years, reading researchers have come to understand that such comprehension is not merely passive, but is the result of active involvement on the part of the reader.

B. Why is text comprehension instruction important?

Researchers have identified a variety of strategies effective readers use in order to actively comprehend texts. Additional research has verified the positive impact of teaching such strategies to students as a means of improving comprehension. Two discussions on instructional effectiveness:

Effectiveness of comprehension instruction.

In examining research on reading comprehension instruction, the National Reading Panel (NRP) identified 16 broad categories, or methods, of comprehension instruction. Of these, seven methods were identified as having "a firm scientific basis for concluding that they improve comprehension in normal readers" (NICHHD, 2000, p. 4-42)–demonstrating that comprehension can be improved through explicit, formal instruction. Five of these methods were in use by the third-grade level, and are thus research-verified as appropriate and effective for instruction in the early elementary grades.

Similarly, a review of research on early childhood reading commissioned by the National Research Council (NRC) concluded that "Explicit instruction in comprehension strategies has been shown to lead to improvement" (Snow, Burns, & Griffin, 1998, p. 322).

Effects on specific skill areas

According to the NRP, research "favors the conclusion that teaching of a variety of reading comprehension strategies leads to increased learning of the strategies, to specific transfer of learning, to increased memory and understanding of new passages, and, in some cases, to general improvements in comprehension" (NICHHD, 2000, p. 4-52).

C. Who benefits from text comprehension instruction?

Grade Levels. The NRP's review of research verified the effectiveness of some methods of text comprehension instruction as early as the second- or third-grade level and ranging up to ninth grade. The NRC, based on its interpretation of the research evidence, recommended such instruction as early as the kindergarten and first-grade levels, advocating explicit instruction on text comprehension "throughout the early grades" (Snow, Burns, & Griffin, 1998, p. 323).

D. Research Recommendations on Comprehension

Range and scope of instruction	**Early Grades.** According to the NRC report recommendations for reading instruction in kindergarten through third grade, "Throughout the early grades, reading curricula should include explicit instruction on strategies such as summarizing the main idea, predicting events and outcomes of upcoming text, drawing inferences, and monitoring for coherence and misunderstandings. This instruction can take place while adults read to students or when students read [to] themselves" (Snow, Burns, & Griffin, 1998, p. 323).	**Grade levels for comprehension strategies.** Of the seven instructional methods verified by the NRP as having a research base, one (comprehension monitoring) was in use by second grade in the studies examined, and an additional four were in use by third grade. The NRP concluded that "The instruction of comprehension appears to be effective on grades 3 through 6" (NICHHD, 2000, p. 4-51). This suggests a solid research base for including comprehension instruction as part of the reading curriculum by the third-grade level.
Instructional Methods and Features *Specific effective methods*	Methods that were identified by the NRP as having "a firm scientific basis for concluding that they improve comprehension in normal readers" (NICHHD, 2000, p. 4-42) and that were used by third grade in the research studies included the following →	**Question answering** (17 studies, mostly grades 3–5), in which teachers ask questions about the text **Question generation** (27 studies, grades 3–9), in which students "generate questions during reading" (NICHHD, 2000, p. 4-45) **Story structure** (17 studies, grades 3–6), in which students are instructed in the "content and organization of stories," including use of graphic organizers in conjunction with story content and structure (NICHHD, 2000, p. 4-45) **Comprehension monitoring** (22 studies, grades 2–6), in which students learn how to monitor their own understanding of texts using procedures such as think-aloud **Cooperative learning** (10 studies, grades 3–6), in which "peers instruct or interact over the use of reading strategies" (NICHHD, 2000, p. 4-45)
Multiple strategies	In looking at 36 studies featuring instruction that combined a variety of different comprehension methods, the NRP concluded that "Considerable success has been found in improving comprehension by instructing students on the use of more than one strategy during the course of reading" (NICHHD, 2000, p. 4-47). One particular advantage of this approach is its ability to guide students through the kind of "coordinated and flexible use of several different kinds of strategies" that is required for skilled reading (NICHHD, 2000, p. 4-47).	
Instructional model	In its discussion of the research, the NRP identified a four-part model for building student comprehension strategies in which "teachers demonstrate, explain, model, and implement interaction with students in teaching them how to comprehend a text" (NICHHD, 2000, p. 4-47, citing 6 studies).	
Regular assessment	According to the NRC report, "Conceptual knowledge and comprehension strategies should be regularly assessed in the classroom, permitting timely and effective instructional response where difficulty or delay is apparent" (Snow, Burns, & Griffin, 1998, p. 323).	

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Demonstration of Comprehension Strategies in *Treasures*

Research Recommendations for Teaching Reading Comprehension	**Demonstration of Alignment**
In kindergarten through third grade, the curriculum includes explicit instruction on strategies such as 1) summarizing the main idea; 2) predicting events and outcomes of upcoming text; 3) drawing inferences; and 4) monitoring for coherence and misunderstandings.	**1. Summarizing the Main Idea:** Students use graphic organizers to summarize the author's craft, for example. They use outlines and journals to keep track of main events and actions. They learn to identify pertinent facts and summarize the main ideas. **2. Predicting Events and Outcomes:** Before beginning to read the main selection, students preview the title and illustrations and make predictions. Students record their predictions and questions that they want to have answered as they read. **3. Making Inferences:** The teacher explains facts about the text or calls attention to the actions of the characters and asks questions to help students understand why events occur. Students state reasons for believing why story events occurred as they did. **4. Monitoring for Understandings:** Students monitor comprehension by analyzing text structure. They make decisions about the selection based on text and picture clues and prior knowledge. **5. Draw Conclusions:** Students reread the selection for comprehension paying close attention to the text structure. Using what they know from real life, they draw conclusions about the text's topic. They use a graphic organizer (Transparency) to record their conclusions. After they complete the Conclusion Chart, they share their facts and conclusions with the class.
Comprehension instruction begins in second grade and continues as an integral part of the third-grade reading curriculum.	Strategies such as analyze story structure, generate questions, monitor comprehension, reread, summarize, visualize, draw conclusions, make predictions, retell, and determine main idea and details are taught each unit levels 2-3. The skill–analyze text structure, for example–is pre-taught using the Student Anthology and applied to a short passage before students read the longer main selection. Students are guided through the application of the strategy with the help of graphic organizers.

Students generate questions during reading.	Students preview the title of the main selection and make predictions about it. They write about their predictions and list questions that they want to have answered through their reading. They question each other in small group discussions and in pairs. Students learn specific strategies (steps) for answering questions: 1. Analyze Text Structure/Draw Conclusions; 2. Evaluate; 3. Text-to-Self; 4. Text-to-World; and 5. Text-to-Text.
Students use graphic organizers to show story content and structure.	Teaching Charts and/or Graphic Organizer Transparencies are available for students to use to reinforce reading comprehension by displaying the sequence of a story. They are also used to evaluate the author's purpose and to analyze characters and setting. Students make character maps, Venn diagrams, story maps, and charts. By the beginning of fourth grade, as students read, they fill in problems and resulting actions that lead to their solutions on a Problem and Solution Chart. They also fill in Main Idea Webs and Description Webs that show details that the author uses in the main selection. At every grade (1-6) the graphic organizers are found in the pupil edition. These same graphic organizers are also found in the leveled books and practice books each week.
Students use procedures such as think-aloud to monitor their own understanding of texts.	As a strategy to develop comprehension, teachers are encouraged to model the Think-Aloud Strategy for students to encourage them to use this strategy on their own. The teacher models the think aloud strategy and then students provide the next think aloud with teacher guidance and then finally students independently provide the think aloud. This procedure allows the teacher to monitor students understanding of the text.
Peers use reading strategies to interact with each other	Students read story selections together as a class or in pairs. During partner reading, one child practices taking turns reading the story to another. They give feedback to each other. Students are also encouraged to role play their favorite scenes from a selection with each other to further improve comprehension development. In the upper grades, students give informal reading inventories to each other and check the WCPM of peers.
Students use multiple strategies to improve comprehension.	Students are taught strategies through *Treasures* to improve reading and listening comprehension. Such strategies include setting a purpose for reading and identifying questions that they want to have answered as they read; analyzing and identifying text structure, generating questions while reading, summarizing, using graphic organizers, and visualizing. In addition, students are also taught to "Think-Aloud" while reading, role play with a peer, talk and write about what has been read, and use illustrations to preview and predict story structure.

Teachers use a multiple-step instructional model	Teachers demonstrate, explain, model, and implement interaction with students in teaching them how to comprehend a text. A typical second grade comprehension lesson flows as follows: The teacher begins with ascertaining student prior knowledge. Next, a comprehension **strategy** is presented such as Analyzing Text Structure. This is followed by the introduction of a specific comprehension **skill** such as Draw Conclusions. Students are then asked to Preview and Predict using the title and illustrations. The genre is introduced and the definition of the genre type is read from the Student Book. Next, students discuss the "Read to Find Out" question in the Student Book. Students are reminded to use the Conclusion Chart in the Leveled Practice Book to record facts and conclusions that they draw about the selection. Finally, students set their own purpose for reading. Throughout reading, comprehension is developed through Teacher Think Alouds and questioning. Students retell the story and complete a summative assessment, Comprehension Check.
Conceptual knowledge and comprehension strategies are regularly assessed in the classroom.	Comprehension is assessed both formally and informally, and the curriculum uses both formative and summative forms of assessment. Comprehension assessment begins when reading begins. Quick Check Observations are used throughout the passage as an informal means of student comprehension assessment. By the end of the week, Weekly Tests are administered to assess conceptual knowledge and comprehension strategies. In addition, Unit Tests and Benchmark Tests are regularly administered to monitor student progress. .

References

Used for the Research Alignment of

Macmillan/McGraw-Hill *Treasures* Comprehensive Reading Curriculum

Synopsis of Findings (Westat) and
Technical Appendix (IESD)

MACMILLAN/McGRAW-HILL

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Technical Appendix (IESD)

IESD Research:

Macmillan/McGraw-Hill
Support for Reading First

Introduction

The Importance of Reading Research

Macmillan/McGraw-Hill has a longstanding tradition and commitment to helping every child learn to read–a tradition that continues today with Macmillan/McGraw-Hill Reading (*Treasures*). Our commitment to helping all American children master the skills and strategies they need to become successful readers and lifelong learners is as strong as ever.

The U.S. federal government has strengthened its commitment to literacy with the landmark Reading First initiative. Based on years of scientifically based research findings, the goal of Reading First is to provide children with effective instruction in the early grades, so that as a nation we may ensure that all children grow up to become literate adults.

Increasingly, federal, state, and local requirements in every area focus on the need for research-verified instructional strategies, methods, and approaches. Macmillan/McGraw-Hill Reading (*Treasures*) has stepped up to this challenge by identifying reputable research related to effective reading instruction, summarizing relevant instructional recommendations based on that research, and then showing how those recommendations are incorporated into Macmillan/McGraw-Hill Reading. This paper presents the results of that research-based process.

Reading First Content Focus

To meet Reading First guidelines, reading programs must be based on scientific evidence related to five elements that have been identified as essential in reading instruction:

- Phonemic awareness
- Phonics
- Fluency
- Vocabulary
- Text comprehension

This paper describes how Macmillan/McGraw-Hill Reading meets findings of scientific research related to these five areas, including research-based recommendations for assessment related to these areas.

Review Process

Development of this research-based white paper included the following steps.

- *Key sources were identified that informed the Reading First initiative.*

- *Additional recent, reputable research related to reading instruction was identified through a combination of referral by reading experts and review of important research journals.*

- *Research sources were reviewed and summarized, with special reference to*

  - *Details of the supporting research evidence*
  - *Strength of the link between the research and specific instructional recommendationsSources and findings were excluded which failed in one of these respects, or in overall quality of the research as reported.*

- Cross-comparison of the research-based recommendations and Macmillan/McGraw-Hill Reading verified that each research-based recommendation listed in this white paper is supported by Macmillan/McGraw-Hill Reading Research Sources

This paper summarizes key research findings and research-based recommendations related to effective reading instruction from two key sources describing the body of research on which Reading First was based:

- Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups (National Institute of Child Health and Human Development [NICHHD], 2000). This source presents an extensive, detailed research review related to five broad categories (see above under Reading First Content Focus). In cases where the data were of sufficient quality and uniformity, research results were summarized in a meta-analysis, a method for statistically combining research results across an entire body of research studies.

- Preventing reading difficulties in young children, a review of research on early childhood reading commissioned by the National Research Council (Snow, Burns, & Griffin, 1998). This source represents a broad-ranging research summary and review, but without inclusion of specific details of the research.

Additionally, specific findings have been incorporated from other recent, reputable research related to reading development, instruction, and assessment. These sources are listed on the next page:

Source	Study Type
Barger, J. (2003). *Comparing the DIBELS oral reading fluency indicator and the North Carolina end of grade reading assessment*. (Technical Report). Asheville: North Carolina Teacher Academy.	Correlation
Buck, J., & Torgesen, J. (2003). *The relationship between performance on a measure of oral reading fluency and performance on the Florida Comprehensive Assessment Test*. (FCRR Technical Report No. 1). Tallahassee: Florida Center for Reading Research. Retrieved September 2005 from the DIBELS Technical Reports webpage: http://dibels.uoregon.edu/techreports/index.php	Correlation
Elbro, C., & Petersen, D. K. (2004). Long-term effects of phoneme awareness and letter sound training: An intervention study with children at risk for dyslexia. *Journal of Educational Psychology*, 96(4), 660-670.	Experimental/ Quasi-experimental[1]
Ewers, C. A., & Brownson, S. M. (1999). Kindergartners' vocabulary acquisition as a function of active vs. passive storybook reading, prior vocabulary, and working memory. *Journal of Reading Psychology*, 20, 11-20.	Experimental
Fuchs, L. S., Fuchs, D., Hosp, M.D., & Jenkins, J.R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading*, 5(3), 239-256.	Research review/ research-based theoretical analysis
Good, III, R.H., Simmons, D.C., & Kame'enui, E.J. (2001). The importance and decision-making utility of a continuum of fluency-based indicators of foundational reading skills for third-grade high-stakes outcomes. *Scientific Studies of Reading*, 5(3), 257-288.	Correlation
Hasbrouck, J., & Tindal, G. A. (in press [scheduled for July 2005]). Oral reading fluency norms: A valuable tool for reading teachers. *The Reading Teacher*.	Norming research
Jenkins, J.R., Fuchs, L.S., van den Broek, P., Espin, C., & Deno, S.L. (2003). Sources of individual differences in reading comprehension and reading fluency. *Journal of Educational Psychology*, 95(4), 719-729.	Correlation and statistical modeling
Morris, D., Bloodgood, J. W., Lomax, R. G., & Perney, J. (2003). Developmental steps in learning to read: A longitudinal study in kindergarten and first grade. *Reading Research Quarterly*, 38(3), 302-328.	Statistical modeling
Muter, V., Hulme, C., Snowling, M. J., & Stevenson, J. (2004). Phonemes, rimes, vocabulary, and grammatical skills as foundations of early reading development: Evidence from a longitudinal study. *Developmental Psychology*, 40(5), 665-681.	Statistical modeling
Shaw, R., & Shaw, D. (2002). *DIBELS oral reading fluency-based indicators of third grade reading skills for Colorado State Assessment Program (CSAP)*. (Technical Report). Eugene: University of Oregon. Retrieved September 2005 from the DIBELS Technical Reports webpage: http://dibels.uoregon.edu/techreports/index.php	Correlation
van Bon, W. H. J., & van Leeuwe, J. F .J. (2003). Assessing phonemic awareness in kindergarten: The case for the phoneme recognition task. *Applied Psycholinguistics*, 24, 195-219.	Statistical modeling
Wilson, J. (2005). *The relationship of Dynamic Indicators of Basic Early Literacy Skills (DIBELS) oral reading fluency to performance on Arizona Instrument to Measure Standards (AIMS)*. (Research Brief). Assessment and Evaluation Department, Tempe School District No. 3. Retrieved September 2005 from the DIBELS Technical Reports webpage: http://dibels.uoregon.edu/techreports/index.php	Correlation

[1] While it was clear that this study used a control group, it was not entirely clear whether selection of the treatment and control groups met criteria of random selection and/or random assignment for an experimental study.

About This Paper

This paper includes the following sections:

- Phonemic awareness
- Phonics
- Fluency
- Vocabulary
- Text comprehension
- Assessment and the Five Essential Elements of Reading Instruction

Each section presents a summary of relevant research findings and recommendations. Top-level descriptions of each research finding and research-based recommendation are presented in the main text, with details of the supporting research provided in footnotes.

Phonemic Awareness

"Phonemic awareness instruction helps children learn to read."

– *Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 6)

What is phonemic awareness?

"Phonemic awareness is the ability to hear, identify, and manipulate the individual sounds–phonemes–in spoken words" (Armbruster, Lehr, & Osborn, 2003, p. 10).

Phonemic awareness is often described as part of a broader category known as phonological awareness. Phonological awareness includes the ability to work with larger units in spoken language such as syllables and rhymes, which often include more than one phoneme. Children typically find it easier to work with these larger units (e.g., rhyming words) before proceeding on to develop skills with individual phonemes (NICHHD, 2000, p. 2-10).

Why is phonemic awareness instruction important?

Strong phonemic awareness is considered an early indicator of eventual success in beginning reading. Phonemic awareness instruction helps children learn to read words, spell words, and comprehend text.

- **Phonemic awareness instruction has a positive overall effect on reading and spelling.** A meta-analysis by the National Reading Panel (NRP) found that instruction in phonemic awareness (PA) had a "moderate" effect on both reading skills (based on 90 comparisons)[2] and spelling (39 comparisons) (NICHHD, 2000, pp. 2-3, 2-63, 2-69).[3] Results across several categories of assessments "show that teaching children to manipulate phonemes in words was highly effective across all the literacy domains and outcomes" (p. 2-3).

- **Phonemic awareness instruction leads to lasting reading improvement.** The NRP meta-analysis found that the effect of PA instruction on reading outcomes was moderate on both immediate and first follow-up post-tests, and small on second follow-up posttests (NICHHD, 2000, p. 2-63).[4] Based on these results, the NRP concluded that "effects of PA training on reading lasted well beyond the end of training" (NICHHD, 2000, p. 2-5).

- **Phonemic awareness instruction can be effectively carried out by teachers.** PA instruction had a positive impact on students' reading and spelling, whether the instruction was carried out by classroom teachers or by individuals with specialized training, such as researchers (NICHHD, 2000, pp. 2-65, 2-74)[5].

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[2] Each comparison is a single instance of one treatment group being compared to one control group. Some studies included multiple comparisons (e.g., a single treatment group being compared to multiple comparison groups, or a single comparison group being compared to multiple treatment groups).

[3] Effect size (ES) = 0.53 for reading, 0.59 for spelling. Both results were statistically significant at $p < 0.05$. According to the NRP, an effect size of 0.20 is considered "small," 0.50 is considered "moderate," and 0.80 is considered "large" (2000, p. 2-3). Characterizations of meta-analysis results as small, moderate, or large in this paper are based on rounding to the nearest of these values.

[4] ES = 0.53 on immediate posttests (90 comparisons), 0.45 on first follow-up posttests (35 comparisons), and 0.23 on second follow-up posttests (8 comparisons). All of these results were statistically significant at $p < 0.05$.

[5] On immediate-reading posttests, ES = 0.41 for classroom teachers (22 comparisons) and 0.64 for researchers and others (68 comparisons). On follow-up reading posttests, ES = 0.32 for classroom teachers (12 comparisons) and 0.63 for researchers and others (23 comparisons). On immediate-spelling posttests when reading-disabled comparisons were removed from the analysis, ES = 0.74 for classroom teachers (8 comparisons) and 0.96 for researchers and others (20 comparisons). All of these results were statistically significant at $p < 0.05$. (The NRP found that of the groups they analyzed, PA instruction did not have a statistically significant impact on spelling outcomes for reading-disabled students. Results were therefore reported separately by the NRP after excluding reading disabled comparisons. Unless otherwise stated, PA research results in this paper related to spelling do not include reading-disabled comparisons. Additionally, results in some categories for both reading and spelling were reported by the NRP separately for immediate posttests and follow-up posttests, while other results were reported for immediate posttests only. In cases where both immediate posttest and follow-up posttests were reported, both sets of results are included in this paper.)

Who benefits from phonemic awareness instruction?

Reading

PA instruction has been shown to have a positive impact on reading skills across many student categories and grade levels (NICHHD, 2000, pp. 2-5, 2-66–2-67):

- Normally developing readers[6]
- Children at risk for future reading problems.[7] Later research suggests the benefits of PA instruction specifically for kindergartners at risk for developing dyslexia (Elbro & Petersen, 2004).[8]
- Disabled readers[9]
- Preschoolers[10]
- Kindergartners[11]
- First-graders[12]
- Second- through 6th-graders (most of whom were disabled readers)[13]
- Children across various SES (socioeconomic status) levels[14]
- Children learning to read in English as well as in other languages[15]

Spelling

PA instruction has been shown to have a positive impact on spelling skills across many student categories and grade levels (NICHHD, 2000, pp. 2-6, 2-70–2-74):

- Kindergartners[16]
- First-graders[17]
- Children at risk for future reading problems[18]
- Normally developing readers[19]
- Children across various SES levels[20]
- Children learning to spell in English as well as children learning in other languages[21]

Common phonemic awareness tasks

The following tasks are commonly used to assess PA skills and/or teach them to students (NICHHD, 2000, p. 2-2):

- Phoneme isolation–Recognizing individual sounds in words. For example: What sound do you hear at the beginning of *pin*? (/p/)
- Phoneme identification–Recognizing the common sound in different words. For example: What sound do you hear that is the same in *sat*, *sun*, and *soup*? (/s/)
- Phoneme categorization–Recognizing the odd sound in a set of words. For example: Listen to these words–*hand*, *heart*, *sun*. Which word begins with a different sound? (*sun*)
- Phoneme blending–Listening to a sequence of separately spoken sounds and then blending them naturally into a recognizable word. For example: What word is /b/ - /a/ - /t/? (*bat*)
- Phoneme segmentation–Breaking a word into its sounds by tapping out or counting the sounds. For example: How many sounds do you hear in *cat*? (three)
- Phoneme deletion–Recognizing the word that remains when a specific phoneme is removed. For example: What word do we have when we say *smile* without the /s/? (*mile*)

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[6] ES = 0.47 on immediate posttests (46 comparisons), 0.30 on follow-up posttests (12 comparisons). Both results were statistically significant at p < 0.05.

[7] ES = 0.86 on immediate posttests (27 comparisons), 1.33 on follow-up posttests (15 comparisons). Both results were statistically significant at p < 0.05.

[8] At-risk students who received 17 weeks of PA and letter knowledge instruction during their kindergarten year significantly outperformed untrained at-risk students in letter knowledge (d = .67, F(1, 78) = 15.4, p < .01), phoneme deletion (d = .47, F(1, 78) = 4.7, p < .05), and phoneme identification (d = .54, F(1, 78) = 6.6, p < .05) at the beginning of grade 1 (p. 664), and "significantly outperformed the at-risk controls on all measures of reading, with effect sizes in the range from .40 to .69" in tests at the beginning of grades 2 and 3 (p. 665; all effects were significant at p < .01 or p < .05). Even at the beginning of grade 7, "there were still significant effects" for oral-word-reading efficiency (d = .48), oral-nonword-reading efficiency (d = .53) and phonological coding (d = .49) (p. 665; all effects were significant at p < .05). There was also a nonsignificant but positive trend at grade 7 in reading comprehension (d = .49), a trend that "was present in both accuracy and efficiency of reading comprehension" (p. 665). At-risk status was determined by having at least one parent with dyslexia.

[9] ES = 0.45 on immediate posttests (17 comparisons), 0.28 on follow-up posttests (8 comparisons). Both results were statistically significant at p < 0.05.

[10] ES = 1.25 on immediate posttests (7 comparisons), p < 0.05.

[11] ES = 0.48 on immediate posttests (40 comparisons), p < 0.05.

[12] ES = 0.49 on immediate posttests (25 comparisons), p < 0.05.

[13] ES = 0.49 on immediate posttests (18 comparisons), p < 0.05.

[14] ES = 0.45 on immediate posttests for low SES (11 comparisons), 0.84 for mid & high SES (29 comparisons). Both results were statistically significant at p < 0.05.

[15] For children learning to read in English, ES = 0.63 on immediate posttests (72 comparisons), 0.42 on follow-up posttests (17 comparisons). For children learning to read in a language other than English, ES = 0.36 on immediate posttests (18 comparisons), 0.47 on follow-up posttests (18 comparisons). All of these results were statistically significant at p < 0.05.

[16] ES = 0.97 on immediate posttests (15 comparisons), p < 0.05.

[17] ES = 0.66 on immediate posttests (13 comparisons), p < 0.05.

[18] ES = 0.76 on immediate posttests (13 comparisons), p < 0.05.

[19] ES = 0.88 on immediate posttests (15 comparisons), p < 0.05.

[20] ES = 0.76 on immediate posttests for low SES (6 comparisons), 1.17 for mid and high SES (9 comparisons). Both results were statistically significant at p < 0.05. (These statistics include reading disabled comparisons. SES results were not reported separately with reading disabled comparisons removed.)

[21] For children learning to spell in English, ES = 0.95 on immediate posttests (22 comparisons). For children learning to spell in a language other than English, ES = 0.51 on immediate posttests (6 comparisons). Both results were statistically significant at p < 0.05.

Research recommendations

Range and scope of instruction

- **Grade level.** Research summarized by the NRP suggests that PA instruction should be provided

  At the kindergarten level

  At the first-grade level

At elementary levels above first grade as supplemental instruction for students with special needs Similarly, a review of research on early childhood reading commissioned by the National Research Council (NRC) concluded that "kindergarten instruction should be designed to provide practice with the sound structure of words [and] the recognition and production of letters," and "first-grade instruction should be designed to provide explicit instruction and practice with sound structures that lead to phonemic awareness" (Snow, Burns, & Griffin, 1998, p. 322).

Instructional methods and features

- **Spoken and written versus spoken only.** Instruction that used letters to teach phoneme manipulation had a considerably greater impact on both reading and spelling than instruction that did not use letters but was limited to spoken sounds only (NICHHD, 2000, pp. 2-64, 2-73).[22]

- **Assessment for kindergarteners based on phoneme recognition.** A study of Dutch children analyzing the relationship among several different assessments of PA found that a group-administered phoneme recognition assessment was the "best paper and pencil representative" of PA skill in kindergarten,[23] and that it "equals phoneme segmentation" (an individually administered assessment) in "sensitivity and specificity when predicting later literacy failure" (van Bon & van Leeuwe, 2003, p. 195).[24] These findings suggest that a group-administered assessment based on phoneme recognition can serve as a useful screening tool for identifying the general level of students' PA skills in kindergarten, which in turn is a useful indicator of students who might need targeted PA skills intervention.

- **Guidance by initial and ongoing assessment at first and second grades.** Based on the research findings, the NRP recommended a design in which *assessment results drive PA instruction at the first- and second-grade levels, both initially and through ongoing formative assessments.*

Assessments conducted before PA instruction begins should "indicate which children need the instruction and which do not, which children need to be taught rudimentary levels of PA (e.g., segmenting initial sounds in words), and which children need more advanced levels involving segmenting or blending with letters" (NICHHD, 2000, p. 2-6).

In order to determine the length of PA instruction, "What is probably most important is to tailor training time to student learning by assessing who has and who has not acquired the skills being taught as training proceeds" (NICHHD, 2000, p. 2-42). Similarly, the NRC research review argued that "intensity of instruction should be matched to children's needs" in acquiring phonological skills (Snow, Burns, & Griffin, 1998, p. 321).

Phonics

"Systematic and explicit phonics instruction significantly improves children's reading comprehension."

–*Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 14)

What is phonics?

Phonics instruction teaches children the relationship between letters (graphemes) and the sounds in spoken language (phonemes), and how to apply that knowledge in reading and spelling words.

Phonics instruction builds on phonemic awareness. Although it includes some types of phonemic awareness activities, in which students "use grapheme-phoneme correspondences to decode or spell words," it extends beyond such tasks to "include other activities such as reading decodable text or writing stories" (NICHHD, 2000, p. 2-11).

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[22] For reading on immediate posttests, ES = 0.67 for programs that used letters (48 comparisons), v. 0.38 for programs that did not use letters (42 comparisons). On follow-up posttests, ES = 0.59 for programs that used letters (16 comparisons), v. 0.36 for programs that did not use letters (19 comparisons). For spelling on immediate posttests, ES = 1.00 for programs that used letters (17 comparisons), v. 0.57 for programs that did not use letters (11 comparisons). All of these ES comparisons were significantly different in favor of programs that use letters at p < 0.05.

[23] A confirmatory structural analysis using linear structured relations (LISREL) was conducted on assessments administered in May/June of kindergarten (Time 1) and March of grade 1 (Time 2), producing a factor loading score for each of eight PA assessments carried out during the Time 1 administration (four of which were also repeated at Time 2). The analysis also included an Early Reading Test at Time 1 and a spelling test and two portions of the Three-Minute Test (a standardized word reading test) at Time 2. The highest loading factor among Time 1 PA tests was for phoneme segmentation (.91), followed by phoneme recognition (.78), one of two phoneme counting measures (.72), phoneme blending (.70), the second of two phoneme counting measures (.57), phoneme deletion (.50), rhyme judgment (.49), and pseudoword repetition (.40) (p. 206). Analysis also showed a single common factor underlying PA scores, which "is closely related to literacy performance" (p. 209).

[24] "Averaged over reading and spelling, maximum specificity of maximum sensitivity was 46% for Phoneme Segmentation and 47% for Phoneme Recognition. Conversely, choosing 80% as the desired level of specificity, the average sensitivity was found to be 45% for Phoneme Recognition whereas Phoneme Segmentation did not even attain an 80% level of specificity. Maximum Phoneme Segmentation specificity averaged over the three literacy measures was 65%, associated with 77% sensitivity (cf. 75% sensitivity at the same specificity level for Phoneme Recognition). This shows that both the Phoneme Segmentation and Phoneme Recognition Tests tend to identify too many children at kindergarten as running the risk of meeting with literacy problems in Grade 1 and that Phoneme Recognition is not inferior to Phoneme Segmentation in that respect" (p. 213).

What is "systematic and explicit" phonics instruction?

Research recommendations favor phonics instruction that is "systematic and explicit." An *explicit* approach includes specific directions to teachers for teaching letter-sound correspondences. A *systematic* approach is one that incorporates a planned, sequential set of phonetic elements to master. These elements are explicitly and systematically introduced in meaningful reading and writing tasks.

Systematic and explicit phonics instruction includes teaching a full spectrum of key letter-sound correspondences: not just major correspondences between consonant letters and sounds, but also short and long vowel letters and sounds, and vowel and consonant digraphs such as *oi*, *ea*, *ou*, *sh*, and *th*.

Several different methods have been developed to teach phonics systematically and explicitly, including synthetic phonics, analytic phonics, embedded phonics, analogy phonics, onset-rime phonics, and phonics through spelling. Broadly speaking, these approaches are all effective (NICHHD, 2000, p. 2-89).

Why is phonics instruction important?

Phonics instruction leads to an understanding of the alphabetic principle–the set of systematic and predictable relationships between written letters and spoken sounds. For children to learn how to sound out word segments and blend these parts to form recognizable words, they must know how letters correspond to sounds.

- **Phonics instruction has a positive overall effect on reading**. A meta-analysis by the National Reading Panel (NRP) found that systematic and explicit phonics instruction had a significantly stronger effect on children's reading than every category of nonsystematic or non-phonics instruction that was studied. This was true whether nonsystematic or non-phonics instruction occurred in the context of "basal programs, regular curriculum, whole language approaches, whole word programs, [or] miscellaneous programs" (NICHHD, 2000, pp. 2-95, 2-160).[25] Similarly, a review of research on early childhood reading commissioned by the National Research Council (NRC) cited a research finding that "children taught via the direct code approach" (i.e., systematic and explicit phonics instruction)

showed better reading gains than students receiving whole-language or embedded phonics instruction (Snow, Burns, & Griffin, 1998, p. 205, citing Foorman et al., 1998).

- **Phonics instruction has positive overall effects on specific skill areas**. The NRP meta-analysis found that across grades K-6, phonics instruction was "most effective in improving children's ability to decode regularly spelled words . . . and pseudowords," but also helped students to read miscellaneous words (some of which were irregularly spelled) and read text orally (NICHHD, 2000, pp. 2-94, 2-159). Phonics instruction positively impacted spelling and text comprehension for kindergarten and first-grade students, but not for those in grades 2-6 (NICHHD, 2000, p. 2-159).[26]

- **Phonics instruction has a lasting impact on reading**. Follow-up tests in the NRP meta-analysis found that the effects of phonics instruction were reduced, but still significant, several months after the instruction ended, "indicating that the impact of phonics instruction lasted well beyond the end of training" (NICHHD, 2000, pp. 2-113, 2-159, 2-161).[27]

Who benefits from phonics instruction?

Grade levels

The NRP meta-analysis found that

- Kindergarten and first-grade students experienced significantly better improvement from phonics instruction than from other types of instruction in all six areas measured (decoding regular words, decoding pseudowords, reading miscellaneous words, spelling, reading text orally, and comprehending text), with a moderate to large effect size for all areas except reading text orally (NICHHD, 2000, p. 2-159). Overall levels of achievement were very similar for kindergartners and first-graders.[28]

- Grades 2–6 students (the majority of which were disabled readers) also experienced significantly better improvement from phonics instruction in four out of six areas (decoding regular words, decoding pseudowords, reading miscellaneous words, and reading text orally), with effect sizes for the various areas ranging from small to moderate (NICHHD, 2000, p. 2-159).[29]

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[25] ES = 0.46 v. basal programs (10 comparisons), 0.41 v. regular curriculum (16 comparisons), 0.31 v. whole language (12 comparisons), 0.51 v. whole word programs (10 comparisons), and 0.46 v. miscellaneous programs (14 comparisons); all differences were significant at $p < 0.05$. Note that these categories included only instructional programs that did not feature explicit, systematic phonics instruction. For example, a basal program that included systematic and explicit phonics instruction would not be included in the category of "basal programs" as defined here.

[26] Across grades K–6, ES = 0.67 for decoding regular words (30 comparisons), 0.60 for decoding pseudowords (40 comparisons), 0.40 for reading miscellaneous words (59 comparisons), 0.25 for reading text orally (16 comparisons), 0.35 for spelling words (37 comparisons), and 0.27 for comprehending text (35 comparisons). All of these results were statistically significant at $p < 0.05$. However, in separate analyses for grades K–1 and 2–6, results for spelling and comprehending text were found to be statistically significant at $p < 0.05$ for grades K–1 but not for grades 2–6. (For ES data from these separate grade range analyses, see footnote 24 for grades K–1 and footnote 25 for grades 2–6.)

[27] In six studies, the experimental and control groups were tested at the end of training and again "after a delay following training to assess long-term effects" (2000, p. 2-110). ES = 0.51 for testing at the end of training and ES = 0.27 for follow-up testing. In both cases, the results were statistically significant at $p < 0.05$. However, the two effect sizes did not significantly differ from one another at $p < 0.05$.

[28] For K–1 combined, ES = 0.98 for decoding regular words (8 comparisons), 0.67 for decoding pseudowords (14 comparisons), 0.45 for reading miscellaneous words (23 comparisons), 0.23 for reading text orally (6 comparisons), 0.67 for spelling words (13 comparisons), and 0.51 for comprehending text (11 comparisons). ES for all measures together = 0.56 for kindergartners (7 comparisons), 0.54 for first graders (23 comparisons). All of these results were statistically significant at $p < 0.05$. Results were not reported separately for kindergartners and first graders for the six areas measured. The relatively small number of studies at the kindergarten level is partly the result of studies that were incorporated by the NRP into the meta-analysis on phonemic awareness (PA), which were therefore excluded from the phonics meta-analysis. The NRP notes that taking the PA studies measuring reading outcomes into account, "Combined, these findings clearly support the importance of teaching phonemic awareness and grade-appropriate phonics in kindergarten" (NICHHD, 2000, p. 2-115)

[29] ES = 0.49 for decoding regular words (17 comparisons), 0.52 for decoding pseudowords (13 comparisons), 0.33 for reading miscellaneous words (23 comparisons), and 0.24 for reading text orally (6 comparisons). All of these results were statistically significant at $p < 0.05$.

Student categories

Phonics instruction has been shown to have a statistically significant positive impact across many student categories (NICHHD, 2000, p. 2-160):

- Kindergartners at risk of developing future reading problems[30]
- First-graders at risk[31]
- First-grade normally achieving readers[32]
- Second through sixth grade normally achieving readers[33]
  Second through sixth graders identified as disabled readers[34]
- Children across various SES (socioeconomic status) levels[35]

Research recommendations

Range and scope of instructio

- **Grade level**. The NRP finding that phonics instruction benefited students in kindergarten, grade 1, and grades 2–6 (the majority of which were disabled readers) suggests a value to including phonics instruction at the kindergarten and first-grade levels and beyond, particularly for disabled readers.

- **Level at which phonics instruction begins**. The NRP meta-analysis found that phonics instruction in kindergarten and first grade was "much more effective" than phonics instruction that began in second grade or later, after students have learned to read independently (NICHHD, 2000, p. 2-93, emphasis added).

- **Letter knowledge as precursor**. Two developmental studies, drawing on and extending a body of existing research, suggest that knowledge of letter names and/or letter sounds is an important precursor to the earliest stages of reading knowledge. Muter et al. (2004) found that students' ability to identify letter sounds and/or names on entering schooling (average age 4 years, 9 months) was one of two significant predictors, together with phoneme sensitivity, of word recognition ability a

year later (pp. 671–672).[36] Similarly, word recognition ability the following year (two years after the first set of tests) was significantly predicted by the three factors of earlier word recognition, letter knowledge, and phoneme sensitivity.[37] In another study involving five assessment rounds spread across kindergarten and first grade, Morris et al. (2003) determined that alphabet knowledge, defined as the ability to name 15 uppercase and lowercase letters, was the first of seven sets of tested reading-related skills to develop chronologically[38]. These findings suggest a possible value for the common practice of explicitly teaching letter names and sounds to students early in kindergarten. One note of caution: these findings are not based on research comparisons of a group of students exposed to such instruction and a similar group of students not so exposed. Thus, a causal link between teaching letter names and sounds to students early in kindergarten and later development of reading skills has not been firmly established from this research.

- **Instruction over multiple years.** Results of a few multi-year studies examined by the NRP "suggest that when phonics instruction is taught to children at the outset of learning to read and continued for 2 to 3 years, the children experience significantly greater growth in reading at the end of training than children who receive phonics instruction for only 1 year after 1st grade" (NICHHD, 2000, p. 2-118).[39]

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[30] ES = 0.58 (6 comparisons), p < 0.05. Results were not reported separately for kindergarten students not at risk.

[31] ES = 0.74 (9 comparisons), p < 0.05.

[32] ES = 0.48 (14 comparisons), p < 0.05.

[33] ES = 0.27 (7 comparisons), p < 0.05.

[34] ES = 0.32 (17 comparisons), p < 0.05.

[35] ES = 0.66 for low SES (6 comparisons), 0.44 for middle SES (10 comparisons), 0.37 where the SES was varied (14 comparisons), and 0.43 where the SES was not given (32 comparisons); p < 0.05 for all results.

[36] Standardized path coefficient for the effect of letter knowledge on word recognition = .63, based on a path analysis of factors from all three sets of tests. Chi square (24, N=90) = 28.80, not significant, comparative fit index = 0.988, goodness of fit index = 0.941, root mean square error of approximation = 0.049 (90% confidence interval = 0.000 to 0.102) (p. 674).

[37] Standardized path coefficient for the effect of letter knowledge on word recognition = .22, based on a path analysis of factors predicting word recognition in the third set of assessments from factors in the second set of assessments. Chi square (2, N=90) = 0.64, not significant, comparative fit index = 1.00, goodness of fit index = 0.998, root mean square error of approximation = 0.000 (90% confidence interval = 0.000 to 0.149) (p. 674).

[38] Structural equation modeling found that alphabet knowledge preceded beginning consonant awareness (standardized path coefficient of .42, p < .05), which in turn preceded concept of word in text and spelling with beginning and ending consonants. These two factors in turn preceded phoneme segmentation, which preceded word recognition, which preceded contextual reading. Chi square (12df) = 44.23, goodness of fit index = .90, normed chi square = 3.69, comparative fit index = .90 (pp. 315-316). All of the standardized path coefficients were significant at p < .05.

[39] ES = 0.43 at the end of second grade for students who had received 2–3 years of phonics instruction (4 comparisons), v. 0.27 for "older children receiving only 1 year of phonics instruction in grades beyond 1st" (p. 2-118; number of comparisons not given). Because of the small number of comparisons, the results are described as "mainly suggestive" (p. 2-118).

Instructional methods and features

- **Varieties of effective programs.** The NRP meta-analysis found small to moderate statistically significant effects that "did not differ statistically from each other" (NICHHD, 2000, p. 2-93) for several types of systematic and explicit phonics instructional programs. Included among these were "Synthetic phonics programs which emphasized teaching students to convert letters . . . into sounds . . . and then to blend the sounds to form recognizable words" (NICHHD 2000, pp. 2-93, 2-160)[40]

- **Spelling instruction.** An analysis of research commissioned by the NRC claimed that spelling instruction, in particular at the 2nd grade level, is important in building "phonemic awareness and knowledge of basic letter-sound correspondences" (Snow, Burns, & Griffin, 1998, p. 212).

- **Phonics instruction as means to an end.** Based on their interpretation of the research results, the NRP argued that phonics instruction (i.e., "the teaching of letter-sound relations") should not be pursued as an end in itself, but should be directed toward the goal of helping students in their "daily reading and writing activities" (NICHHD, 2000, p. 2-96). Students should understand that this is the goal of learning letter-sounds, and should have practice in putting their skills to use.

- **Part of an integrated reading program.** Based on their interpretation of the research results, the NRP argued that phonics instruction "should be integrated with other reading instruction to create a balanced reading program" including vocabulary and literature (NICHHD, 2000, p. 2-97). Phonics "should not become the dominant component in a reading program, neither in the amount of time devoted to it nor in the significance attached" (NICHHD, 2000, p. 2-97).

- **Variable, guided by assessment.** Based on their interpretation of the research results, the NRP argued that, ideally, phonics instruction should be variable based on the needs of individual students as determined through assessment (NICHHD, 2000, pp. 2-96, 2-97). Similarly, the NRC research review argued that "intensity of instruction should be matched to children's needs" in applying explicit instruction on the connection between phonemes and spellings (Snow, Burns, & Griffin, 1998, p. 321).

Vocabulary

"Although a great deal of vocabulary is learned indirectly, some vocabulary should be taught directly."

–Put Reading First (Armbruster, Lehr, & Osborn, 2003, p. 36)

What is vocabulary?

Vocabulary is knowledge of the meaning, use, and pronunciation of individual words. It includes both *oral vocabulary*–words we use in speaking or recognize in listening–and *reading vocabulary*–words we use or recognize in print.

Vocabulary is a key component of comprehension. Before readers can understand the meaning of spoken or written text, they must know what most of the words mean.

Why is vocabulary instruction important?

Much of our vocabulary knowledge comes from simple exposure to new words in context. However, research has verified that direct instruction in vocabulary–specifically teaching the meaning of new words, and teaching strategies for vocabulary building–has a positive impact on students' language development.

- **Link between vocabulary development and reading comprehension.** According to the National Reading Panel (NRP), although a direct causal link between vocabulary development and reading comprehension has not been established by research, still a variety of studies "underscore the notion that comprehension gains and improvement on semantic tasks are results of vocabulary learning" (NICHHD, 2000, pp. 4-15, 4-20, citing 7 studies).[41] Similarly, a longitudinal study on early reading development among British schoolchildren found evidence that vocabulary knowledge, as tested at the start of the students' first year of school, was one of three predictors of reading comprehension during the first year, as tested at the start of the students' third year of school–a span of two school years (Muter et al., 2004).[42]

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[40] ES = 0.45 overall for synthetic programs (39 comparisons). Among specific groups taught using synthetic programs, ES = 0.64 for kindergartners and first-graders at risk of developing future reading problems (9 comparisons), 0.54 for first-grade normally achieving readers (8 comparisons), 0.27 for second through sixth grade normally achieving readers (6 comparisons), and 0.36 for disabled readers (9 comparisons). All of these results are significant at p < 0.05.

[41] Beck, Perfetti, & McKeown, 1982; McKeown, Beck, Omanson, & Perfetti, 1983; Wixson, 1986; Carney, Anderson, Blackburn, & Blessing, 1984; Kameenui, Carnine, & Freschi, 1982; Stahl & Fairbanks, 1986; Medo & Ryder, 1993.

[42] Standardized path coefficient for the effect of vocabulary knowledge on reading comprehension = .16, based on a path analysis of factors from all three sets of tests. Chi square (2, N=90) = 3.92, not significant, comparative fit index = 0.992, goodness of fit index = 0.986, root mean square error of approximation = 0.104 (90% confidence interval = 0.000 to 0.257) (p. 675). Vocabulary knowledge was measured by the British Picture Vocabulary Scale II (Dunn, Dunn, Whetton, & Burley, 1997); reading comprehension was measured by the Neale Analysis of Reading Ability II (Neale, 1997). Note that vocabulary knowledge was measured in the first of three annual sets of assessments when students first entered school (average age four years nine months), but was not measured during the second set of assessments. Reading comprehension was measured during the third set of assessments. Thus, vocabulary knowledge from when students first entered school was still a significant predictor of reading comprehension two years later. This held true "even when the effects of early word recognition, phoneme sensitivity, and letter knowledge were controlled" (p. 678). Other significant predictors of reading comprehension were word recognition and grammatical awareness, from the second set of assessments.

- **Effects on specific skill areas.** According to a review of research on early childhood reading commissioned by the National Research Council (NRC), "Vocabulary instruction generally does result in measurable increase in students' specific word knowledge. Sometimes and to some degree it also results in better performance on global vocabulary measures, such as standardized tests, indicating that the instruction has evidently enhanced the learning of words beyond those directly taught. Second, pooling across studies, vocabulary instruction also appears to produce increases in children's reading comprehension" (Snow, Burns, & Griffin, 1998, p. 217).

Who benefits from vocabulary instruction?

Most of the studies reviewed by the NRP occurred within the grades 3–8 range, with only a few studies addressing vocabulary instruction before grade 3. At least five studies reviewed by the NRP supported vocabulary instruction by the third- grade level.[43] The NRC report expanded the grade range of students who can benefit from vocabulary instruction, advocating direct instruction in vocabulary development for "children who have started to read independently, typically second graders and above" so that they will "sound out and confirm the identities of visually unfamiliar words" (Snow, Burns, & Griffin, 1998, p. 322).

It is worth noting that these research findings and recommendations relate specifically to reading vocabulary, and are thus dependent on the development of independent reading skills. In contrast, development of children's oral vocabulary starts much earlier–as soon as children can begin to understand spoken language. Although the NRP research did not cover development of oral vocabulary per se, the NRP analysis underscored the fact that development of reading ability is dependent on oral vocabulary: in order for students to understand a word once it has been decoded, it must already be part of their vocabulary (NICHHD, 2000, p. 4-15). Similarly, the NRC report argues that "Learning new concepts and the words that encode them is essential for comprehension development" (Snow, Burns, & Griffin, 1998, p. 217). Based on these factors, it seems reasonable to conclude that even before students can read independently, direct methods for building oral vocabulary may help contribute to students' ultimate success in reading.

Research Recommendations
Range and Scope of Instruction

- **Grade levels.** Given the NRP research findings related to effectiveness of vocabulary instruction at third grade and above, and the NRC recommendations for direct instruction in vocabulary at second grade, instruction in vocabulary seems appropriate by the second- and third-3rd grade levels. Before that point, exposure to new words and concepts through oral vocabulary development is a worthwhile goal, since "Even at the youngest ages, the ability to understand and remember the meanings of new words depends quite strongly on how well developed one's vocabulary already is" (Snow, Burns, & Griffin, 1998, p. 217, citing Robbins & Ehri, 1994).

Instructional Methods and Features

- **Multiple strategies, incorporating direct and indirect vocabulary instruction.** Based on research surveyed by the NRP, "It is clear that vocabulary should be taught both directly and indirectly"–that is, using both explicit instruction in vocabulary and methods of decoding word meanings, on the one hand, and more contextual approaches to exposing students to vocabulary on the other (NICHHD, 2000, p. 4-24). Based on both the research results it reviewed and theoretical considerations, the NRP further recommended that reading instruction include a combination of different strategies, both direct and indirect, for building vocabulary, rather than relying on only one method (NICHHD, 2000, p. 4-27).

- **Specific instructional methods.** The NRP found that a variety of instructional methods led to improvements in student vocabulary, including

  Deriving meaning from context (NICHHD, 2000, p. 4-23, citing 2 studies)[44] and a combination of context-based and definitional approaches (NICHHD, 2000, p. 4-23, citing 2 studies)[45]

  "Restructuring the task" of learning new words in a variety of different ways, such as providing redundant information and providing sample sentences along with definitions (NICHHD, 2000, pp. 4-22–4-23, citing 7 studies)[46]

  Direct instruction in "vocabulary items that are required for a specific text to be read as part of the lesson" (NICHHD, 2000, pp. 4-24–4-25, citing 4 studies).[47] This includes pre-instruction of vocabulary before the reading or lesson (p. 4-25, citing 3 studies).[48]

[43] Heise, Papalewis, & Tanner, 1991; Levin, Levin, Glasman, & Nordwall, 1992; Eldredge, 1990; Gipe & Arnold, 1979; Rinaldi, Sells, & McLaughlin, 1997.

[44] Gipe & Arnold, 1979; Tomesen & Aarnoutse, 1998.

[45] Kolich, 1991; Stahl, 1983.

[46] Kameenui, Carnine, & Freschi, 1982; Gordon, Schumm, Coffland, & Doucette, 1992; Schwartz & Raphael, 1985; Scott & Nagy, 1997; Wu & Solman, 1993; Eldredge, 1990; Malone & McLaughlin, 1997.

[47] Tomesen & Aarnoutse, 1998; White, Graves, & Slater, 1990; Dole, Sloan, & Trathen, 1995; Rinaldi, Sells, & McLaughlin, 1997.

[48] Brett, Rothlein, & Hurley, 1996; Wixson, 1986; Carney, Anderson, Blackburn, & Blessing, 1984.

- **Storybook reading.** A body of research evidence shows that "reading storybooks aloud to young children . . . results in reliable gains in incidental word acquisition" (Ewers & Brownson, 1999, p. 12, citing 5 additional studies).[49]

- **Characteristics of effective instructional methods.** Summarizing the characteristics of instructional methods that were found to be effective according to the research surveyed, the NRP identified several factors, including the following:

"Richness of context in which words are to be learned," including "extended and rich instruction of vocabulary (applying words to multiple contexts, etc.)" (NICHHD, 2000, pp. 4-22, 4-27). Along similar lines, the NRC report cites a review of studies in which "methods in which children were given both information about the words' definitions and examples of the words' usages in a variety of contexts resulted in the largest gains in both vocabulary and reading comprehension," compared to drill and practice (Snow, Burns, & Griffin, 1998, pp. 217–218, citing Stahl & Fairbanks, 1986). The NRP further recommended that vocabulary items should be "derived from content learning materials" and likely to appear in a variety of other contexts as well (NICHHD, 2000, p. 4-25).

"Active student participation," including activities such as student-initiated talk in the context of listening to storybooks (NICHHD, 2000, pp. 4-21, 4-26, 4-27). This calls for active student participation supported by the findings of Ewers and Brownson (1999), who reported on a study in which a storybook with 10 targeted vocabulary words was read aloud individually to 66 kindergarteners. After each sentence that included a targeted vocabulary word, readers either would "recast" the target word using a familiar synonym (e.g., after reading "He is wearing his favorite fedora," the reader would say, "He is wearing his favorite hat"), or would ask a *what* or *where* question (e.g., "What was he wearing?" with a follow-up question asking "What was the word I used?" if the student answered with a synonym). Pretest-posttest comparison found that students in both treatments learned a significant number of the targeted vocabulary words; however, students in the active (question-answering) treatment learned significantly more words than those in the passive treatment.[50] This result was true both of students with a high phonological working memory and of those with a low phonological working memory.[51]

"High frequency and multiple, repeated exposures to vocabulary material" (NICHHD, 2000, p. 4-22)

- **Assessment.** Both the NRP and the NRC report included specific research-based recommendations related to assessment.

The NRC report recommended that "Because the ability to obtain meaning from print depends so strongly on the development of word recognition accuracy," this skill "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).

Based on the variety of measures used to assess student vocabulary and the different results those measures can achieve, the NRP recommended that vocabulary be assessed in multiple ways in the classroom. In particular, they argued that "the more closely the assessment matches the instructional context, the more appropriate the conclusions about the instruction will be" (NICHHD, 2000, p. 4-26).

Comprehension

"Text comprehension can be improved by instruction that helps readers use specific comprehension strategies."

–*Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 49)

What is text comprehension?

Comprehension is often identified as the primary goal of reading: children and adults *read* in order to *understand*. If children can "read" words but cannot understand them, they are merely decoding. Real reading requires understanding. Over the past 30 years, reading researchers have come to understand that such comprehension is not merely passive, but is the result of active involvement on the part of the reader.

Why is text comprehension instruction important?

Researchers have identified a variety of strategies effective readers use in order to actively comprehend texts. Additional research has verified the positive impact of teaching such strategies to students as a means of improving comprehension.

- **Effectiveness of comprehension instruction.** In examining research on reading comprehension instruction, the National Reading Panel (NRP) identified 16 broad categories, or methods, of comprehension instruction. Of these, seven methods were identified as having "a firm scientific basis for concluding that they improve comprehension in normal readers" (NICHHD, 2000, p. 4-42)–demonstrating that comprehension can be improved through explicit, formal instruction. **Five of these methods were in use by the third- grade level, and are thus research-verified as appropriate and effective for instruction in the early elementary grades.** Similarly, a review of research on early childhood reading commissioned by the National Research Council (NRC) concluded that "Explicit instruction in comprehension strategies has been shown to lead to improvement" (Snow, Burns, & Griffin, 1998, p. 322).

[49] Eller, Pappas, & Brown, 1988; Elley, 1989; Leung & Pikulski, 1990; Senechal, 1997; Senechal & Cornell, 1993.

[50] $F_{(1, 62)} = 19.59$, $p < .01$ (p. 15).

[51] $F_{(1, 62)} = 18.60$, $p < .001$ (p. 16). Level of phonological working memory was determined by administration of the Children's Test of Nonword Repetition (CNRep) (p. 14, citing Gathercole, Willis, Baddeley, & Emslie, 1994).

- **Effects on specific skill areas.** According to the NRP, research "favors the conclusion that teaching of a variety of reading comprehension strategies leads to increased learning of the strategies, to specific transfer of learning, to increased memory and understanding of new passages, and, in some cases, to general improvements in comprehension" (NICHHD, 2000, p. 4-52).

Who benefits from text comprehension instruction?

- **Grade levels.** The NRP's review of research verified the effectiveness of some methods of text comprehension instruction as early as grades 2-3, ranging up to grade 9. The NRC, based on its interpretation of the research evidence, recommended such instruction as early as the kindergarten and first- grade levels, advocating explicit instruction on text comprehension "throughout the early grades" (Snow, Burns, & Griffin, 1998, p. 323).

Research Recommendations

Range and Scope of Instruction

- **Early grades.** According to the NRC report recommendations for reading instruction in grades K-3, "Throughout the early grades, reading curricula should include explicit instruction on strategies such as summarizing the main idea, predicting events and outcomes of upcoming text, drawing inferences, and monitoring for coherence and misunderstandings. This instruction can take place while adults read to students or when students read [to] themselves" (Snow, Burns, & Griffin, 1998, p. 323).

- **Grade levels for comprehension strategies.** Of the seven instructional methods verified by the NRP as having a research base, one (comprehension monitoring) was in use by grade 2 in the studies examined, and an additional four were in use by grade 3. The NRP concluded that "the instruction of comprehension appears to be effective on grades 3 through 6" (NICHHD, 2000, p. 4-51). This suggests a solid research base for including comprehension instruction as part of the reading curriculum by the third- grade level.

In addition to this NRP-verified research base in the upper elementary grades, many research-based instructional recommendations, such as those from the NRC, and many state standards call for explicit comprehension instruction at earlier grades as well. Such instruction may help to build a foundation for development of such skills in later grades. It is worth noting that the lack of NRP verification for comprehension instruction at the K–2 levels appears to reflect a scarcity of reputable research on comprehension instruction at these grade levels–a lack of evidence, as opposed to negative or ambivalent evidence.

Instructional Methods and Features

- Specific effective methods. Methods that were identified by the NRP as having "a firm scientific basis for concluding that they improve comprehension in normal readers" (NICHHD, 2000, p. 4-42) and that were used by grade 3 in the research studies included the following:

Question answering (17 studies, mostly grades 3–5), in which teachers ask questions about the text[52]

Question generation (27 studies, grades 3–9), in which students "generate questions during reading" (NICHHD, 2000, p. 4-45)[53]

Story structure (17 studies, grades 3–6), in which students are instructed in the "content and organization of stories," including use of graphic organizers in conjunction with story content and structure (NICHHD, 2000, p. 4-45)[54]

Comprehension monitoring (22 studies, grades 2–6), in which students learn how to monitor their own understanding of texts using procedures such as think-aloud[55]

[52] Anderson & Biddle, 1975; Ezell et al., 1992; Fischer, 1973; Garner, Hare, Alexander, Haynes, & Winograd, 1984; Garner, Macready, & Wagoner, 1984; Griffey et al., 1988; Levin & Pressley, 1981; Pressley & Forrest-Pressley, 1985; Raphael & McKinney, 1983; Raphael & Pearson, 1985; Raphael & Wonnacott, 1985; Richmond, 1976; Rowls, 1976; Serenty & Dean, 1986; Sheldon, 1984; Watts, 1973; Wixson, 1983.

[53] Blaha, 1979; Brady, 1990; Cohen, 1983; Davey & McBride, 1986; Dermody, 1988; Dreher & Gambrell, 1985; Hansen & Pearson, 1983; Helfeldt & Lalik, 1976; King, 1989; King, 1990; King, 1992; Labercane & Battle, 1987; Lonberger, 1988; Lysynchuk, Pressley, & Vye, 1990; MacGregor, 1988; Manzo, 1969; Nolte & Singer, 1985; Palinscar, 1987; Palinscar & Brown, 1984; Ritchie, 1985; Short & Ryan, 1984; Simpson, 1989; Singer & Donlan, 1982; Smith, 1977; Taylor & Frye, 1992; Williamson, 1989; Wong & Jones, 1982.

[54] Baumann & Bergeron, 1993; Buss, Ratliff, & Irion, 1985; Fitzgerald & Spiegel, 1983; Gordon & Rennie, 1987; Greenewald & Rossing, 1986; Griffey et al., 1988; Idol, 1987; Idol & Croll, 1987; Nolte & Singer, 1985; Omanson, Beck, Voss, McKeown, et al., 1984; Reutzel, 1984; Reutzel, 1985; Reutzel, 1986; Short & Ryan, 1984; Singer & Donlan, 1982; Spiegel & Fitzgerald, 1986; Varnhagen & Goldman, 1986.

[55] Babbs, 1984; Baker & Zimlin, 1989; Baumann, Seifert-Kessell, & Jones, 1992; Block, 1993; Carr, Dewitz, & Patberg, 1983; Cross & Paris, 1988; Elliot-Faust & Pressley, 1986; Hasselhorn & Koerkel, 1986; Markman, 1977; Miller, 1985; Miller, 1987; Miller, Giovenco, & Rentiers, 1987; Nelson et al., 1996; Paris, Cross, & Lipson, 1984; Paris & Jacobs, 1984; Paris, Saarnio, & Cross, 1986; Payne & Manning, 1992; Schmitt, 1988; Schunk & Rice, 1984; Schunk & Rice, 1985; Silven, 1992; Tregaskes & Daines, 1989.

Cooperative learning (10 studies, grades 3–6), in which "peers instruct or interact over the use of reading strategies" (NICHHD, 2000, p. 4-45)[56]

- Multiple strategies. In looking at 36 studies featuring instruction that combined a variety of different comprehension methods, the NRP concluded that "considerable success has been found in improving comprehension by instructing students on the use of more than one strategy during the course of reading" (NICHHD, 2000, p. 4-47).[57] One particular advantage of this approach is its ability to guide students through the kind of "coordinated and flexible use of several different kinds of strategies" that is required for skilled reading (NICHHD, 2000, p. 4-47).

- Instructional model. In its discussion of the research, the NRP identified a four-part model for building student comprehension strategies in which "teachers demonstrate, explain, model, and implement interaction with students in teaching them how to comprehend a text" (NICHHD, 2000, p. 4-47, citing 6 studies).[58]

- Regular assessment. According to the NRC report, "Conceptual knowledge and comprehension strategies should be regularly assessed in the classroom, permitting timely and effective instructional response where difficulty or delay is apparent" (Snow, Burns, & Griffin, 1998, p. 323).

Fluency

"Repeated and monitored oral reading improves reading fluency and overall reading achievement."

–*Put Reading First* (Armbruster, Lehr, & Osborn, 2003, p. 24)

What is fluency?

Fluency is the ability to read text quickly, accurately, and with expression. It provides a bridge between word recognition and comprehension. Fluency includes word recognition, but extends beyond knowledge of individual words to reflect the meaningful connections among words in a phrase or sentence. Fluent readers are able to recognize words and comprehend them simultaneously.

Why is fluency instruction important?

Fluency is widely acknowledged to be a critical component of skilled reading. A study conducted by the National Assessment of Educational Progress (NAEP) found a "close relationship between fluency and reading comprehension" (NICHHD, 2000, p. 3-1, citing Pinnell et al., 1995). More generally, a National Research Council report stated that "adequate progress in learning to read English beyond the initial level depends on . . . sufficient practice in reading to achieve fluency with different kinds of texts written for different purposes" (Snow, Burns, & Griffin, 1998, p. 223). Additional evidence of this link between fluency and the development of general reading ability, particularly reading comprehension, is provided by several studies that found student performance on fluency assessments was an effective predictor of their performance on other types of reading measures.[59]

It is generally agreed that fluency results from reading practice. However, approaches to developing fluency have ranged from simply encouraging independent reading to more structured approaches to oral reading practice, designed to guide students toward developing specific fluency skills (e.g., reading with expression). In reviewing the research on fluency instruction, the National Reading Panel (NRP) found value in approaches that incorporated repeated oral reading, guided or unguided, as opposed to less focused attempts to encourage reading in general.

- **Repeated oral reading instruction has a positive overall effect on reading.** A meta-analysis by the NRP found that fluency instruction in the form of repeated oral reading (guided or unguided) "had a consistent, and positive impact on word recognition, fluency, and comprehension as measured by a variety of test instruments and at a range of grade levels" (NICHHD, 2000, p. 3-3). The weighted average of these effect sizes resulted in a moderate effect on student reading (NICHHD, 2000, p. 3-16).[60]

- **Repeated oral reading instruction has a positive impact on specific skill areas.** The NRP meta-analysis found that repeated oral reading had a moderate effect on reading accuracy, a somewhat less strong effect on reading fluency, and a smaller effect on reading comprehension (NICHHD, 2000, pp. 3-3, 3-18).[61]

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[56] Bramlett, 1994; Guthrie et al., 1996; Judy, Alexander, Kulikowich, & Wilson, 1988; Klingner, Vaughn, & Schumm, 1998; Mathes et al., 1994; Pickens & McNaughton, 1988; Soriano, Vidal-Abarca, & Miranda, 1996; Stevens, Madden, Slavin, & Farnish, 1987; Stevens, Slavin, & Farnish, 1991; Uttero, 1988.

[57] Adams, Carnine, & Gersten, 1982; Anderson & Roit, 1993; Blanchard, 1980; Brady, 1990; Brown, Pressley, Van Meter, & Schuder, 1996; Carnine & Kinder, 1985; Carr, Bigler, & Morningstar, 1991; Chan & Cole, 1986; Dermody, 1988; Fischer Galbert, 1989; Gilroy & Moore, 1988; Grant, Elias, & Broerse, 1989; Jacobs & Paris, 1987; Jones, 1987; Kelly, Moore, & Tuck, 1994; Klingner, Vaughn, & Schumm, 1998; Labercane & Battle, 1987; Loranger, 1997; Lysynchuk, Pressley, & Vye, 1990; Padron, 1985; Palinscar, 1987; Palinscar & Brown, 1984; Palinscar, David, Winn, & Stevens, 1991; Pelow & Colvin, 1983; Reutzel & Hollingsworth, 1991a; Reutzel & Hollingsworth, 1991b; Rich, 1989; Ritchie, 1985; Rush & Milburn, 1988; Shortland-Jones, 1986; Sindelar, 1982; Smith, Johnson, & Johnson, 1981; Soriano, Vidal-Abarca, & Miranda, 1996; Stevens, 1988; Taylor & Frye, 1992; Williamson, 1989.

[58] Palinscar & Brown, 1984; Rosenshine, Meister, & Chapman, 1996; Rosenshine & Meister, 1994; Bereiter & Bird, 1985; Block, 1993; Brown, Pressley, Van Meter, & Schuder, 1996.

[59] Barger, 2003; Buck & Torgesen, 2003; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Fuchs, Fuchs, Hosp, & Jenkins, 2001; Fuchs, Fuchs, & Maxwell, 1988; Good, Simmons, & Kame'enui, 2001; Jenkins, Fuchs, van den Broek, Espin, & Deno, 2003; Shaw & Shaw, 2002; Wilson, 2005. For additional information on results of these studies, see below under Validity of oral reading fluency measures.

[60] Weighted ES = 0.41, based on 14 studies incorporating 99 comparisons. Weighting reflected the number of subjects per study (i.e., studies with larger numbers of subjects weighted more than studies with smaller numbers of subjects). The NRP meta-analysis for fluency did not report statistical significance or p-values.

[61] Weighted ES = 0.55 for word recognition (11 comparisons from 8 studies), 0.44 for fluency (35 comparisons from 10 studies), and 0.35 for comprehension (49 comparisons from 12 studies).

- **In contrast, encouraging children to read on their own has no research-verified impact on reading achievement.** The NRP reviewed research studies on attempts to build fluency through encouraging independent student reading; most of these were studies of sustained silent reading. It found that the body of research failed to confirm any positive effects (NICHHD, 2000, pp. 3-3, 3-24–3-26, citing 14 studies).[62]

Who benefits from fluency instruction?

Analysis of grade levels covered by the studies in the NRP meta-analysis led to the conclusion that "repeated reading procedures have a clear impact" on reading ability among

- "Nonimpaired readers at least through grade 4"
- "Students with various kinds of reading problems throughout high school" (NICHHD, 2000, p. 3-17)

Research recommendations

Range and scope of instruction

- **Grade level.** The NRP research findings suggest a value to including fluency instruction in the form of repeated oral reading procedures at least through the fourth-4th grade level, and possibly beyond in a supporting capacity for students with reading problems. A review of research on early childhood reading commissioned by the National Research Council (NRC) identified fluency instruction as a key component of first-1st grade instruction and argued that "throughout the early grades, time, materials, and resources should be provided" for both daily independent reading and daily supported reading and rereading (Snow, Burns, & Griffin, 1998, p. 195). However, the NRC did not cite specific studies as the basis for recommending that such activities occur daily.

Instructional methods and features

- **Effective methods.** Small sample sizes in studies reviewed by the NRP made it impossible to compare the effectiveness of different methods that fell within the category of repeated (guided or unguided) oral reading. However, some of the methods that produced "clear improvement" (NICHHD, 2000, p. 3-15) included the following:

Repeated readings (set number of repetitions, set amount of time, or until fluency criteria were reached) (NICHHD, 2000, p. 3-15, citing 9 studies)[63]

Repeated readings "combined with other [guiding] procedures such as a particular type of oral reading feedback . . . or phrasing support for the reader" (NICHHD, 2000, p. 3-15, citing 2 studies)[64]

Practice of oral reading "while listening to the text being read simultaneously" (NICHHD, 2000, p. 3-15, citing 3 studies)[65]

- **Oral reading practice.** In the NRP's description of effective repeated oral reading programs, the NRP stated that many of these programs provided increased oral reading practice "through the use of one-to-one instruction, tutors, audiotapes, peer guidance, or other means," compared to earlier approaches (NICHHD, 2000, p. 3-11).

- **Incorporation of independent reading.** The report commissioned by the NRC identified independent reading, whether silent or spoken, as a key strategy for helping students develop fluency. Such reading requires that students read texts at the appropriate instructional level, neither too easy nor too difficult (i.e., at the instructional level) (Snow, Burns, & Griffin, 1998, p. 213). In light of the NRP research results, this recommendation should be considered not as an alternative to repeated oral reading, but as a supplement to it.

- **Part of a larger reading program context.** According to the NRP, in all of the programs reviewed, "the fluency work was only part of the instruction that students received" (NICHHD, 2000, p. 3-20). They cited a study cautioning against too much focus on fluency issues as a potential distraction from reading comprehension, then concluded that repeated oral reading should occur "in the context of an overall reading program, not as stand-alone interventions" (NICHHD, 2000, p. 3-20, citing Anderson, Wilkinson, & Mason, 1991).

- **Regular assessment.** Based on the research, the NRP recommended that "teachers should assess fluency regularly," using both formal and informal methods (NICHHD, 2000, p. 3-4). Such informal methods can include "reading inventories . . . miscue analysis . . . pausing indices . . . running records . . . and reading speed calculations" (NICHHD, 2000, p. 3-9, citing 5 studies).[66] Similarly, the NRC report recommended that "because the ability to obtain meaning from print depends so strongly on the development of . . . reading fluency," fluency "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).

[62] Evans & Towner, 1975; Reutzel & Hollingsworth, 1991a; Collins, 1980; Langford & Allen, 1983; Cline & Kretke, 1980; Davis, 1988; Holt & O'Tuel, 1989; Burley, 1980; Summers & McClelland, 1982; Manning & Manning, 1984; Morrow & Weinstein, 1986; Peak & Dewalt, 1994; Vollands, Topping, & Evans, 1999; Carver & Leibert, 1995. These studies were not considered to be of sufficiently high quality and quantity to conduct a meta-analysis.

[63] Faulkner & Levy, 1999; Levy, Nicholls, & Kohen, 1993; Neill, 1979; O'Shea, Sindelar, & O'Shea, 1985; Rasinski, 1990; Sindelar, Monda, & O'Shea, 1990; Stoddard, Valcante, Sindelar, O'Shea, & Algozzine, 1993; Turpie & Paratore, 1995; VanWagenen, Williams, & McLaughlin, 1994.

[64] Reitsma, 1998; Taylor, Wade, & Yekovich, 1985.

[65] van Bon, Boksebeld, Font Freide, & van den Hurk, 1991; Rasinski, 1990; Smith, 1979.

[66] Johnson, Kress, & Pikulski, 1987; Goodman & Burke, 1972; Pinnell et al., 1995; Clay, 1972; Hasbrouck & Tindal, 1992.

- **Validity of oral reading fluency measures.** According to Hasbrouck and Tindal (in press), measuring student oral reading fluency in terms of words correct per minute "has been shown, in both theoretical and empirical research, to serve as an accurate and powerful indicator of overall reading competence, especially in its correlation with comprehension. The validity and reliability of these measures has been well established in a body of research extending over the past 25 years" (citing Fuchs, Fuchs, Hosp, & Jenkins, 2001; Shinn, 1998). For example, Fuchs et al. (2001) summarized research showing that measures of oral reading fluency involving text passages that were several paragraphs in length corresponded well with "traditional, commercial, widely used tests of reading comprehension" (p. 243), and were superior in this regard to reading words from a list,[67] measures of silent fluency,[68] and more direct measures of reading comprehension.[69] More specifically, several studies have shown that third-grade tests of oral reading fluency from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) correlated well to high-stakes reading assessments from Arizona,[70] Colorado,[71] Florida,[72] North Carolina,[73] and Oregon.[74]

- **Oral reading fluency norms.** Based on analysis of assessment data from a pool ranging from approximately 3,500 to over 20,000 students collected between 2000 and 2005, Hasbrouck and Tindal (in press) have developed a new set of oral reading fluency norms to replace the widely used norms that were published in 1992 (Hasbrouck & Tindal, 1992). The new norms "align closely with both those published in 1992, and also closely match the widely used DIBELS norms . . . and those developed by Edformation with their AIMSweb system . . . with few exceptions." These new norms cover grades 1–8 and provide information for 90th, 75th, 50th, 25th, and 10th percentile rankings. The researchers also provided

specific norm-related recommendations for using oral reading results for screening, diagnosis, and monitoring student progress:

- **Screening.** According to the authors, " fluency-based assessments have been proven to be efficient, reliable, and valid indicators of reading proficiency when used as screening measures" (citing Fuchs et al., 2001; Good, Simmons, & Kame'enui, 2001).

For screening in grades 2–8, the authors recommended that "a score falling within 10 words above or below the 50th percentile should be interpreted as within the normal, expected, and appropriate range for a student at that grade level at that time of year."

For screening in grade 1, the authors recommended following guidelines established by Good et al. (2002) that identified students reading at or above 40 words correct per minute (wcpm) by the end of the school year as being "at low risk of reading difficulty," students reading at 20–40 wcpm as being "at some risk," and students reading below 20 wcpm as being "at high risk of failure."

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[67] Jenkins, Fuchs, van den Broek, Espin, & Deno (2003) compared measures of oral reading fluency of (a) connected text (a folktale) and (b) a context-free word list (list of words from the folktale) to performance on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension for 113 fourth- graders. They found that speed of oral reading from the folktale correlated more strongly to the ITBS score than did speed of oral reading from the word list (criterion validity coefficients of .83 and .54, respectively; the difference was statistically significant, t(110) = 7.86, p < .001) (p. 723).

[68] Fuchs, Fuchs, Eaton, & Hamlett (2000) compared measures of oral and silent reading speed with "the number of questions answered correctly on the passages that had been read" and with the raw score on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension (Fuchs et al., 2001, p. 247, summarizing Fuchs et al., 2000). They found that "for For silent reading, the correlation with the questions answered on the passage was .38, and with the Iowa test, it was .47. For oral reading, the correlation with the passage questions was .84, and with the Iowa test, it was .80. So, correlations for the oral reading fluency score were substantially and statistically significantly higher than for the silent reading fluency scores" (Fuchs et al., 2001, p. 247; p- values not reported).

[69] Fuchs, Fuchs, & Maxwell (1988) compared measures of oral reading fluency, short-answer question answering, passage recall, and cloze (all based on the same 400-word passages) with the Reading Comprehension subtest of the Stanford Achievement Test for 70 middle school and junior high school students with reading disabilities. They found that "criterioncriterioncriterioncriterionCriterion validity coefficients (average correlations across the different scoring methods) for the question answering, the recall, and the cloze measures were .82, .70, and .72, respectively. The coefficient for oral reading fluency was .91. Tests for differences between these correlations demonstrated that the correlation for oral reading fluency was significantly higher than the correlation for each of the three direct measures of reading comprehension" (Fuchs et al., 2001, p. 244, summarizing Fuchs et al., 1988; p-values not reported). Additionally, according to Fuchs et al. (2001), "high correlations have also been documented for nondisabled elementary school age children within a variety of studies that (a) incorporated different criterion measures of reading accomplishment, (b) examined within-grade as well as across-grade coefficients, and (c) used instructional level as well as a fixed level of text across students" (p. 245, citing as research reviews Hosp & Fuchs, 2000; Marston, 1989).

[70] "The correlation between [Arizona Instrument to Measure Standards] and [DIBELS oral reading fluency assessment] for the overall group was . . . r = .741," based on scores of 241 third- graders (Wilson, 2005; p-value not reported).

[71] The DIBELS oral reading fluency assessment was administered three times: in fall, winter, and spring. The fall and winter administrations each had a correlation coefficient of .73 with the spring assessment of the Colorado State Assessment Program (CSAP). The spring administration of DIBELS oral reading fluency assessment had a correlation of .80 with CSAP (Shaw & Shaw, 2002; p-values not reported). Each correlation was based on the scores of more than 50 third-graders.

[72] "There was a significant correlation between [DIBELS oral reading fluency] scores and reading [Florida Comprehensive Assessment Test–Sunshine State Standards] scores (r = .70, p < .001) . . . and reading scores on the [Florida Comprehensive Assessment Tests norm-referenced test] (r = .74, p < .001)," based on scores of 1,102 third- grade students (Buck & Torgesen, 2003).

[73] "The correlation between [DIBELS oral reading fluency] Spring scores and [North Carolina] End of Grade reading scores was . . . r = .73," based on scores of 38 third- grade students (Barger, 2003; no p-value reported).

[74] The correlation coefficient between DIBELS oral reading fluency assessment and the Oregon Statewide Assessment was .67 (45% of variance explained, p < .001), based on the scores of 364 third- graders (Good, Simmons, & Kame'enui, 2001, p. 275).

- Diagnosis. According to the authors, oral reading fluency norms "can play a useful role in diagnosing possible problems that are primarily fluency based."

For diagnosis of fluency problems, the authors recommended procedures that "are similar to those for screening, except here the level of materials should reflect the student's instructional reading level, rather than [the] grade level," with instructional level defined as text that is "challenging but manageable . . . with no more than approximately one in ten difficult words (90% success)" (citing Partnership for Reading, 2001). This allows teachers to determine if students' fluency is appropriate to their reading level. Hasbrouck and Tindal do not suggest that an oral reading fluency assessment should be the only method of diagnosing reading problems; rather, such an assessment can be used along with other procedures
(e.g., miscue analysis).

- Monitoring progress. According to the authors, oral reading fluency measures "have been found by many educators to be better tools for making decisions about students' progress than traditional standardized measures which can be time-consuming, expensive, are only administered infrequently, and have limited instructional utility" (citing Good et al., 2001; Tindal & Marston, 1990). Fuchs et al. (2001) provided a similar, research-based description of how oral reading fluency can be used to monitor student progress, both across and within individual student performance.

For monitoring student progress, Hasbrouck and Tindal (in press) recommended that students scoring within 10 wcpm of the 50th percentile at or above grade level should be "considered as making adequate progress in reading, unless there are other indicators that would raise concern." Such students "may only need to have their reading progress monitored a few times per year to determine if they are meeting the benchmark standards that serve as predictors of reading success."

For students reading below grade level, the authors suggested more frequent oral reading fluency assessments: once or twice monthly to once a week, depending on the severity of the problem, with scores graphed against goals and with adjustments to the instructional program if a student falls short of needed progress for three or more consecutive assessments (citing Hasbrouck et al., 1999).

Assessment and the Five Essential Elements of Reading Instruction

General Conclusions

General conclusions that can be reached about assessment based on the recommendations of the National Reading Panel (NRP) and the National Research Council (NRC) reports include the following:

- **Assessment should guide instruction.** This was mentioned in combination with each of the five areas.
- **Assessment should be frequent and/or regular.** This was explicitly mentioned for most of the areas.
- **Assessment should use appropriate measures.** This was particularly a concern with fluency and vocabulary.

Area-Specific Conclusions

- **Phonemic awareness (PA)–kindergarten assessment based on phoneme recognition; guidance by initial and ongoing assessment at 1st and 2nd grades.** A study of kindergartners suggested that PA assessment at this level should focus on phoneme recognition. Additionally, the NRP recommended, based on its research findings, an instructional design in which assessment results drive PA instruction at the 1st and 2nd grade levels, both initially and through ongoing formative assessments. All these research-based recommendations are described in more detail below.

Assessment for kindergarteners based on phoneme recognition. A study of Dutch children analyzing the relationship among several different assessments of PA found that a group-administered phoneme recognition assessment was the "best paper and pencil representative" of PA skill in kindergarten,[75] and that it "equals phoneme segmentation" (an individually administered assessment) in "sensitivity and specificity when predicting later literacy failure" (van Bon & van Leeuwe, 2003, p. 195).[76] These findings suggest that a group-administered assessment based on phoneme recognition can serve as a useful screening tool for identifying the general level of students' PA skills in kindergarten, which in turn is a useful indicator of students who might need targeted PA skills intervention.

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[75] A confirmatory structural analysis using linear structured relations (LISREL) was conducted on assessments administered in May/June of kindergarten (Time 1) and March of grade 1 (Time 2), producing a factor loading score for each of eight PA assessments carried out during the Time 1 administration (four of which were also repeated at Time 2). The analysis also included an Early Reading Test at Time 1 and a spelling test and two portions of the Three-Minute Test (a standardized word reading test) at Time 2. The highest loading factor among Time 1 PA tests was for phoneme segmentation (.91), followed by phoneme recognition (.78), one of two phoneme counting measures (.72), phoneme blending (.70), the second of two phoneme counting measures (.57), phoneme deletion (.50), rhyme judgment (.49), and pseudoword repetition (.40) (p. 206). Analysis also showed a single common factor underlying PA scores, which "is closely related to literacy performance" (p. 209).

[76] "Averaged over reading and spelling, maximum specificity of maximum sensitivity was 46% for Phoneme Segmentation and 47% for Phoneme Recognition. Conversely, choosing 80% as the desired level of specificity, the average sensitivity was found to be 45% for Phoneme Recognition whereas Phoneme Segmentation did not even attain an 80% level of specificity. Maximum Phoneme Segmentation specificity averaged over the three literacy measures was 65%, associated with 77% sensitivity (cf. 75% sensitivity at the same specificity level for Phoneme Recognition). This shows that both the Phoneme Segmentation and Phoneme Recognition Tests tend to identify too many children at kindergarten as running the risk of meeting with literacy problems in Grade 1 and that Phoneme Recognition is not inferior to Phoneme Segmentation in that respect" (p. 213).

Pre-assessment. Assessments conducted before PA instruction begins should "indicate which children need the instruction and which do not, which children need to be taught rudimentary levels of PA (e.g., segmenting initial sounds in words), and which children need more advanced levels involving segmenting or blending with letters" (NICHHD, 2000, p. 2-6).

Ongoing assessments and instructional time. In order to determine the length of PA instruction, "What is probably most important is to tailor training time to student learning by assessing who has and who has not acquired the skills being taught as training proceeds" (NICHHD, 2000, p. 2-42). Similarly, a report commissioned by the NRC argued that "intensity of instruction should be matched to children's needs" in acquiring phonological skills (Snow, Burns, & Griffin, 1998, p. 321).

- **Phonics–variable, guided by assessment.** Based on their interpretation of the research results, the NRP argued that ideally, phonics instruction should be variable based on the needs of individual students as determined through assessment (NICHHD, 2000, pp. 2-96, 2-97). Similarly, the NRC report argued that "intensity of instruction should be matched to children's needs" in applying explicit instruction on the connection between phonemes and spellings (Snow, Burns, & Griffin, 1998, p. 321).

- **Fluency–regular assessment, using research-validated methods.** A broad range of research, including both research reviewed by the NRP and research from other sources, describes research-validated measures and provides research-based recommendations for how to use those measures.

Regular assessment. Based on the research, the NRP recommended that "teachers should assess fluency regularly," using both formal and informal methods (NICHHD, 2000, p. 3-4). Such informal methods can include "reading inventories . . . miscue analysis . . . pausing indices . . . running records . . . and reading speed calculations" (NICHHD, 2000, p. 3-9, citing 5 studies).[77] Similarly, the NRC report recommended that "Because the ability to obtain meaning from print depends so strongly on the development of . . . reading fluency," fluency "should be regularly assessed in the classroom, permitting timely and effective instructional response" (Snow, Burns, & Griffin, 1998, p. 323).

Validity of oral reading fluency measures. According to Hasbrouck and Tindal (in press), measuring student oral reading fluency in terms of words correct per minute "has been shown, in both theoretical and empirical research, to serve as an accurate and powerful indicator of overall reading competence, especially in its correlation with comprehension. The validity and reliability of these measures has been well established in a body of research extending over the past 25 years" (citing Fuchs, Fuchs, Hosp, & Jenkins, 2001; Shinn, 1998). For example, Fuchs et al. (2001) summarized research showing that measures of oral reading fluency involving text passages that were several paragraphs in length corresponded well with "traditional, commercial, widely used tests of reading comprehension" (p. 243), and were superior in this regard to reading words from a list,[78] measures of silent fluency,[79] and more direct measures of reading comprehension.[80] More specifically, several studies have shown that third-grade tests of oral reading fluency from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) correlated well to high-stakes reading assessments from Arizona,[81] Colorado,[82] Florida,[83] North Carolina,[84] and Oregon.[85]

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[77] Johnson, Kress, & Pikulski, 1987; Goodman & Burke, 1972; Pinnell et al., 1995; Clay, 1972; Hasbrouck & Tindal, 1992.

[78] Jenkins, Fuchs, van den Broek, Espin, & Deno (2003) compared measures of oral reading fluency of (a) connected text (a folktale), and (b) a context-free word list (list of words from the folktale) to performance on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension for 113 fourth graders. Fuchs et al. found that speed of oral reading from the folktale correlated more strongly to the ITBS score than did speed of oral reading from the word list (criterion validity coefficients of .83 and .54, respectively; the difference was statistically significant, t(110) = 7.86, p < .001) (p. 723).

[79] Fuchs, Fuchs, Eaton, & Hamlett (2000) compared measures of oral and silent reading speed with "the number of questions answered correctly on the passages that had been read" and with the raw score on the Iowa Test of Basic Skills (ITBS) subtest for reading comprehension (Fuchs et al., 2001, p. 247, summarizing Fuchs et al., 2000). They found that "For silent reading, the correlation with the questions answered on the passage was .38, and with the Iowa test, it was .47. For oral reading, the correlation with the passage questions was .84, and with the Iowa test, it was .80. So, correlations for the oral reading fluency score were substantially and statistically significantly higher than for the silent reading fluency scores" (Fuchs et al., 2001, p. 247; p values not reported).

[80] Fuchs, Fuchs, & Maxwell (1988) compared measures of oral reading fluency, short-answer question answering, passage recall, and cloze (all based on the same 400-word passages) with the Reading Comprehension subtest of the Stanford Achievement Test for 70 middle school and junior high school students with reading disabilities. They found that "Criterion validity coefficients (average correlations across the different scoring methods) for the question answering, the recall, and the cloze measures were .82, .70, and .72, respectively. The coefficient for oral reading fluency was .91. Tests for differences between these correlations demonstrated that the correlation for oral reading fluency was significantly higher than the correlation for each of the three direct measures of reading comprehension" (Fuchs et al., 2001, p. 244, summarizing Fuchs et al., 1988; p-values not reported). Additionally, according to Fuchs et al. (2001), "high correlations have also been documented for nondisabled elementary school age children within a variety of studies that (a) incorporated different criterion measures of reading accomplishment, (b) examined within-grade as well as across-grade coefficients, and (c) used instructional level as well as a fixed level of text across students" (p. 245, citing as research reviews Hosp & Fuchs, 2000; Marston, 1989).

[81] "The correlation between [Arizona Instrument to Measure Standards] and [DIBELS oral reading fluency assessment] for the overall group was . . . r = .741," based on scores of 241 third graders (Wilson, 2005; p-value not reported).

[82] The DIBELS oral reading fluency assessment was administered three times: in fall, winter, and spring. The fall and winter administrations each had a correlation coefficient of .73 with the spring assessment of the Colorado State Assessment Program (CSAP). The spring administration of DIBELS oral reading fluency assessment had a correlation of .80 with CSAP (Shaw & Shaw, 2002; p-values not reported). Each correlation was based on the scores of more than 50 third graders.

[83] "There was a significant correlation between [DIBELS oral reading fluency] scores and reading [Florida Comprehensive Assessment Test–Sunshine State Standards] scores (r = .70, p < .001) . . . and reading scores on the [Florida Comprehensive Assessment Tests norm-referenced test] (r = .74, p < .001)," based on scores of 1,102 third grade students (Buck & Torgesen, 2003).

[84] "The correlation between [DIBELS oral reading fluency] Spring scores and [North Carolina] End of Grade reading scores was . . . r = .73," based on scores of 38 third-grade students (Barger, 2003; no p-value reported).

Oral reading fluency norms. Based on analysis of assessment data from a pool ranging from approximately 3,500 to more than 20,000 students collected between 2000 and 2005, Hasbrouck and Tindal (in press) have developed a new set of oral reading fluency norms to replace the widely used norms that were published in 1992 (Hasbrouck & Tindal, 1992). The new norms "align closely with both those published in 1992, and also closely match the widely used DIBELS norms . . . and those developed by Edformation with their AIMSweb system . . . with few exceptions." These new norms cover grades 1-8, and provide information for 90th, 75th, 50th, 25th, and 10th percentile rankings. The researchers also provided specific norm-related recommendations for using oral reading results for screening, diagnosis, and monitoring student progress:

– Screening. According to the authors, "fluency-based assessments have been proven to be efficient, reliable, and valid indicators of reading proficiency when used as screening measures" (citing Fuchs et al., 2001; Good, Simmons, & Kame'enui, 2001).

For screening in grades 2-8, the authors recommended that "a score falling within 10 words above or below the 50th percentile should be interpreted as within the normal, expected, and appropriate range for a student at that grade level at that time of year."

For screening in grade 1, the authors recommended following guidelines established by Good et al. (2002) that identified students reading at or above 40 words correct per minute (wcpm) by the end of the school year as being "at low risk of reading difficulty," students reading at 20–40 wcpm as being "at some risk," and students reading below 20 wcpm as being "at high risk of failure."

– Diagnosis According to the authors, oral reading fluency norms "can play a useful role in diagnosing possible problems that are primarily fluency based."

For diagnosis of fluency problems, the authors recommended procedures that "are similar to those for screening, except here the level of materials should reflect the student's instructional reading level, rather than [the] grade level," with instructional level defined as text that is "challenging but manageable . . . with no more than approximately one in ten difficult words (90% success)" (citing Partnership for Reading, 2001). This allows teachers to determine if students' fluency is appropriate to their reading level. Hasbrouck and Tindal do not suggest that an oral reading fluency assessment should be the only method of diagnosing reading problems; rather, such an assessment can be used along with other procedures (e.g., miscue analysis).

– Monitoring progress. According to the authors, oral reading fluency measures "have been found by many educators to be better tools for making decisions about students' progress than traditional standardized measures which can be time-consuming, expensive, are only administered infrequently, and have limited instructional utility" (citing Good et al., 2001; Tindal & Marston, 1990). Fuchs et al. (2001) provided a similar, research-based description of how oral reading fluency can be used to monitor student progress, both across and within individual student performance.

For monitoring student progress, Hasbrouck and Tindal (in press) recommended that students scoring within 10 wcpm of the 50th percentile at or above grade level should be "considered as making adequate progress in reading, unless there are other indicators that would raise concern." Such students "may only need to have their reading progress monitored a few times per year to determine if they are meeting the benchmark standards that serve as predictors of reading success."

For students reading below grade level, the authors suggested more frequent oral reading fluency assessments: once or twice monthly to once a week, depending on the severity of the problem, with scores graphed against goals and with adjustments to the instructional program if a student falls short of needed progress for three or more consecutive assessments (citing Hasbrouck et al., 1999).

● Vocabulary–regular assessment in multiple ways. Both the NRP and the NRC report included specific research-based recommendations related to assessment.

The NRC report identified word recognition accuracy as a skill that "should be regularly assessed in the classroom," with assessment results used to guide instruction (Snow, Burns, & Griffin, 1998, p. 323).

Based on the variety of measures used to assess student vocabulary and the different results those measures can achieve, the NRP recommended that vocabulary be assessed in multiple ways in the classroom. In particular, they argued that "the more closely the assessment matches the instructional context, the more appropriate the conclusions about the instruction will be" (NICHHD, 2000, p. 4-26).

● Text comprehension–regular assessment. According to the NRC report, "Conceptual knowledge and comprehension strategies should be regularly assessed in the classroom," with teachers tailoring instruction accordingly "where difficulty or delay is apparent" (Snow, Burns, & Griffin, 1998, p. 323). The NRP did not directly address assessment of text comprehension.