

Waterford

Early Reading Program™

RESEARCH SUMMARY

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This document is intended as a review of research relevant to the development of the Waterford Early Reading Program, created by the Waterford Institute and published by Electronic Education.

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Waterford Early Reading Program – Preface

The Waterford Early Reading Program™ is a comprehensive research-based curriculum that teaches children how to read, write, and keyboard. It is one of the nation's first research-based, technology-driven reform models in early reading instruction.

The program consists of multiple year-long instructional strands, which, taken together, provide an innovative continuum of instruction tailored to each child's reading level.

- *Reading Level One*
- *Reading Level Two*
- *Reading Level Three*
- *Phonological Awareness*
- *Keyboarding to Read and Write*
- *Writing*

The *Waterford Early Reading Program* was developed by Waterford Institute, a non-profit organization whose mission is to provide the finest possible education through high-quality models and software. At the completion of a \$10 million research project in New York inner-city schools, one of the most important findings was that computer-based interventions should come at a much earlier age than previously anticipated. Because the software necessary to accomplish this task had not yet been developed, the Waterford Institute began designing and developing the *Waterford Early Reading Program*. The first Reading Level of the program was released in 1995, and subsequent releases and updates have been used successfully in over 10,000 sites across the United States.

The Institute's research team is comprised of experienced elementary teachers and professionals in the field of education and computer development. They have spent over ten years researching theories in child development to determine the best sequence of instruction for technology-based early reading curriculum. They have consulted with top reading and learning experts including Marilyn Jager Adams and Joseph Torgesen. They also studied national and state standards and reviewed current reading texts.

This document is an introduction to the research background of this innovative new instructional model and the guiding principles behind it.

Reading—Essential but Elusive

All children must learn to read in order to grow into successful, contributing members of society. Reading is the foundation for every other part of a child’s education. Children who learn to read at an early age are able to master other vital skills and concepts, including math and science. Unfortunately, too many elementary school children read far below their grade level, which puts them at a serious disadvantage in today’s increasingly complex, fast-paced world. The challenge to teach every child to read deserves the attention of the best minds in education.

THE IMPORTANCE OF LEARNING TO READ

“Reading is the most important skill for success in school and society. Children who fail to learn to read will surely fail to reach their full potential” (Hall & Moats, 1999, pp. 6–7).

“Reading is important for the society as well as the individual. Economics research has established that schooling is an investment that forms human capital—that is, knowledge, skill, and problem solving ability that have enduring value. While a country receives a good return on investment in education at all levels from nursery school and kindergarten through college, the research reveals that the returns are highest from the early years of schooling when children are first learning to read....The early years set the stage for later learning. Without the ability to read, excellence in high school and beyond is unattainable” (Anderson et al, 1985, p. 1).

OBSTACLES TO LITERACY

Despite the importance of reading, national studies show that children are growing up without mastering core reading skills.

The 2000 National Assessment of Educational Progress (NAEP) showed 37 percent of fourth-grade students reading at a “below basic” level of achievement (National Center for Education Statistics [NCES], 2001).

Almost 70 percent of inner city fourth graders cannot read at a basic level on national reading tests (“No Child Left Behind” U.S. Department of Education, 2001, ¶ 2).

Society’s Increasing Demands

“It is essential and urgent to teach children to read and write competently, enabling them to achieve today’s high standards of literacy. Although the United States enjoys the highest literacy rate in its history, society now expects virtually everyone in the population to function beyond the minimum standards of literacy. Today the definition of *basic proficiency* in literacy calls for a fairly high standard of reading comprehension and analysis. The main reason is that literacy requirements of most jobs have increased significantly and are expected to increase in the future. Communications that in the past were verbal (by phone or in person) now demand reading and writing—messages sent by electronic mail, Internet, or facsimile as well as print documents” (National Association for the Education of Young Children [NAEYC], and International Reading Association [IRA], 1998, part 1, p. 1).

Difficulties Learning to Read

“With the increasing variation among young children in our programs and schools, teaching today has become more challenging. Experienced teachers throughout the United States report that the children they teach today are more diverse in their backgrounds, experiences, and abilities than were those they taught in the past....What this means is that some kindergartners may have skills characteristic of the typical three-year-old, while others might be functioning at the level of the typical eight-year-old. Diversity is to be expected and embraced, but it can be overwhelming when teachers are expected to produce uniform outcomes for all, with no account taken of the initial range in abilities, experiences, interests, and personalities of individual children” (NAEYC & IRA, 1998, part 1, p. 1).

Children with Special Challenges

Non-English Speakers

“In the United States between 1986 and 1998, the number of children with limited English ability rose from 1.6 million to 9.9 million. By the year 2050, the percentage of children in the United States who arrive at school speaking a language other than English will reach 40% (Lindholm-Leary, 2000). Many of these second-language speakers of English will also come from backgrounds of poverty, have parents with low levels of education, and attend schools in urban and rural areas that are plagued by limited resources, insufficient numbers of certified teachers, and poor physical structures” (International Reading Association [IRA], 2001).

“Linguistic and socioeconomic factors play key roles in the literacy achievement of second-language learners” (IRA, 2001).

“Most important, teachers must understand how children learn a second language and how this process applies to young children’s literacy development. Teachers need to respect the child’s home language and culture and use it as a base on which to build and extend children’s language and literacy experiences” (NAEYC & IRA, 1998, part 2, p. 2).

Children with Learning Disabilities

“The term *learning disability* (LD) is traditionally synonymous with the concept of unexpected underachievement—specifically, students who do not listen, speak, read, write, or develop mathematics skills commensurate with their potential, even though there has been adequate opportunity to learn” (Finn, Rotherham, & Hokanson, 2001, p. 261).

Low Socio-Economic Status

The statistics are staggering: nearly one-fourth of all preschool children in the United States live in poverty (Sadovnik, Cookson, & Semel, 1994, p. 366). Millions of children are being raised by single parents with incomes under the poverty level, defining them as “at risk” students. Millions more have no adult supervision after school.

“Families rated low in SES [socioeconomic status] are not only less affluent and less educated than other families but also tend to live in communities in which the average family SES is low and tend to receive less adequate nutrition and health services, including prenatal and pediatric care. In other ways, too, low SES often encompasses a broad array of conditions that may be

detrimental to the health, safety, and development of young children, which on their own may serve as risk factors for reading difficulties.... [The risk effects of SES] are strongest when it is used to indicate the status of a school or a community or a district, not the status of individuals. A low-status child in a generally moderate or upper-status school or community is far less at risk than that same child in a whole school or community of low-status children” (National Research Council, 1999, pp. 125–127).

“In order to combat such problems, large investments in education must be made, particularly at the early childhood level” (Day & Yarbrough, 2001, ¶ 5).

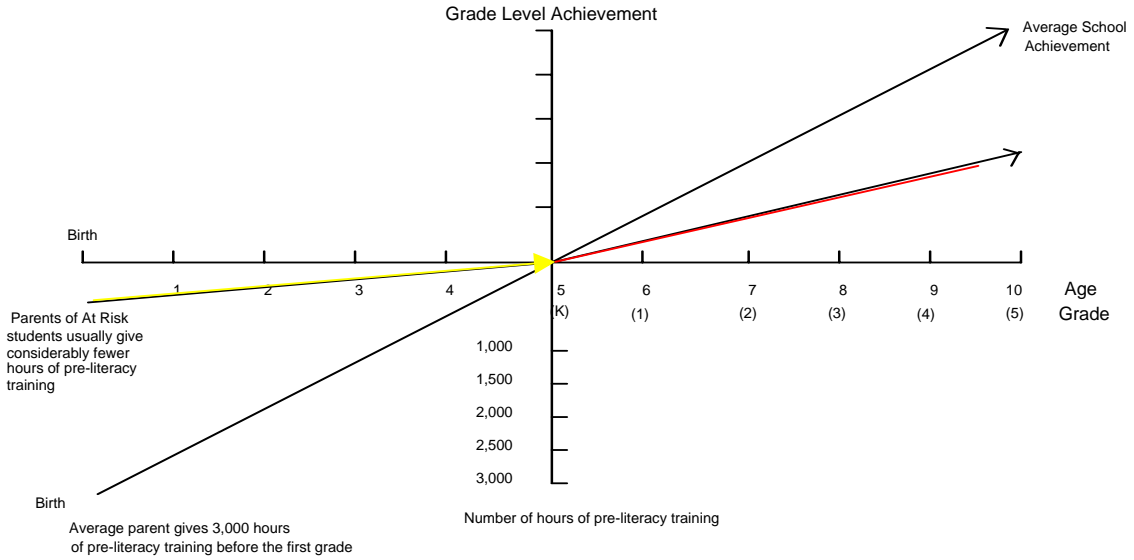
The Achievement Gap: Too Little Too Late

Students who struggle in the early grades tend to continue to do poorly into the upper grades. Children who have difficulty reading at the end of first grade often display similar difficulties in fourth grade.

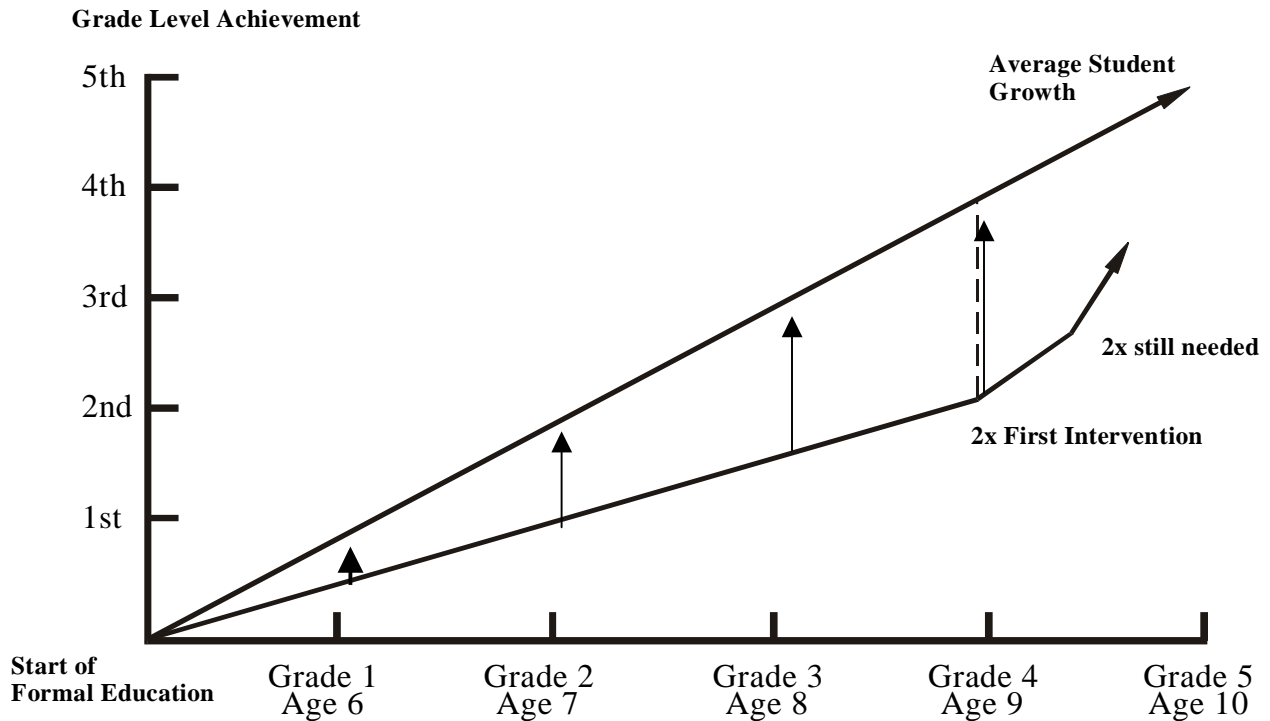
Research shows that “without early intervention, the poor first-grade reader almost invariably becomes a poor middle school reader, high school reader, and adult reader. In short, children who get off to a poor start in reading rarely catch up. We wait—they fail. But it does not have to be this way. It is a tragedy that both general and special education practices and policies continue unchanged even as extensive converging evidence makes clear that one major solution to the problem of school failure in general, and reading failure in particular, is early identification and prevention” (Finn et al, 2001, p. 270).

In the following figure, the grade-level achievement of students is represented graphically on the vertical and horizontal axes extending up and to the right. Average achievement is represented by the solid black line, while the “at risk” student is the broken line below. As grade level/age increases, so does the level of expected achievement.

The number of pre-literacy hours is also graphed. While the average parent gives 3,000 hours of pre-literacy training (counting activities, songs, or books) to their children, parents of at risk students usually receive considerably fewer hours. Marilyn Adams estimated that at-risk students received less than 200 hours during this same time period (1990).



As years go by, the gap that was not immediately apparent in the early grades begins to widen, and the need for intervention grows exponentially. If tutors or technology is introduced too late, the struggling student may have to gain two to four times his peers in order to match their rate of growth. This is, by definition, extremely difficult for the neediest students.



These graphs illustrate the problem of delaying intervention until later in the primary grades. The horizontal line represents the progress of formal education through grade five. The vertical axis represents the increasing expectations for grade level achievement in reading. The average student's performance is illustrated by the bold diagonal line.

The line below represents the "at risk" or struggling student. The vertical arrows represent the amount of work needed to bring this student up to the level of expected grade level achievement. An intervention at grade three or four may take four to six times the amount of resources needed to accomplish the same goal in earlier grades.

What's more, for intervention to be successful, it must not only double the child's rate of learning, but multiply it by four times just for him or her to catch up. Because these children are the weakest learners, they face a tremendous obstacle to achieving success in this manner.

THE SOLUTION: EARLY INTERVENTION WITH THE RIGHT TOOLS

Children need early prevention and intervention in their curriculum.

"...the most valid and efficient way to deliver this early intervention in reading is through regular education....it is critical to provide this instruction as early as possible in a child's school career to avoid the reading failure that will otherwise occur" (Finn et al, 2001, p. 271).

"The ability to read and write does not develop naturally, without careful planning and instruction....Experiences in these early years begin to define the assumptions and expectations about becoming literate and give children the motivation to work toward learning to read and write. From these experiences children learn that reading and writing are valuable tools that will help them do many things in life" (NAEYC & IRA, 1998, part 1, p. 3).

"An extensive knowledge base now exists to show us the skills children must learn in order to read well. These skills provide the basis for sound curriculum decisions and instructional approaches that can help prevent the predictable consequences of early reading failure" (Center for the Improvement of Early Reading Achievement [CIERA] & National Institute for Literacy [NIFL], 2001, p. ii).

How the Waterford Early Reading Program Meets the Needs of Today's Children

The *Waterford Early Reading Program* was designed to give teachers and parents the tools they need to intervene early and narrow the achievement gap. The pages that follow review the following instructional elements—elements that make it a unique and powerful instructional program.

- A balanced reading continuum grounded in research
- Regular review and assessment
- Technology integrated into the curriculum
- Individualized instruction
- Engaging learning approach
- Parental involvement

A BALANCED READING CONTINUUM GROUNDED IN RESEARCH

The Waterford Early Reading Program is a complete continuum of instruction. It assumes children have no knowledge of reading and writing, and it takes them through all necessary steps to help them become fluent readers.

In order to implement the most effective methods for teaching beginning reading, the designers of the *Waterford Early Reading Program*, all former teachers, researched data, consulted experts, and observed students. The program is largely based on the 10 research-based findings summarized below.

1. Emergent Readers Need to Understand How Print Works

“After their first contacts with print, children face three big challenges in the task of learning to read: The first is that all spoken languages have to be written down in some serial order which is arbitrary...The second is that the information in print is organized in a hierarchy of levels—discourse or text, sentence, phrase, word, letter cluster, letter and sub-letter levels—and the reader has to know which level to attend to at any one moment to be effective...The third problem combines the other two—during acquisition children have to learn how to attend to print in serial order while at the same time deciding which level of the language hierarchy to attend to...Learning what information in print to attend to in what order to get the greatest payoff can only be done on whole texts and this learning underlies successful reading” (Clay, 1991, p. 113).

2. Recognizing Individual Letters Is a Critical Determinant of Reading Proficiency

“With explicit instruction directing their attention to letters and sounds, and with practice using appropriately graded and engaging materials, students who seem to be low in reading ability can in time function within the normal range” (Carnegie Task Force, 1996, p. 105).

“Based on her review of the literature, Chall reported that prereaders’ knowledge of letter names was a strong predictor of success in early reading achievement—even stronger than mental age

(Chall 1967). Based on analyses of the USOE first-grade studies, Bond and Dykstra reinforced and extended Chall's report: Prereaders' letter knowledge was found to be the single best predictor of first-year reading achievement, with the ability to discriminate phonemes auditorily ranking a close second. Furthermore, these two predictors were the winners regardless of the instructional approach administered (Bond and Dykstra 1967)." (Adams, 1990. p. 55.)

"...If children do not know letter names and shapes, they need to be taught them along with phonemic awareness" (CIERA & NIFL, 2001, p. 7).

The easiest place for students to start is with the alphabet song. Once the letter names become familiar, students can benefit from activities that teach the letter shapes (Adams, 1990, p. 363).

3. Phonological Awareness Plays a Critical Role in Learning to Read

"Phonemic [or phonological] awareness is the ability to notice, think about, and work with the individual sounds in spoken words. Before children learn to read print, they need to become aware of how the sounds in words work. They must understand that words are made up of speech sounds, or phonemes" (CIERA & NIFL, 2001, p. 2).

"Recent longitudinal studies of reading acquisition have demonstrated that the acquisition of phonemic awareness is highly predictive of success in learning to read—in particular in predicting success in learning to decode. In fact, phonemic awareness abilities in kindergarten (or in that age range) appear to be the best single predictor of successful reading acquisition" (International Reading Association, 1998, p. 2).

The importance of phonological (or phonemic) awareness in learning to read is supported by Griffith & Olsen (March 1992, 516–523), Bradley & Bryant (1991), Juel (1991), Juel (1998, p. 778), and Torgesen & Mathes (2000).

4. Beginning Readers Need to Understand the Relationships Between Written Language and Its Component Sounds

The relationship between written language and its component sounds is called *phonics*, and although there has been much debate over its importance, the fact is that all students learn about letter-sound relationships regardless of the type of instruction they receive. Then they use this knowledge to decode new words (Snow, Burns, & Griffin, 1998, pp. 173–174).

Marilyn Jager Adams, who has reviewed much of the research on phonics instruction, concludes that phonics instruction should be a prominent part of any beginning reading program, but that it should by no means be a program's only concern (1990, p. 411).

"Phonics instruction is most effective when it begins in kindergarten or first grade. To be effective with young learners, systematic instruction must be designed appropriately and taught carefully. It should include teaching letter shapes and names, phonemic awareness, and all major letter-sound relationships. It should ensure that all children learn these skills. As instruction proceeds, children should be taught to use this knowledge to read and write words" (CIERA & NIFL, 2001, p. 15).

“A program of systematic phonics instruction clearly identifies a carefully selected and useful set of letter-sound relationships and then organizes the introduction of these relationships into a logical instructional sequence... a systematic program of instruction provides children with ample opportunities to practice the relationships they are learning” (CIERA & NIFL, 2001, p. 16).

5. Beginning Readers Need Practice Reading and Listening to a Variety of Texts

Reading to and listening to wonderful stories reminds the students that the effort involved in word recognition is worthwhile. As S. A. Stahl explains, “Letter-sound instruction makes no sense to a child who does not have an over-all conception of what reading is about, how print functions, what stories are, and so on” (1994, p. 620).

“Problems arise when the relationship between what children learn in phonics and the stories they read is either too low or too high. When too few of the words are decodable, it is questionable whether what is taught in phonics is of any use. On the other hand, when all but one or two of the words in a selection are constrained by the letter sounds introduced, it is virtually impossible to write interesting selections in natural sounding language (Beck & Juel, 1992, p. 115).

“Studies have found that a minimum of five books per child is necessary to provide even the most basic print-rich environment (Morrow & Weinstein, 1986; Neuman & Roskos, 1997). Computers and developmentally appropriate software should also be available to provide alternative, engaging, enriching literacy experiences” (NAEYC 1996, as cited in NAEYC & IRA, 1998, part 2, p. 5).

6. Beginning Readers Need to Develop Automatic Word Recognition Skills so That They Can Pay Attention to Meaning

Automaticity is based on the principle that tasks become easier and require less attention through practice. When decoding becomes automatic, readers are able to focus on comprehension. Adams states that skillful readers “process the letters of text...quickly and easily” because they have an “overlearned knowledge about the sequences of letters comprising frequent words and spelling patterns” (1990, p. 410).

7. Readers Should Practice Spelling and Writing New Words

Spelling out words forces readers to attend to each letter of a word in left to right order (Adams, 1990, p. 131). A study by B. W. A. Whittlesea has shown that “the act of writing newly learned words results in a significant strengthening of their perceptual integrity in recognition” (Adams, 1990, pp. 129–130).

8. Readers Need Practice Reading Orally with Expression and Automaticity

“Although some readers may recognize words automatically in isolation or on a list, they may not read the same words fluently when the words appear in sentences in connected text...It is important to provide students with instruction and practice in fluency as they read connected text” (CIERA & NIFL, 2001, p. 23).

“Model fluent reading, then have students reread the text on their own. By listening to good models of fluent reading, students learn how a reader’s voice can help written text make sense...It is the actual time that students are actively engaged in reading that produces reading gains” (CIERA & NIFL, 2001, p. 26).

One group of researchers found “in their analysis of oral reading lessons...that maintaining a focus on comprehension during reading lessons not only improves comprehension, but also improves children’s word recognition skills beyond that of an emphasis on accuracy (Stahl, Huebach, & Cramond, 1994, p. 8).

9. Readers Can Develop Comprehension Strategies That Help Them Better Understand What They Read

“Text comprehension can be improved by instruction that helps readers use specific comprehension strategies” (CIERA & NIFL, 2001, p. 49). Presenting comprehension strategies to students as “the procedures that readers ought to use all of the time when reading and thus teaching them in the context of regular assignments is not only possible but desirable” (Pressley et al., 1989, p. 325).

10. Readers Should Practice Writing Connected Text to Express Ideas and Learn Basic Grammar and Usage Skills to Improve Their Writing

For many beginning readers, the ability to read is a by-product of the ability to print and spell (Durkin, 1989, p. 137). Stotsky points out that better readers are often better writers and vice versa, as measures by quantifiable factors (as quoted in Heller, 1995, p. 5).

“...the potential contribution of writing to reading runs much deeper than any concern of form or style. In particular, as children become authors, as they struggle to express, refine, and reach audiences through their own writing, they actively come to grips with the most important reading insights of all (Graves 1983).” (Adams, 1990, p. 405)

REGULAR REVIEW AND ASSESSMENT

“Reviewing skills helps students retain knowledge. Exemplary beginning reading programs build in review to strengthen learning. A reading instruction program that teaches a specific curriculum element in two weeks, with a review at the beginning of the second week...bridges interruptions ‘to support cumulative learning’” (Calfee, 1998, p. 329).

The *Waterford Early Reading Program* employs three different types of assessment:

- Pretests or screening assessments, which determine students’ knowledge for beginning placement and initial instruction
- Ongoing assessments, which use the instructional process to check and determine the individual needs of each student
- Unit or final assessments, which check for longer retention of important skills

How Waterford Courses Provide Assessment and Review

The sections below summarize how assessment and review is integrated into each course.

Reading Level One

Students take a pretest at the beginning of the course to assess their knowledge of the capital symbols of the 26 letters of the alphabet. During the first half of the course, they are instructed on the capital form of each letter. After every five letters, students review the five letters just learned to make sure they recognize them in context. This pattern is repeated in the second half with lowercase letters, but if students score poorly in the five-letter review segment, they receive remedial instruction on problem letters. Instruction in 52 basic print concepts is introduced and assessed with each lesson. Every five lessons, students spend time in Play and Practice, where they choose letter review activities from a menu. Teachers distribute alliterative books and specific to each letter and nursery rhyme books which students take home to keep so they can their families can support the at-school assessment and review.

Reading Level Two

Each *Level Two* session begins with a review segment: a song, a book, and a game that reviews students' low-scored vocabulary words. Students progress through an instructional sequence packed with songs, books containing both controlled and natural text, comprehension strategies, letter sounds, spelling, pattern words, and automatic word recognition. Each lesson begins with a pre-screening activity, which directs struggling students to supplementary activities to master vocabulary used within that lesson. Word automaticity assesses students' knowledge of the words needed to read the lesson books fluently. Oral recordings assess student's independent reading level, and printed reports provide skill-specific feedback on dozens of research-based early literacy concepts. If scores show they are not prepared, students may receive additional practice with vocabulary or concepts not mastered. At the end of each unit, students review the words and skills from that unit. This unit review ends with Play and Practice, where students again review past skills in an open-ended environment. As with *Reading Level One*, students are given their own set of books so they can read at home and take charge over their own learning.

Reading Level Three

Each *Level Three* session begins with a word review game that assesses students on words not mastered in previous lessons. These words continue to appear for review and practice until they are mastered. Students work through lessons that teach fluency, comprehension, grammar, word patterns, automatic word recognition, and spelling. Each lesson's spelling pretest assesses students' ability to spell the words they need to read the controlled text and natural language books. If their scores show they do not know certain words, they receive additional practice with those words. Every five lessons, students also review their choice of past books and songs in Play and Practice. As with *Reading Level One* and *Level Two*, students take home and keep books that support the review and assessment they receive in the classroom.

Phonological Awareness

At the beginning of this course, students complete an assessment sequence that identifies their strengths and weaknesses. They are assessed on counting syllables, rhyming, blending, identifying initial sounds, and counting individual phonemes. Students complete the course once, doing as many activities as is warranted by their performance (i.e., ongoing assessment)—each time with new sounds and words. After a skill is introduced, students are given multiple opportunities for practice and review. After completing all activities in *Phonological Awareness*,

students take the assessment again, and if necessary, repeat the activities for skills that remain unmastered.

Keyboarding to Read and Write

Each *Keyboarding* session begins with a warm-up which reviews previously learned letters. After direct instruction, the carefully sequenced practice activities give students instant feedback and constantly challenge them to improve their speed and accuracy scores. *Keyboarding* supports the *Reading* courses by requiring students to keyboard many high priority words and some literature from *Reading Level Two* and *Level Three*.

Writing

The *Writing* course is not a sequence of activities, but is a menu with writing activities, paint programs, and a word processor. Students use it to apply the reading and writing skills taught in *Reading Level One*, *Level Two*, and *Level Three* and *Keyboarding to Read and Write*. Although there is no assessment in *Writing*, by its very nature, it provides practice and review, and assesses or reveals which skills and concepts students are able to apply in an open-ended environment.

TECHNOLOGY INTEGRATED INTO THE CURRICULUM

The Waterford Early Reading Program maximizes the benefits of computer instruction (adaptive, interactive software) in combination with solid classroom materials (easy-to-use teacher guides, take-home student books, classroom posters and handouts).

Technology Is Required by New National Standards

National Association for the Education of Young Children (NAEYC) guidelines require that “appropriate technology is integrated into the regular learning environment and used as one of many options to support children’s learning” (NAEYC, 1996).

Good Technology Should Be Integrated with Classroom Activities

“Very young children have shown comfort and confidence in using software. They can follow pictorial directions and use situational and visual cues to understand and think about their activity (Clements and Nastasi 1993). Typing on the keyboard does not seem to cause them any trouble; if anything, it is a source of pride” (Clements, 2001, p. 1).

“Research shows that computer activities yield the best results when coupled with suitable off-computer activities. For example, children who are exposed to developmental software alone—the on-computer group—show gains in intelligence, non-verbal skills, long-term memory, and manual dexterity. Those who also worked with supplemental activities, in comparison—the off-computer group—... improved their scores in verbal, problem-solving, and conceptual skills (Haugland 1992)” (Clements, 2001, p. 4).

INDIVIDUALIZED INSTRUCTION

Waterford programs individually tutor each student in daily 15–30 minute instructional periods (session times are adjustable). The computer tracks the progress of each student, adapts to

individual abilities, and keeps recordings of oral reading, so teachers are more able to prepare directed classroom lessons and activities.

“Studies with infants have found that long-term retention is enhanced when information is distributed over multiple, temporally discrete sessions instead of being presented in a single, massed session” (Rovee-Collier, 1995). Geary (1994) confirms this principle, stating “practice should occur in small doses (about 20 minutes a day) and over an extended period of time.”

“A continuum of reading and writing development is useful for identifying challenging but achievable goals or benchmarks for children’s literacy learning, remembering that individual variation is to be expected and supported. Using a developmental continuum enables teachers to assess individual children’s progress against realistic goals and then adapt instruction to ensure that children continue to progress” (NAEYC & IRA, 1998, part 2, p. 2).

ENGAGING LEARNING APPROACH

Waterford programs introduce key concepts in a musical context. Waterford extends the excitement of learning to the home by providing student copies of books and other media. Students who own their own set of Waterford books—especially poor students with few other materials possessions—are more motivated to read and learn.

Each Student Needs Books to Read at Home

“Studies indicate that the number of books in a family’s home relates to the academic achievement of its children...whether parents read to their children can impact the degree of educational success” (Shaw & Blake, 1998, p. 74).

“Analyses of schools that have been successful in promoting independent reading suggest that one of the keys is ready access to books. However, fully 15 percent of the nation’s schools do not have libraries. In most of the remaining schools, the collections are small, averaging just over 13 volumes per student” (Anderson et al, 1985, p. 78).

Engaging Multi-media Elements Teach Important Concepts and Skills

“Songs and chants serve at least two purposes. First, they make rote learning tasks, such as the alphabet and vowel generalizations, easy to memorize and later transfer to real reading situations. Second, songs and chants provide a springboard into rich experiences” (Reutzel and Cooter, 1992, p. 125).

Teachers can increase their effectiveness tenfold by using visual information in class. “Learning really starts with the seeing, and then the thinking,...rather than the other way around (“Making an Impression,” 2002).

PARENTAL INVOLVEMENT

Waterford recognizes the importance of the home in successful learning. Students are given a variety of take-home materials to amplify the positive impact of the Waterford classroom curriculum. These materials inform parents of their students’ progress and provide activity ideas for parents that continue students’ learning at home.

The *Waterford Early Reading Program* uses the following items to reinforce learning in the home:

- Videotapes that teach letter names and sounds, nursery rhymes, and international songs
- Books (both controlled text and natural text) that reinforce word patterns, sight words, vocabulary, and comprehension taught at school
- Audiocassette tapes of books and songs that allow students to listen to stories and songs they are exposed to in the classroom
- HomeLink Newsletters that inform parents about their students' progress and foster continued learning at home, available in both English and Spanish languages.
- Worksheets and computer printouts available at the end of many lessons that provide homework, extra practice, and reinforcement of skills

Family Involvement Is a Critical Factor in Teaching Children to Read

“Parents play roles of inestimable importance in laying the foundation for learning to read” (Anderson et al, 1985, p. 27). Henderson and Berla (1994) found that “family involvement is a critical factor in student achievement from the earliest childhood years through high school, and that efforts to improve a child’s performance are much more effective when the family is actively involved.” Studies show that children from low-income or minority families benefit most when their parents are involved with school (Shaw & Blake, 1998, p. 76).

Parents Help Children Develop Positive Attitudes Toward Literacy

“Studies indicate that the number of books in a family’s home relates to the academic achievement of its children...whether parents read to their children can impact the degree of educational success” (Shaw & Blake, 1998, p. 74).

Conclusion

The *Waterford Early Reading Program* has a unique mission: to improve and enhance the education of all children and narrow the achievement gap for students who need help the most.

Some students enter school prepared to learn; others do not. Waterford developed programs to give students with a wide variety of backgrounds access to a carefully sequenced reading curriculum they can work through at their own pace. Their performance is assessed and skills are re-taught as necessary to ensure that they build a solid foundation before going on to more advanced concepts. As they master skills and concepts, their self-confidence grows.

Through the application of innovative technology and a quality curriculum, Waterford puts every child on the proven path to reading.

Research Sources

- Adams, Marilyn Jager. (1990). *Beginning to read: Thinking and learning about print*. Cambridge: MIT Press.
- Adams, Marilyn Jager. (1998). *Phonemic awareness in young children*. Baltimore, MD: Paul H. Brookes Publishing Co.
- Allington, Richard L. (Feb 1983). Fluency: The neglected reading goal. *The Reading Teacher*, 36 (6), 556–561.
- Anderson, R.C. et al. (1984). *Becoming a nation of readers: The report of the commission on reading*. Washington DC: The National Institute of Education.
- Au, K.H. Mason, J.M., & Scheu, J.A. (1995). *Literacy instruction for today*. New York: Harper Collins College Publishers.
- Balajthy, E. (Feb 1988). Keyboarding, language arts, and the elementary school child. *Computing Teacher*, 15(5), 40–43.
- Barr, Rebecca, Kamil, Michael L., Mosenthal, Peter B., & Pearson, P. David (Eds.). (2000). *Handbook of reading research* (Vol. 3). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Beck, I. L., & Juel, C. (1992). *The role of decoding in learning to read. What research has to say about reading instruction*. Samuels, S.J., and Farstrup, A.E. (Eds.) Newark, DE: International Reading Association.
- Blachman, Benita. (1997). Early intervention and phonological awareness: A cautionary tale. *Foundations of Reading Acquisition and Dyslexia*. Blachman, B. (Ed.). Mahwah, NJ: Lawrence Erlbaum Associates, 414.
- Blackman, B., Ball, E., Black, S., & Tangel, D. (1994). Kindergarten teachers develop phoneme awareness in low-income, inner-city classrooms: Does it make a difference? *Reading and Writing: An Interdisciplinary Journal*, 6, 1–17.
- Bond, G.L., & Dystra, R. (1967). The cooperative research program in first-grade reading instruction. *Reading Research Quarterly*, 2(4), 5–142.
- Bradley, L. & Bryant, P.E. (1991). Phonological skills before and after learning to read. *Phonological processes in literacy: A tribute to Isabelle Y Liberman*. Brady, S. A., & Shankweiler, D. P. (Eds.). Hillsdale, NJ: Erlbaum, 37–45.
- Bredenkamp, Sue, Copple, Carol, & Neuman, Susan B. (2000). *Learning to read and write: Developmentally appropriate practices for young children*. Washington DC: The National Association for the Education of Young Children.
- Brown, A. L., Palincsar, A. S., & Arbruster, B. B. (1994). Instructing comprehension-fostering activities in interactive learning situations. *Theoretical models and processes of reading* (4th ed.). Ruddell, R. B., Ruddell, M.R. & Singer, H. (Eds.). Newark, DE: International Reading Association, 757–785.
- Bryant, P., Maclean, M., & Bradley, L. (1990). Rhyme, language, and children's reading. *Applied Psycholinguistics*, 11(4), 237–252.
- Bryant P., et al. (1989). Nursery rhymes, phonological skills, and reading. *Journal of Child Language*, 16(2), 407–428.

Burns, Marilyn. (1992). *About teaching mathematics: A K–8 resource*. Sausalito, CA: Math Solutions Publications. 79.

Burns, M. S., et al. (Eds.) (1998). *Preventing Reading Difficulties in Young Children*. Washington DC: National Academy Press.

Byrne, B., & Fielding-Barnsley, R. (1993). Evaluation of a program to teach phonemic awareness to young children: A 1-year follow-up. *Journal of Educational Psychology* (85). 104–111.

Calfee, R. (1998). Phonics and phonemes: Learning to decode and spell in a literature-based program. In Metsala, J. L. & Ehri, L. C. (eds.). *Word recognition in beginning literacy*. Mahwah, N.J.: Lawrence Erlbaum Associates, Publishers, 329.

Campbell, D. D. (1973). Typewriting contrasted with handwriting: A circumvention study of learning disabled children. *Journal of Special Education*, 7(2), 155-168.

Center for the Improvement of Early Reading Achievement (CIERA), and National Institute for Literacy (NIFL). (2001). *Put reading first: The research building blocks for teaching children to read—Kindergarten through grade 3*. Jessup, MD: NIFL at ED Pubs.

Clay, M. M. (1991). *Becoming literate*. Auckland, New Zealand: Heinemann Education.

_____. (1985). *The early detection of reading difficulties* (3rd ed.). Portsmouth, NH: Heinemann.

Clements, Douglas. (2001). Dialogue on early childhood science, mathematics, and technology education- First experiences in science, mathematics, and technology- Young children and technology. *Project 2061*. [Online]. Available: <http://www.project2061.org/newsinfo/earlychild/experience/clements.htm>

Cothran, A., & Mason, G. E. (1978). The typewriter: Time-tested tool for teaching reading and writing. *Elementary School Journal*, 78(3), 171–178.

Cullinan, B. E. (1989). Literature for young children. *Emerging Literacy: Young children learn to read and write*. Strickland, D. S. and Morrow, L. M. (Eds.). Newark, DE: International Reading Association.

Cunningham, A. E. (1990). Explicit versus implicit instruction in phonemic awareness. *Journal of Experimental Child Psychology*, 50, 429–444.

Day, Barbara, & Yarbrough, Tracie. (2001). Dialogue on early childhood science, mathematics, and technology education- A context for learning- The state of early childhood programs in America: Challenges for the new millenium. *Project 2061*. [Online]. Available: <http://www.project2061.org/newsinfo/earlychild/context/day.htm>

Durkin, Dolores. (1989). *Teaching them to read* (5th ed.). Boston, MA: Allyn and Bacon.

Eldredge, J. L. (1995). *Teaching decoding in holistic classrooms*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Finn, Chester E., Rotherham, Andrew J., & Hokanson, Charles R., Jr. (Eds.) (2001). *Rethinking special education for a new century*. [Online]. Available: http://www.edexcellence.net/library/special_ed/special_ed_ch12.pdf

Fountas, I. C., & Pinnell, G. S. (1996). *Guided reading: Good first teaching for all children*. Portsmouth, NH: Heinemann.

Fry, E.B., Kress, J. E. & Fountoudidis, D. L. (1993). *The reading teacher's book of lists*. West Nyack, NY: The Center for Applied Research in Education.

- Garland, Cynthia. (1990). *Mathematics their way: Summary newsletter*. Saratoga, CA: Center for Innovation in Education, 9,1
- Geary, David C. (1994). *Children's Mathematical Development: Research and Practical Applications*. Easton, MD: Easton Publishing Services.
- Graves, Donald. (1994). *A fresh look at writing*. Portsmouth, NH: Heinemann.
- Graves, M. F., Juel, C., & Graves, B. B. (1998). *Teaching Reading in the 21st Century*. Boston, MA: Allyn & Bacon. 154.
- Griffith, P. L., & Olson, M. W. (Mar. 1992). Phonemic awareness helps beginning readers break the code. *The Reading Teacher*, 45(7), 516–523.
- Gunning, T. (1998). *Assessing and correcting reading and writing difficulties*. Boston, MA: Allyn and Bacon, 70–88.
- Hall, Susan L., and Moats, Louisa C. (1999). *Straight talk about reading: How parents can make a difference during the early years*. Lincolnwood, IL: Contemporary Books.
- Heller, Mary F. (1995). *Reading writing connections from theory to practice* (2nd ed.). White Plains: Longman Publishers.
- Henderson A. and Berla N. (1994). *A New Generation of Evidence: The Family is Critical to Student Achievement*. Columbia, MD: National Committee for Citizens in Education.
- International Reading Association. (2001). *Second-Language Literacy Instruction- A Position Statement of the International Reading Association*. [Online brochure]. Availability: <http://www.reading.org/pdf/1046.pdf>
- _____. (1998). *Phonemic awareness and the teaching of reading*. Position statement adopted April 1998. [Online]. Available: http://www.reading.org/pdf/phonemic_aware.pdf
- _____. (1997). *The role of phonics in reading instruction*. Position statement passed at 1997 meeting of IRA board of directors.[Online]. Available: <http://www.readingonline.org>.
- Johns, J. L. (1993). *Informal reading inventories: Annotated reference guide*. DeKalb, IL: Communitex International Corp.
- Johnson, M.S., Cress, R. A., & Pikulskil, J. J. (1987). *Informal reading inventories*. Newark, DE: International Reading Association.
- Juel, C. (1991). Beginning reading. *Handbook of Reading Research* (Vol. 2). Barr, R., et al (Eds.). New York, NY: Longman, 759–788.
- _____. (1988). Learning to read and write: A longitudinal study of fifty–four children from first through fourth grades. *Journal of Educational Psychology*, 80(4), 437–447.
- _____. (1994). *Learning to read and write in one elementary school*. New York, NY: Springer-Verlag.
- _____. (1990). The role of decoding in early literacy instruction and assessment. *Assessment for instruction in early literacy*. Morrow, L. M., & Smith, J. K. (Eds.). Englewood Cliffs, NJ: Prentice-Hall, 135–154.
- Kirtley, C., Bryant, P., MacLean, M., & Bradley, L. (1989). Rhyme, rime, and the onset of reading. *Journal of Experimental Child Psychology*, 48, 224–245.

- Lesgold, A. M., & Resnick, L. B. (1982). How reading disabilities develop: Perspectives from longitudinal study. *Theory and Research in Learning Disability*. Das, J. P., Mulcahy, R., & Wall, A. E. (Eds.). New York, NY: Plenum.
- Lieberman, Isabelle Y., & Shankweiler, Donald. (1985). Phonology and problems of learning to read the write. *Remedial and Special Education*, 6, 8–17.
- Lipson, Marjorie Y. & Wixson, Karen K. (1997). *Assessment and instruction of reading and writing disability*. New York, NY: Addison-Wesley Educational Publishers Inc.
- Maclean, M., Bryant, P., & Bradley, L. (1987). Rhymes, nursery rhymes, & reading in early childhood. *Merrill-Palmer Quarterly*, 33(3), 255–281.
- Making an Impression on the Mind's Eye. (2002, June). *Education Update*, 44, 4.
- McCracken, Robert A., & McCracken, Marlene J. (1986). *Stories, songs, and poetry to teach reading and writing: Literacy through language*. Winnepeg: Peguis Publishers Ltd.
- Miller, J. W., & McKenna, M. (1989). *Teaching reading in the elementary classroom*. Scottsdale, AZ: Gorsuch Scarisbrick Publishers, 433–437.
- National Association for the Education of Young Children. (1996). *Technology and Young Children—Ages 3 through 8*. Position statement of NAEYC adopted April 1996. [Online]. Available: http://www.naeyc.org/resources/position_statements/pstech98.htm
- National Association for the Education of Young Children and International Reading Association. (1998). *Learning to read and write: Developmentally appropriate practice for young children, pt.1*. A joint position of the International Reading Association (IRA) and the National Association for Education of Young Children (NAEYC). [Online]. Available: http://www.naeyc.org/resources/position_statements/psread1.htm
- _____. (1998). *Learning to read and write: Developmentally appropriate practice for young children, pt.2*. [Online]. Available: http://www.naeyc.org/resources/position_statements/psread2.htm
- National Center for Education Statistics. (2001). *NAEP: The nation's report card: Reading achievement level results from the nation's fourth-graders*. [Online]. Available: <http://nces.ed.gov/nationsreportcard/reading/results/achieve-pf.asp>
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA. The National Council of Teachers of Mathematics, Inc.
- National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. NICHD, 2–41.
- National Research Council. (1999). *Starting out right, a guide to promoting children's reading success*. Washington DC: National Academy Press.
- _____. (1998). *Preventing reading difficulties in young children*. Washington DC: National Academy Press.
- Pearson, P. D., & Fielding, L. (1996). Comprehension instruction. *Handbook of Reading Research* (Vol. 2), 815–860.
- Pearson, P. D. et al. (1992). Developing expertise in reading comprehension. *What research has to say about reading instruction*. Newark, DE: International Reading Association, 145–199.
- Perfetti, C. A. (1985). *Reading Ability*. New York: Oxford University Press.

- Peterson, M. E., & Haines, L. P. (1992). Orthographic analogy training with kindergarten children. Effects on analogy use, phonemic segmentation, and letter-sound knowledge. *Journal of Reading Behavior*, 24(1), 121.
- Powell, Debbie. (1990). *Teaching graphophonics in a whole language classroom*. Hawthorn, Victoria, Australia: Distributed in the U.S. by Rigby.
- Pressley, Michael et al. (1989). The challenges of classroom strategy instruction. *The Elementary School Journal*, 89(3), 301–341.
- Pressley, M. (1998). *Reading instruction that works: The case for balanced teaching*. New York: Guilford Press.
- _____. (2000). What should comprehension instruction be the instruction of? *Handbook of Reading Research* (Vol. 3). Barr, R. et al. (Eds.) Mahwah, NJ: Lawrence Erlbaum Associates, Publishers, 545.
- Reitsma, Peter. (Spring 1998). Reading practice for beginners: Effects of guided reading, reading-while-listening, and independent reading with computer-based speech feedback. *Reading Research Quarterly*, 23(2), 219–235.
- Report of the Carnegie Task Force on Learning in the Primary Grades. (1996). *Years of Promise: A Comprehensive Learning Strategy for America's Children*. Carnegie Corporation of New York.
- Reutzel, D. R., & Cooter, R. B. (1992). *Teaching children to read: From basals to books*. New York, NY: Macmillan.
- Rosenshine, Barak V. (April 1986). Synthesis of research on explicit teaching. *Educational Leadership*, 43(7), 60–69.
- Rovee-Collier, C. (1995). Time Windows in Cognitive Development. *Developmental Psychology*. Vol. 31 No. 2, 147–169.
- Sadovnik, A., Cookson, P., & Semel, S. (1994). *Exploring Education*. Needham Heights, MA: Allyn and Bacon.
- Samuels, S. J. (1994). Word recognition. *Theoretical Models and Processes of Reading* (4th ed.). Ruddell, R.B., Ruddell, M. R., & Singer, H. (Eds.). Newark, DE: International Reading Association, 359–380.
- San Francisco State University. (1999). *Bay area mathematics task force report: A mathematics source book*. San Francisco, CA: San Francisco State University, 7.
- Shaw, Jean M. & Blake, Sally S. (1998). *Mathematics for young children*. Upper Saddle River, NJ. Prentice-Hall.
- Slocum, Timothy A., O'Connor, Rollanda E., & Jenkins, Joseph R. (1993). Transfer among phonological manipulation skills. *Journal of Educational Psychology*, 85(4), 618–630.
- Snow, Catherine E., Burns, M. Susan, & Griffin, Peg (Eds.) (1998). *Preventing Reading Difficulties in Young Children*. Washington DC: National Academy Press.
- _____. (1999). *Starting out right: A guide to promoting children's reading success*. Washington, DC: National Academy Press.
- Stahl, Steven A. (1992). Saying the 'p' word: Nine guidelines for exemplary phonics instruction. *The Reading Teacher*, 45, 618–625.
- _____. (1999). *Vocabulary development*. Cambridge, MA: Brookline Books. 4.

Stahl, S. A., Heubach, Kathleen, & Cramond, Bonnie. (30 Nov.–3 Dec. 1994). *Fluency-oriented reading instruction*. Annual Meeting of the National Reading Conference. San Diego, CA.

Stanovich, Keith E. (2000) *Progress in understanding reading: Scientific foundations and new frontiers*. New York, NY: The Guilford Press.

_____. (Dec. 1993–Jan. 1994). Romance and reality. *The Reading Teacher*, 47(4). 280–291.

_____. (1980). Toward an interactive-compensatory model of individual differences in the development of reading fluency. *Reading Research Quarterly*, 16(1), 32–71.

Strickland, Dorothy, & Cullinan, Bernice. (1990). Afterword in *Beginning to Read: Thinking and Learning about Print* by Marilyn Jager Adams. Cambridge: MIT Press, 426–434.

Tierny, R. J. et al. (1989). The effects of reading and writing upon thinking critically. *Reading Research Quarterly*, 24(2), 134–173.

Tierny, R. J., & Leys, M. (1986). What is the value of connecting reading and writing? *Convergences: Transactions in Reading and Writing*. Peterson, B. T. (Ed.). Urbana, IL: National Council of Teachers of English, 15–29.

Torgesen, Joseph K., & Mathes, Patricia G. (2000). *A basic guide to understanding, assessing, and teaching phonological awareness*. Austin, TX: Pro-Ed, Inc.

U.S. Department of Education. (2001). *No child left behind* [Online]. Available: <http://www.ed.gov/offices/OESE/esea/nclb/part2.html>

Wallach, Michael A., & Wallach, Lise. (1979). Helping disadvantaged children learn to read by teaching them phoneme identification skills. *Theory and Practice of Early Reading* (Vol. 3). Resnick, L. A., & Weaver, P. A. (Eds.). Hillsdale, NJ: Erlbaum Associates, 197–215.



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