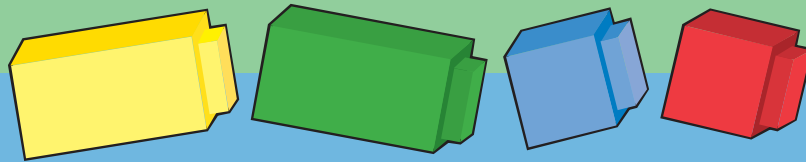


The Effects of the Use of Reading Rods® Manipulatives on Early Literacy Learning



A research project showing the positive effects of the use of Reading Rods on literacy standardized test scores for Grades 1 and 2

EDUCATIONAL ANALYST

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STUDY DESIGN PROJECT LEADER

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Study Analysis and Findings

In this research study, data were analyzed for the following purposes:

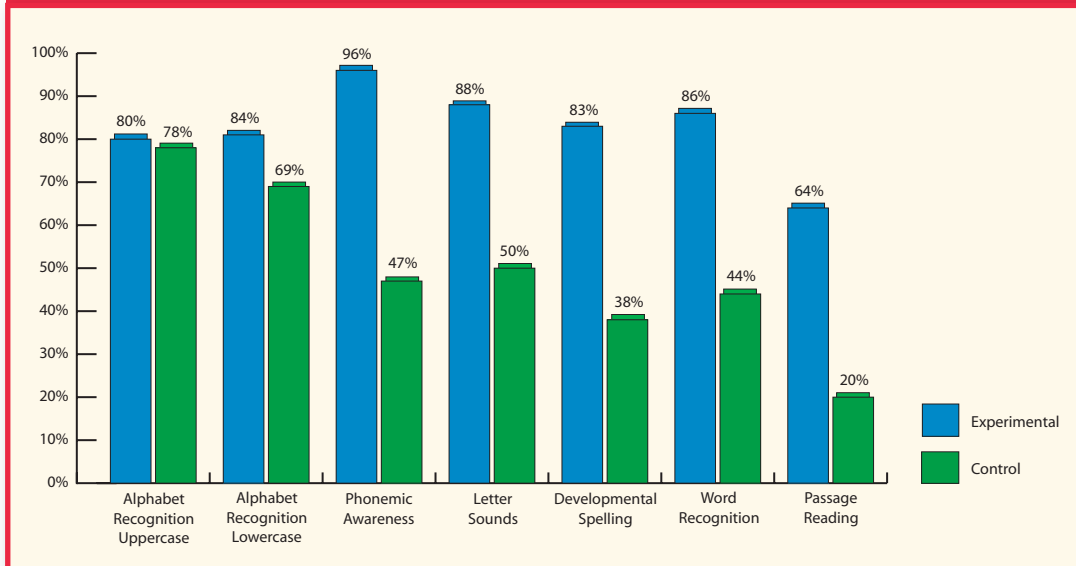
1. To determine if students originally scoring below the Target subsequently met or exceeded Target performance levels after their use of Reading Rods® Phonics.
2. To examine if students who used Reading Rods Phonics showed greater improvement from pre- to posttest in individual skill areas than students who did not have an opportunity to use the materials.
3. To study differences in student achievement based on the degree of teacher implementation of the Reading Rods Phonics materials.

ANALYSIS 1: Number of Students Crossing from Below Target on the Fall Pretest to Target-and-Above Performance on the Spring Posttest

A series of statistical (chi-square) tests were conducted to compare Experimental and Control Groups in terms of how many students scoring below Target in the fall had met or exceeded Target scores in the spring.*

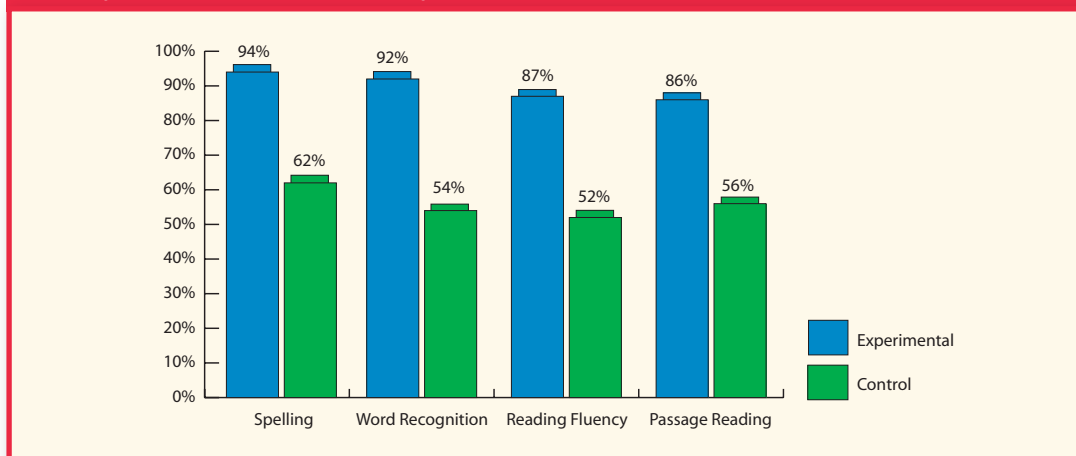
FINDING 1: On 8 of 10 ISEL** subtests used (upper- and lowercase letter recognition subtests were combined for analysis), the Experimental Group crossed from below-Target performance in the fall (49th percentile and lower) to Target-and-above performance at a higher rate than the Control Group (all chi-square tests > 9.1, $p < .005$). The differences on 8 of 10 subtests were statistically significant beyond the .05 level.

TABLE 1: Comparison of the Percents of Experimental and Control Group Students Crossing from Below Target in Fall to Target-and-Above Performance in Spring (Subsample of 12 Schools with Similar Socioeconomic Levels: Grade 1)



Substantial numbers of first grade Experimental Group students moved out of the below-Target category to either meet or exceed the Target level in the spring. This movement is most striking for the Phonemic Awareness skill, where 96 percent (74 out of 77) of students below the 50th percentile in the fall advanced to 50th percentile or above Target levels in the spring. This improvement is statistically greater than that of the Control Group [$\chi^2(1) = 31.6, p < .001$]. On the same skill, fewer than half (36 out of 71) Control Group students reached Target level. On the Letter Sounds, Developmental Spelling, and Word Recognition subtests, many more Experimental Group students reached Target levels than did Control group students (all chi-squares > 9.2, all p-values < .005).

TABLE 2: Comparison of the Percents of Experimental and Control Group Students Crossing from Below Target in Fall to Target-and-Above Performance in Spring (Subsample of 12 Schools with Similar Socioeconomic Levels: Grade 2)



For Grade 2, the percentage of fall below-Target students meeting the Target-level requirement in the spring is greater for Experimental than for Control Group students in all four skill areas tested (all chi-squares > 12.1, all p-values < .001). The greatest improvement for the Experimental Group students occurred on the Spelling subtest. The least improvement for Control Group students occurred on the Word Recognition subtest, where 36 of the 78 did not meet or pass the target in the spring.

* Raw scores needed to reach the 50th percentile were higher in the spring, reflecting the fact that the entire norming group used to set Target level scores for this test had progressed to higher skill levels by the spring.

** The Illinois Snapshot of Early Learning (ISEL) subtests used in this study for Grade 1 were Alphabet Recognition (Uppercase and Lowercase), Phonemic Awareness, Letter Sounds, Developmental Spelling, Word Recognition, and Passage Reading. Subtests used for Grade 2 were Spelling, Word Recognition, Reading Fluency, and Passage Reading.

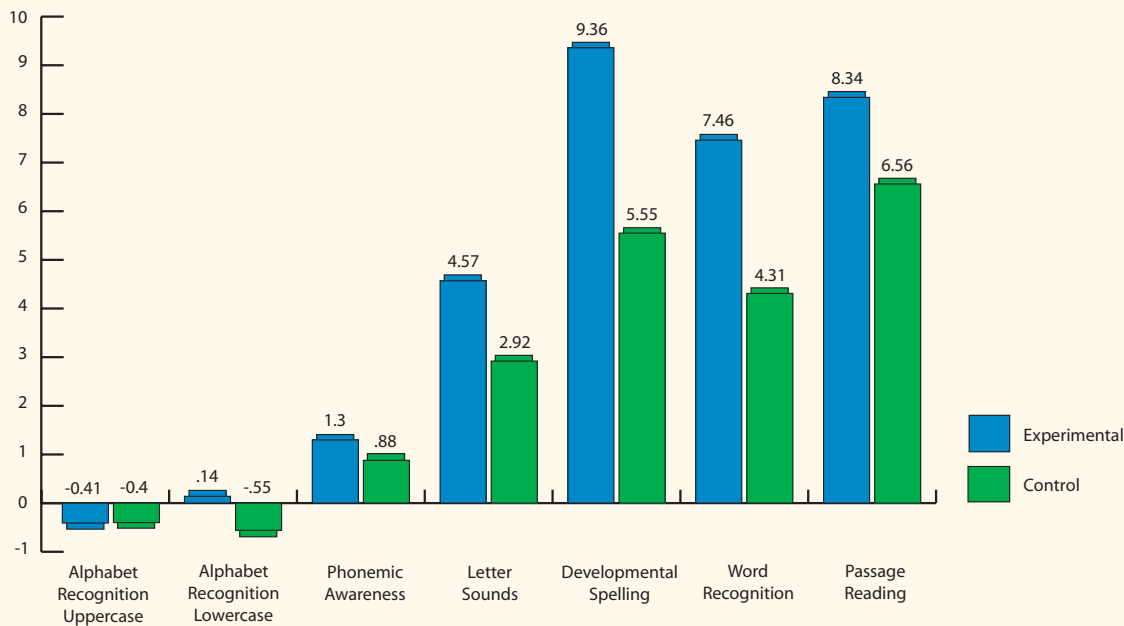
A full copy of this research report is available by contacting ETA/Cuisenaire at 800-445-5985 or online at www.eta-cuisenaire.com/readingrodsresearch

ANALYSIS 2: Comparison of Grades 1 and 2 Experimental Group and Control Group Mean Gains From Pretest to Posttest (12-School Subsample)

A series of statistical tests (analyses of variance) were conducted to compare the mean change from pretest to posttest of all students participating in the study (not just those below Target in the fall) on 11 ISEL subtests. Gains from pre- to posttest were compared to see if Experimental Group students using Reading Rods® Phonics had gains significantly greater than Control Group students.

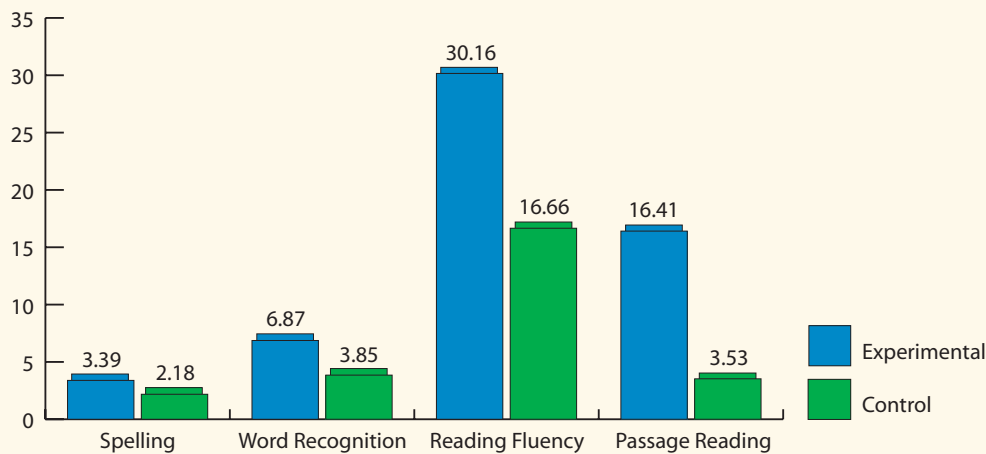
FINDING 2: Experimental Group students showed greater gains than Control Group students on nine of the ISEL component tests administered, including Spelling, Word Recognition, Accuracy of Passage Reading, and Reading Speed and Fluency (all F-tests > 4.5, $p < .04$). The differences on 9 of 11 subtests were statistically significant beyond the .05 level. The two subtests on which the Control Group and the Experimental Group did not differ were Alphabet Recognition, Uppercase and Alphabet Recognition, Lowercase. There were ceiling effects noted on these two subtests, with both groups of students achieving scores very close to the maximum possible score.

TABLE 3: Comparison of Mean Gains of Experimental and Control Groups from Pretest to Posttest (Subsample of 12 Schools: **Grade 1**)



A series of statistical tests (analyses of variance) showed that the mean change from pre-test to post-test for Grade 1 students in scores on the Letter Sounds, Developmental Spelling, Word Recognition, and Passage Reading sub-tests were significantly greater for the Experimental Group than for the Control Group (all F-tests > 14.4, p-values < .001). The Experimental Group also scored significantly better than the Control Group on Phonemic Awareness, although the difference was less than on the other sub-tests. The two groups did not differ in performance on the Alphabet Recognition sub-tests, however, the statistical test was based on far fewer score changes since most students were performing at the ceiling level on the pre-test.

TABLE 4: Comparison of Mean Gains of Experimental and Control Groups from Pretest to Posttest (Subsample of 12 Schools: **Grade 2**)



A series of statistical tests (analyses of variance) showed that the mean change from pretest to posttest for Grade 2 students in scores on all four subtests was significantly greater for the Experimental Group than for the Control Group (all F-tests > 6.1, p-values < .015). Thus, superior gains for the Experimental Group are seen in Grade 2.

ANALYSIS 3: Effect on Student Achievement Based on Degree of Teacher Implementation of Reading Rods® Phonics

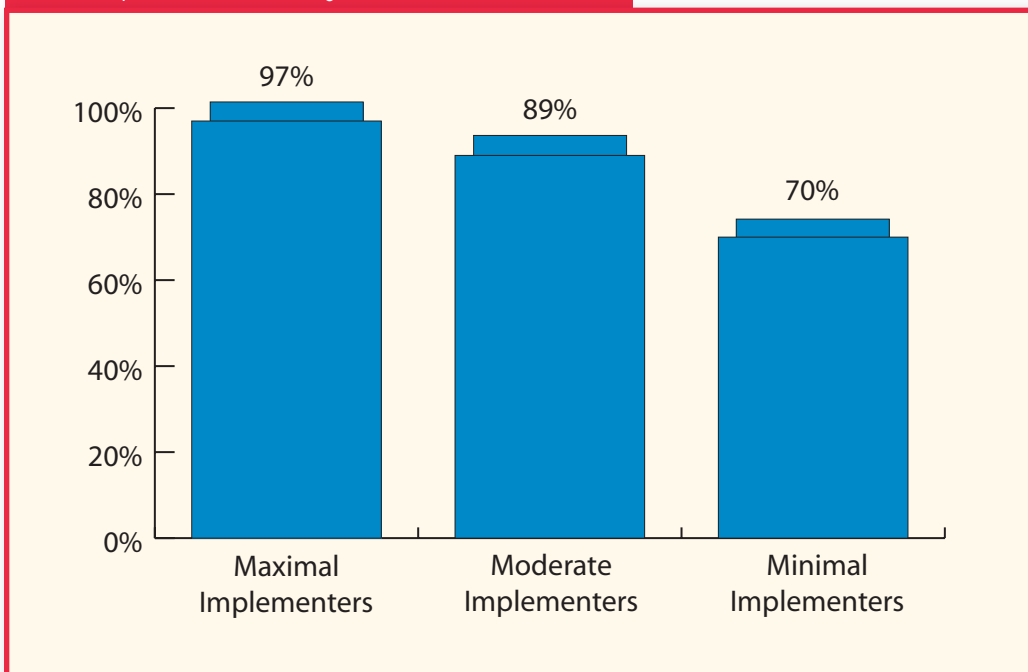
Experimental Group students were classified according to the degree of implementation their teachers made of Reading Rods Phonics materials and strategies. These were introduced during teacher orientation as a means of supplementing other instruction in ways most effective for students needing extra help.

Observers visited classrooms and interviewed teachers according to a degree-of-implementation rubric to classify them as maximal, moderate, or minimal users. The rubric classified usage based on how many times per week (1) teacher-directed modeling was employed

in small or full group lesson-unit planning; (2) students interacted in Reading Rods Phonics work; (3) students engaged in writing through journaling or book reviews; and (4) students independently used Reading Rods Phonics games.

FINDING 3: Of 27 teachers in the Experimental Group, 15 teachers were classified as maximal users, eight as moderate users, and four as minimal users, according to the rubric. Measurement of student achievement in classrooms led by these teachers indicated that maximal use of Reading Rods Phonics is associated with the movement of almost all below-Target pretesting students to score levels at or above the higher requirements to be on Target by the time of the spring posttest.

TABLE 5: Effect on Student Achievement Based on Degree of Teacher Implementation of Reading Rods Phonics



This table shows that the percentages of students crossing from below Target to above Target during the intervention period are greatest for maximally implementing teachers (97%). Of the 157 possible crossings into Target level or above by students in the classrooms of the eight moderate implementers, 139 such crossings, or 89%, actually occurred. Even in the four classrooms of minimally implementing teachers, substantial gains from pretest to posttest were made by students who achieved 62 of the 88 crossings possible, for a rate of 70%.

Recommendations Based on This Research

For Teachers—

This research study strongly indicates that Reading Rods Phonics offers powerful support to literacy instruction for all students. Students with the opportunity to work with Reading Rods Phonics activities and manipulatives experienced greater achievement, as measured by their scores on standardized tests. Reading Rods Phonics is especially effective in helping below-Target students to “catch up” and reach or exceed goals.

For Educational Administrators—

Careful consideration should be given to making the supplemental materials and strategies of Reading Rods Phonics and professional development available to teachers in ways that allow for direct focus on literacy skills. This is especially important when significant numbers of low-achieving students are served. Research indicates that exposure to lessons using Reading Rods Phonics is associated with higher test scores. Research also indicates that teachers who receive appropriate orientation in the use of Reading Rods Phonics activities and Reading Rods manipulatives, and then maximally incorporate the manipulatives into the curriculum, have students with the highest gains in student achievement.

Research Summary

Introduction

The purpose of this study was to measure the effects on standardized test scores in Grades 1 and 2 of a literacy instructional program that included the use of Reading Rods® Phonics along with teacher orientation to the effective use of these instructional materials with individual students as well as small and large groups. The findings of this study will be used to suggest appropriate ways for teachers and school administrators to support student achievement of early literacy skills.

Study Design and Methodology

During the 2004-05 school year, 534 first- and second-graders in 14 elementary schools of a large Midwestern urban school district participated in the study. These schools are of similar size and also reflect highly similar student achievement levels and racial/ethnic composition. For this study, seven schools served as the Experimental Group and the remaining seven served as the Control Group.

In each of the 14 schools, random samples of four to five students per classroom were drawn from alphabetical class lists. These students participated in pretesting in December 2004 and posttesting in June 2005 using component subtests of the Illinois Snapshot of Early Learning (ISEL)*, one of two widely used measures of student reading achievement in the urban school district studied. Subtests were selected according to assumptions of their importance in supporting future advances in literacy by the students, assumptions that Reading Rods Phonics focused on these skill areas, and research findings indicating that these skills are important components of student ability to obtain and communicate meaning through written language. A group of certificated teachers with graduate degrees and experienced in reading instruction served as third-party test administrators. The role of these professionals was intended to reduce possible distortions associated with test administration by the students' regular classroom teachers.

After the pretest was administered to each student individually, the seven schools in the Experimental Group received Reading Rods Phonics instructional materials and four hours of teacher orientation as to appropriate individual, small-group, and large-group uses of these materials. The seven schools in the Control Group participated in testing but did not receive instructional materials or teacher orientation until the study concluded.

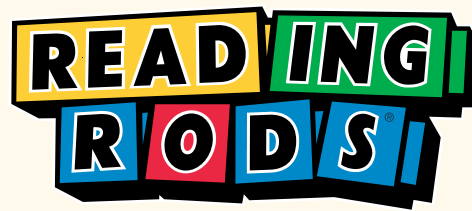
Test results were analyzed during the summer of 2005 to determine student progress between the December pretest and the June posttest. Special attention was given to the measurement of progress by students who previously failed to meet the Target level† on the pretest as defined in the ISEL Test Manual.

Additionally, observer-interviewers in this study assessed and categorized the teachers participating in the Experimental Group as maximal, moderate, or minimal users of the Reading Rods Phonics materials and instructional strategies based on a defined rubric. Results were analyzed to determine the degree to which teacher implementation of Reading Rods Phonics influenced students' test scores.

In order to more closely compare the results of the Experimental and Control Group schools with similar socioeconomic status (as measured by the percent of students qualifying for free or reduced-cost school meals), a subset of six schools from each group also was selected for separate analysis.

Full Research Report

A full copy of this research report is available by contacting ETA/Cuisenaire at 800-445-5985 or online at www.etcuisenaire.com/readingrodsresearch



What is Reading Rods® Phonics?

Designed to support the five areas of reading instruction as defined by the National Reading Panel, Reading Rods Phonics is a unique, supplemental resource that combines interlocking color-coded cubes with a variety of hands-on opportunities to learn and practice key literacy and language arts skills. At the foundation of this resource are Reading Rods—patented, color-coded manipulatives that help students identify consonants, vowels, and groupings of letters, including blends, digraphs, vowels/consonants, and 2-, 3-, and 4-letter word families. As students combine the Rods to form words, phrases, and sentences, the interlocking process reinforces the left-to-right sequencing of letters and words while the markings on the Rods indicate directionality and sequences of letters in words and words in sentences.

The Research Roots of Reading Rods

The concept for Reading Rods is based on the early literacy research of Elkonin (1973), a Russian psychologist who studied how students understand phoneme letter combinations and sentence structure by asking them to arrange tokens symbolizing Russian phonemes into meaningful combinations to be displayed in boxes. Researchers Wylie and Durrell (1970) subsequently identified 37 rimes that allow students to successfully read nearly 500 primary-level words. These rimes are addressed in Reading Rods Phonics activities. Reading Rods Phonics is also based on research findings from the National Reading Panel Report (2001) and Put Reading First (2001).

What Does This New Study Show?

This study, conducted in 2004-05, indicates that **teachers using the Reading Rods Phonics resource helped students achieve significantly higher early literacy test scores** than students who did not have the opportunity to use the resource.

The study shows...

- Reading Rods Phonics made a significant impact in helping students in the Experimental Group who were performing below the Target level "catch up" and exceed the Target score at a higher rate than the students in the Control Group.
- Instruction with Reading Rods Phonics resulted in higher literacy test scores in the Experimental Group.
- Teachers using Reading Rods Phonics more often and more consistently helped their students make larger achievement gains than those teachers who used Reading Rods Phonics less frequently or less consistently.

* The Illinois Snapshot of Early Learning (ISEL) subtests used in this study for Grade 1 were Alphabet Recognition (Uppercase and Lowercase), Phonemic Awareness, Letter Sounds, Developmental Spelling, Word Recognition, and Passage Reading. Subtests used for Grade 2 were Spelling, Word Recognition, Reading Fluency, and Passage Reading.

† Target level has been set at scores achieving or exceeding the 50th percentile of the state-wide norming group used for this test.

About the Researchers



Ward Weldon, Ph.D.

Serving as the Evaluation Advisor on the Reading Rods® Phonics research project, Dr. Ward Weldon earned his doctoral degree at Northwestern University and is an Associate Professor of Education at the University of Illinois at Chicago (UIC), where he has been a member of the faculty for 36 years.

He currently teaches in the Policy Studies Area of the College of Education at UIC and has served as the Director of the UIC Principals' Center. This Center prepares aspiring principals to meet eligibility and certification requirements for service as principals.

Dr. Weldon's research and teaching interests in the United States and several countries around the world are in the areas of school leadership, school reform, school finance, and educational program development and evaluation. He frequently serves as chair or committee member for doctoral candidates at the dissertation-writing level and has supervised dissertation research into literacy instruction, curricula, and evaluation of program effects.



Joyce E. Bristow

Serving as the Study Design Project Leader on this project, Ms. Bristow identified schools and communicated with principals regarding the purpose of the study.

Currently the Area Instruction Officer for Area 16 at the Chicago Public Schools, she provides professional development and instructional support to numerous elementary school principals, assistant principals, and leadership teams. During her career with the Chicago Public Schools, Ms. Bristow has been the Chief State Liaison Officer to the Illinois State Board of Education, oversaw and managed the citywide operation of the Academic Preparatory Centers and Middle Schools, was the Executive Assistant to the Chief Education Officer, and served as the principal of a magnet school.

A graduate of Tennessee State University, Ms. Bristow received advanced degrees from Northwestern University and Chicago State University. She is a member of the National Alliance of Black School Educators, the National Principals Association, the Association for Supervision and Curriculum Development, and several other professional organizations.

About ETA/Cuisenaire®

ETA/Cuisenaire is recognized as the premier publisher and pioneer of interactive literacy and manipulative-based education. The company's supplemental reading, math, and science resources engage students, support educators, promote partnerships with parents, and empower children to master skills and galvanize their love of learning.

Since the introduction of Reading Rods, ETA/Cuisenaire has expanded its offering of supplemental reading resources to include additional hands-on instructional materials, leveled books, computer software, professional books, and much more. These literacy solutions support the recommendations of the National Reading Panel and demonstrate the company's commitment to helping educators improve students' literacy performance and achievement.



For more information about Reading Rods® Phonics and the many other supplemental resources for literacy instruction available from ETA/Cuisenaire, contact:

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