What Works Clearinghouse

INSTITUTE OF EDUCATION SCIENCES

Elementary School Math July 2010[1]

Scott Foresman–Addison Wesley Elementary Mathematics

Program Description[2]

Scott Foresman–Addison Wesley Elementary Mathematics is a core curriculum for students at all ability levels in prekindergarten through grade 6. The program supports students' understanding of key math concepts and skills and covers a range of mathematical content across grades. The curriculum focuses on questioning strategies, problem-solving skills, embedded assessment, and exercises tailored to students of different ability levels. It provides explicit problem-solving instruction, hands-on activities, and opportunities to extend students' mathematical understanding through reading and writing connections. According to its developer, *Scott Foresman–Addison Wesley Elementary Mathematics* is aligned to the National Council of Teachers of Mathematics standards for the elementary grades.

Research[3]

Two studies of *Scott Foresman–Addison Wesley Elementary Mathematics* that fall within the scope of the Elementary School Math review protocol meet What Works Clearinghouse (WWC) evidence standards, and one study meets WWC evidence standards with reservations. The studies included more than 2,800 elementary students from grades 1 through 5 in 49 schools. The schools were located in a mix of urban, suburban, and rural settings in Connecticut, Kentucky, Minnesota, Nevada, New Jersey, New York, Ohio, Virginia, Washington, and Wyoming.[4]

Based on these three studies, the WWC considers the extent of evidence for *Scott Foresman–Addison Wesley Elementary Mathematics* on elementary students to be medium to large for math achievement.

1. This report has been updated to include reviews of seven studies that have been released since 2005. Of the additional studies, three were not within the scope of the protocol and two were within the scope of the protocol but did not meet evidence standards. A complete list and disposition of all studies reviewed are provided in the references.
2. The descriptive information for this program was obtained from a publicly available source: the program's website (http://www.pearsonschool.com; downloaded June 2010). The WWC requests developers to review the program description sections for accuracy from their perspective. Further verification of the accuracy of the descriptive information for this program is beyond the scope of this review. The literature search reflects documents publicly available by March 2009.
3. The studies in this report were reviewed using WWC Evidence Standards, Version 1.0 (see the WWC Standards), as described in protocol Version 1.1.
4. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.

Effectiveness

Scott Foresman–Addison Wesley Elementary Mathematics was found to have mixed effects on math achievement for elementary students.

	Math achievement
Rating of effectiveness	Mixed effects
Improvement index[5]	Average: –2 percentile points
	Range: –10 to +6 percentile points

Absence of conflict of interest

The Agodini et al. (2009) study summarized in this intervention report was prepared by staff of Mathematica Policy Research. Because the principal investigator for the WWC review of elementary school mathematics also is a Mathematica staff member, the study was rated by staff members from the University of Wisconsin and the Optimal Solutions Group. The intervention report was reviewed by the deputy principal investigator, a WWC Quality Assurance reviewer, and an external peer reviewer.

Additional program information

Developer and contact

Scott Foresman–Addison Wesley Elementary Mathematics was developed and is distributed by Pearson Scott Foresman, a division of Pearson Education, Inc. Address: One Lake Street, Upper Saddle River, NJ 07458. Email: communications@pearsoned.com. Web: www.pearsonschool.com. Telephone: (201) 236-7000.

Scope of use

The editions of *Scott Foresman–Addison Wesley Elementary Mathematics* reviewed in this report were published in 2004 and 2005. Information is not available on the number or demographics of students, schools, or districts using the curriculum.

Teaching

Scott Foresman–Addison Wesley Elementary Mathematics consists of teacher-led lessons that follow a check-learn-check-practice sequence, emphasizing key math concepts and skills. Teachers check students' skills prior to each lesson, introduce the lesson, and then check students' understanding during the lesson. "Practice" sections in the text permit students to further demonstrate their understanding of concepts and apply this knowledge to solving real-life problems. Lessons (typically 45–60 minutes in length) are organized into chapters that extend over two to eight weeks and use texts, workbooks, transparencies, manipulatives, and technology through group and individual activities.

Cost

The cost of *Scott Foresman–Addison Wesley Elementary Mathematics* varies based on the grade and number of components included. For the 2004 and 2005 editions, current prices range from $23.47 to $61.97 for a single student edition textbook, up to $214.47 for a single teacher's edition textbook, from $3.97 to $7.47 each for various student workbooks, and up to $409.47 for a manipulatives kit.

Research

Twelve studies reviewed by the WWC investigated the effects of *Scott Foresman–Addison Wesley Elementary Mathematics* on elementary students. Two studies (Agodini et al., 2009; Resendez & Azin, 2006) are randomized controlled trials that meet WWC evidence standards.[6] One study (Resendez & Manley, 2005) is a randomized controlled trial that meets WWC evidence standards with reservations. The remaining nine studies do not meet either WWC evidence standards or eligibility screens.

5. These numbers show the average and range of student-level improvement indices for all findings across all studies.
6. One of the three comparisons in Agodini et al. (2009) demonstrated differential attrition of more than 5 percentage points; therefore, this one comparison is rated as meeting evidence standards with reservations.

Research *(continued)*

Meets evidence standards

Agodini et al. (2009) presented results for 39 schools that had been randomly assigned to one of four conditions: *Scott Foresman–Addison Wesley Elementary Mathematics* (11 schools), *Saxon Math* (9 schools), *Investigations in Number, Data, and Space* (10 schools), and *Math Expressions* (9 schools). The analysis included 1,309 first-grade students and 131 teachers who were evenly divided among the four conditions. The study compared average spring math achievement of students in each condition. The study reported student outcomes after one school year of program implementation.

Resendez and Azin (2006) randomly assigned 39 teachers of 3rd- and 5th-grade students to *Scott Foresman–Addison Wesley Elementary Mathematics* (20 teachers) or a comparison condition (19 teachers). The analysis included approximately 850 students in the 39 classrooms. The comparison curricula included two distinct basal curricula and a school-created math program based on a number of different math materials from various resources. The study compared average student math achievement outcomes of classrooms in the intervention condition (20 classrooms) with those of the comparison condition (19 classrooms). The classroom-level means included 837 to 862 students, depending on the outcome measure used.[7] The study reported student outcomes after one year of program implementation.

Meets evidence standards with reservations

Resendez and Manley (2005) was a randomized controlled trial with severe differential attrition. The authors randomly assigned 35 teachers of 2nd- and 4th-grade students to *Scott Foresman–Addison Wesley Elementary Mathematics* (18 teachers) or a comparison condition (17 teachers) using five different elementary math programs. The analysis included 533 to 645 students, depending on the outcome measure used. The teachers in the intervention condition were in their first year of implementing the *Scott Foresman–Addison Wesley Elementary Mathematics* program. The comparison programs included chapter-based basal curricula and strand/module-based investigative curricula. The study compared math achievement outcomes of students in the intervention condition with those of the comparison condition. The study reported student outcomes after one year of program implementation.

Extent of evidence

The WWC categorizes the extent of evidence in each domain as small or medium to large (see the WWC Procedures and Standards Handbook, Appendix G). The extent of evidence takes into account the number of studies and the total sample size across the studies that meet WWC evidence standards with or without reservations.[8]

The WWC considers the extent of evidence for *Scott Foresman–Addison Wesley Elementary Mathematics* for elementary students to be medium to large for mathematics achievement.

Effectiveness

Findings

The WWC review of interventions for elementary school mathematics addresses student outcomes in the domain of overall mathematics achievement. The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *Scott Foresman–Addison Wesley Elementary Mathematics* on elementary students.[9]

7. Number of students indicates the number posttested.
8. The extent of evidence categorization was developed to tell readers how much evidence was used to determine the intervention rating, focusing on the number and size of studies. Additional factors associated with a related concept—external validity, such as the students' demographics and the types of settings in which studies took place—are not taken into account for the categorization. Information about how the extent of evidence rating was determined for *Scott Foresman-Addison Wesley Elementary Mathematics* is in Appendix A6.
9. The level of statistical significance was reported by the study authors or, when necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For an explanation about the clustering connection, see the WWC Tutorial on Mismatch. For the formulas the WWC used to calculate the statistical significance, see WWC Procedures and Standards Handbook, Appendix C for clustering and WWC Procedures and Standards Handbook, Appendix D for multiple comparisons. In the case of Agodini et al. (2009), no corrections for clustering or multiple comparisons were needed. In the case of Resendez and Azin (2006), corrections for multiple comparisons were needed, and in the case of Resendez and Manley (2005), a correction for multiple comparisons was needed, so the significance levels may differ from those reported in the original studies.

Effectiveness *(continued)*

Agodini et al. (2009) reported, and the WWC confirmed, statistically significant negative effects of the *Scott Foresman–Addison Wesley Elementary Mathematics* program on the Early Childhood Longitudinal Study–Kindergarten (ECLS-K) Math Assessment, when compared to *Saxon Math* or *Math Expressions*. The study also reports no significant effects of *Scott Foresman–Addison Wesley Elementary Mathematics* on the ECLS-K Math Assessment when compared to *Investigations in Number, Data, and Space*.

Resendez and Azin (2006) reported no statistically significant effects of the *Scott Foresman–Addison Wesley Elementary Mathematics* program on either the TerraNova Math Total or the TerraNova Math Computation scores. The average effect across the two outcome measures in Resendez and Azin (2006) was not large enough to be considered substantively important according to WWC criteria (i.e., an effect size of at least 0.25).

Resendez and Manley (2005) reported no statistically significant effects of the *Scott Foresman–Addison Wesley Elementary Mathematics* program on either the TerraNova Math Total or the TerraNova Math Computation scores. The average effect across the two outcome measures in Resendez and Manley (2005) was not large enough to be considered substantively important according to WWC criteria (i.e., an effect size of at least 0.25).

In summary, one study showed statistically significant negative effects and two studies showed indeterminate effects.

Rating of effectiveness

The WWC rates the effects of an intervention in a given outcome domain as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative. The rating of effectiveness takes into account four factors: the quality of the research design, the statistical significance of the findings, the size of the difference between participants in the intervention and the comparison conditions, and the consistency in findings across studies (see the WWC Procedures and Standards Handbook, Appendix E).

The WWC found *Scott Foresman–Addison Wesley Elementary Mathematics* to have mixed effects for mathematics achievement for elementary students

Improvement index

The WWC computes an improvement index for each individual finding. In addition, within each outcome domain, the WWC computes an average improvement index for each study and an average improvement index across studies (see WWC Procedures and Standards Handbook, Appendix F). The improvement index represents the difference between the percentile rank of the average student in the intervention condition and the percentile rank of the average student in the comparison condition. Unlike the rating of effectiveness, the improvement index is entirely based on the size of the effect, regardless of the statistical significance of the effect, the study design, or the analysis. The improvement index can take on values between –50 and +50, with positive numbers denoting favorable results for the intervention group.

The average improvement index for mathematics achievement is –2 percentile points across the three studies, with a range of –10 to +6 percentile points across findings.

Summary

The WWC reviewed 12 studies on *Scott Foresman–Addison Wesley Elementary Mathematics* for elementary students. Two of these studies meet WWC evidence standards; one study meets WWC evidence standards with reservations; the remaining nine studies do not meet either WWC evidence standards or eligibility screens. Based on the three studies, the WWC found mixed effects in mathematics achievement for elementary students. The conclusions presented in this report may change as new research emerges.

References

Meets WWC evidence standards

Agodini, R., Harris, B., Atkins-Burnett, S., Heaviside, S., Novak, T., & Murphy, R. (2009). *Achievement effects of four early elementary school math curricula: Findings from first graders in 39 schools* (NCEE 2009-4052). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

Resendez, M., & Azin, M. (2006). *2005* Scott Foresman–Addison Wesley Elementary Math *randomized control trial: Final report.* Jackson, WY: PRES Associates, Inc.

Additional source:

Resendez, M., & Sridharan, S. (2006). *Technical report: A study on the effectiveness of the 2005* Scott Foresman–Addison Wesley Elementary Math *program*. Jackson, WY: PRES Associates, Inc.

Meets WWC evidence standards with reservations

Resendez, M., & Manley, M. A. (2005). *Final report: A study on the effectiveness of the 2004* Scott Foresman–Addison Wesley Elementary Math *program*. Jackson, WY: PRES Associates, Inc.

Additional source:

Resendez, M., & Sridharan, S. (2005). *Technical report: A study on the effectiveness of the 2004* Scott Foresman–Addison Wesley Elementary Math *program*. Jackson, WY: PRES Associates, Inc.

Studies that fall outside the Elementary School Math review protocol or do not meet WWC evidence standards

Cambium Learning, Inc. (2006). *An evaluation of Voyages mathematics, Fairview public schools 2005–2006: Technical report.* Natick, MA: Author. The study does not meet WWC evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.

Cummins-Colburn, B. J. L. (2007). Differences between state-adopted textbooks and student outcomes on the Texas Assessment of Knowledge and Skills examination (Doctoral dissertation, Touro University International). *Dissertation Abstracts International, 68*(06A), 168–2299. The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.

Gatti, G. G. (2004). Scott Foresman–Addison Wesley Math *national effect size study.* Upper Saddle River, NJ: Pearson Education. The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.

Jitendra, A. K., Deatline-Buchman, A., & Sczesniak, E. (2005). A comparative analysis of third-grade mathematics textbooks before and after the 2000 NCTM standards. *Assessment for Effective Intervention, 30*(2), 47–62. The study is ineligible for review because it does not examine the effectiveness of an intervention.

Klein, D. (2000). *High achievement in mathematics: Lessons from three Los Angeles elementary schools.* Washington, DC: Brookings Institution Press. The study is ineligible for review because it does not use a comparison group.

Simpson, N. (2001). *Scott Foresman California Mathematics validation study pretest–posttest results*. Sacramento, CA: Pearson Scott Foresman. The study is ineligible for review because it does not use a comparison group.

Slavin, R. E., & Lake, C. (2007). Effective programs in elementary mathematics: A best-evidence synthesis. *The Best Evidence Encyclopedia.* Retrieved April 21, 2008, from http://www.bestevidence.org/word/elem_math_Feb_9_2007.pdf. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.

Additional source:

Effective programs for elementary mathematics: A best evidence synthesis. Educator's summary. (2009). Retrieved

References

March 30, 2009, from http://www.bestevidence.org/word/elem_math_Mar_11_2009_sum.pdf.

Triantos, L. M. (2005). *The aftermath of implementing a standards-based curriculum in a K–8 district: Is there a correlation between hands-on instruction and math scores?* Unpublished master's thesis, Rowan University, Glassboro, NJ. The study is ineligible for review because it does not use a comparison group.

WESTAT. (2003). *Analysis of field testing for* Scott Foresman–Addison Wesley Mathematics *2004*. Rockville, MD: Author. The study is ineligible for review because it does not include a student outcome.