What Works Clearinghouse

INSTITUTE OF EDUCATION SCIENCES

Elementary School Math Revised April 30, 2007

Saxon Elementary School Math

Program description

Saxon Elementary School Math, published by Harcourt Achieve, is a core curriculum for students in kindergarten through grade 5. A distinguishing feature of *Saxon Elementary School Math* is its use of a distributed approach, as opposed to a chapter-based approach, for instruction and assessment. The program is built on the premise that students learn best when instruction is incremental and explicit, previously learned concepts are continually reviewed, and assessment is frequent and cumulative. At each grade level, math concepts are introduced, reviewed, and practiced over time in order to move students from understanding to mastery to fluency. For grades K–3, the *Saxon Elementary School Math* curriculum emphasizes hands-on activities and teacher-directed math conversations that engage students in learning. The curriculum for grades 4–5 also uses math conversations to introduce new concepts, but shifts the focus to student-directed learning.

Research

One study of the *Saxon Elementary School Math* program met the What Works Clearinghouse (WWC) evidence standards with reservations. The study included students in grades 1–8 from a range of socioeconomic backgrounds and attending 342 schools across the state of Georgia. This report focuses only on findings for grades 1–5.[1]

The WWC considers the extent of evidence for *Saxon Elementary School Math* to be small for math achievement.

Effectiveness

Saxon Elementary School Math was found to have no discernible effects on math achievement.

	Math achievement
Rating of effectiveness	No discernible effects
Improvement index[2]	na

na = not applicable

1. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.
2. The student-level improvement index could not be computed for *Saxon Elementary School Math*.

Additional program information

Developer and contact

Saxon Elementary School Math was developed by Saxon Publishers, an imprint of Harcourt Achieve. Address: 6277 Sea Harbor Drive, Orlando, Florida 32887. Email: info@SaxonPublishers.com. Web: http://saxonpublishers.harcourtachieve.com. Telephone: (800) 284-7019.

Scope of use

The first Saxon textbook, *Saxon Algebra,* was published in 1979 by John Saxon for junior college students. In 1980, a high school version, *Algebra 1,* was published. In 1981, the program was tested by 20 teachers with approximately 1,400 students. By 1993, the company had become Saxon Publishers and developed programs for kindergarten through high school. Information is not available on the number or demographics of students, schools, or districts using this intervention.

Teaching

Daily lessons in grades 1–3 consist of three components: 1) the meeting, 2) the math lesson, and 3) the written practice, which includes guided class practice and homework. A typical lesson begins with the meeting where students engage in various practical activities (for example, understanding calendars), and enter into math conversations and dialogue with the class and teacher to communicate their understanding of math concepts. Following the meeting, the teacher begins the math lesson in which new concepts are introduced. Hands-on activities are incorporated into the math lesson to encourage student involvement and further the learning of new concepts. The math lesson is followed by written practice, which includes teacher-facilitated guided class practice of newly and previously learned concepts. The day's homework is completed by the students independently. Cumulative and written assessments occur every five lessons. In kindergarten, these components may be separated into different sessions, and assessments are conducted as individual interviews between the teacher and individual students.

For grades 4 and 5, a daily lesson consists of four components: 1) warm-up, 2) lesson introducing new math concept, 3) practice on new concept, and 4) mixed practice including new and previously learned concepts. Students are introduced to concepts incrementally, given opportunities for continual review and practice, and assessed cumulatively and frequently. An assessment score of 80% or lower indicates a need for remediation, and provision for remediation is part of the program.

Cost

Saxon Elementary School Math grades 1–3 can be ordered as a 24-student or 32-student kit that includes all of the teacher, lesson, classroom and student materials. The student kits range from over $600 to over $800 depending on the size of the kit. Individual kit components, such as manipulatives, workbooks, student texts, teacher manuals, and materials in Spanish, can be purchased separately. Grades 4 and 5 have a separate student edition ($50–$55) and teacher manual set ($185). Other ancillary materials, such as black line master books, fact practice workbooks, and a test practice generator, can be purchased separately.

Research

Seven studies reviewed by the WWC investigated the effects of *Saxon Elementary School Math.* One study (Resendez & Manley, 2005) was a quasi-experimental design that met WWC evidence standards with reservations. The remaining six studies did not meet WWC evidence screens.

Resendez & Manley (2005) conducted a retrospective study that included 170 intervention schools in Georgia and 172 comparison schools that were matched to the intervention schools on student demographics, geographical location, and baseline math performance on Georgia's Criterion-Referenced Competency Test (CRCT). The intervention schools used the *Saxon Elementary School Math* program recommended for each grade level in grades 1–8 between 2000 (or prior) and 2005. The comparison schools used a variety of non-*Saxon* curricula. The majority of comparison schools used traditional basal math curricula. One third of the schools used a mix of basal, investigative,

Research *(continued)*

and other approaches, and a small percentage used an investigative approach to teaching math. This intervention report presents findings for grades 1–5 on Georgia's Criterion-Referenced Competency Test (CRCT).

Extent of evidence

The WWC categorizes the extent of evidence in each domain as small or moderate to large (see the What Works Clearinghouse Extent of Evidence Categorization Scheme). The extent of evidence takes into account the number of studies and the total sample size across the studies that met WWC evidence standards with or without reservations.[3]

The WWC considers the extent of evidence for *Saxon Elementary School Math* to be small for math achievement.

Effectiveness

Findings

The WWC review of elementary school mathematics curriculum-based interventions addresses student outcomes in overall math achievement.

Resendez & Manley (2005) reported no significant effects of the *Saxon Elementary School Math* program on overall math achievement at grades 1–5. Using school-level data provided by the authors, the WWC confirmed that *Saxon Elementary School Math* did not have a statistically significant effect on math achievement at each grade level from first to fifth grade. Based on this study finding, the WWC categorized *Saxon Elementary School Math* as having no discernible effects on overall math achievement.

The WWC also calculated effect sizes and significance levels for subtests of the Georgia CRCT using school-level data provided by the authors. The WWC found significant effects of *Saxon Elementary School Math* on patterns, relations, and algebra at grade 2. For grade 4 the WWC found statistically significant effects of *Saxon Elementary School Math* on computations and estimation, and problem solving. Subtest results were not included in the WWC's rating of effectiveness.

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 (as calculated by the WWC[4]), the size of the difference between participants in the intervention and the comparison conditions, and the consistency in findings across studies (see the WWC Intervention Rating Scheme).

The WWC found *Saxon Elementary School Math* to have no discernible effects on math achievement

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 as well as an average improvement index across studies (see the Technical Details of WWC-Conducted Computations). The improvement index represents the difference between the percentile rank of the average student in the intervention condition versus the percentile rank of the average student in the comparison condition. Unlike the rating of effectiveness, the improvement index is based entirely on the size of the effect, regardless of the statistical significance of the effect, the study design, or the

3. 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 students' demographics and the types of settings in which studies took place, are not taken into account for the categorization.
4. The level of statistical significance was reported by the study authors or, where necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For an explanation, see the WWC Tutorial on Mismatch. See the Technical Details of WWC-Conducted Computations for the formulas the WWC used to calculate the statistical significance. In the case of Saxon Elementary School Math, no corrections for clustering or multiple comparisons were needed.

The WWC found *Saxon Elementary School Math* to have no discernible effects on math achievement *(continued)*

analysis. The improvement index can take on values between –50 and +50, with positive numbers denoting favorable results. The average and range of the student-level improvement index could not be computed because student-level standard deviations were not available for the single study reviewed.

Summary

The WWC reviewed seven studies on *Saxon Elementary School Math.* One of these studies met WWC standards with reservations and the remaining studies did not meet WWC evidence screens. This study found no discernible effects on math achievement. The evidence presented in this report may change as new research emerges.

References

Met WWC standards with reservations

Resendez, M., & Manley, M. A. (2005). *The relationship between using Saxon Elementary and Middle School Math and student performance on Georgia statewide assessments.* Orlando, FL: Harcourt Achieve.

Did not meet WWC evidence screens

Calvery, R., Bell, D., & Wheeler, G. (1993, November). *A comparison of selected second and third graders' math achievement: Saxon vs. Holt.* Paper presented at the meeting of the Mid-South Educational Research Association, New Orleans, LA.[5]

Fahsl, A. J. (2001). An investigation of the effects of exposure to Saxon math textbooks, socioeconomic status and gender on math achievement scores. *Dissertation Abstracts International 62*(08), 2671A. (UMI No. 3021615)[6]

Hansen, E., & Greene, K. (2000). *A recipe for math: What's cooking in the classroom: Saxon or Traditional?* Retrieved May 4, 2006 from http://www.secondaryenglish.com/recipeformath.html[5]

Klein, D. (2000). *High achievement in mathematics: Lessons from three Los Angeles elementary schools.* Washington, DC: Brookings Institution Press.[7]

Nguyen, K., Elam, P., & Weeter, R. (1993). *The 1992–93 Saxon mathematics program evaluation report.* Oklahoma City: Oklahoma City Public Schools.[8]

Plato, J. (1998). *An evaluation of Saxon math at Blessed Sacrament School.* Retrieved May 4, 2006 from the University of Illinois, College of Education Web site: http://lrs.ed.uiuc.edu/students/plato1/Final.html[7]

For more information about specific studies and WWC calculations, please see the WWC *Saxon Elementary School Math* Technical Appendices.

5. Does not use a strong causal design: the study, which used a quasi-experimental design, did not establish that the comparison group was equivalent to the treatment group at the baseline in a pretest measure of math achievement.
6. Does not use a strong causal design: the study did not use a comparison group.
7. Does not use a strong causal design: this is a qualitative study.
8. Disruption: the study, which used a quasi-experimental design, demonstrated problems with disruption or contamination.