

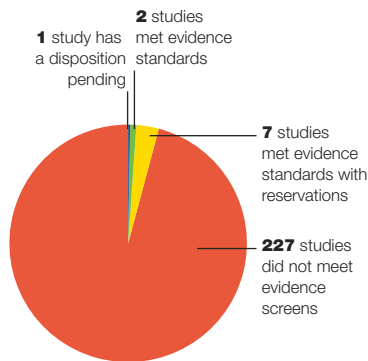
What Works Clearinghouse



Elementary School Math

July 16, 2007

WWC identified 237 studies of 73 curricula



The What Works Clearinghouse (WWC) looked at elementary school math curricula designed to promote math knowledge and skills among elementary school students (average ages 5 to 10 years).¹ Because there is some variation in how elementary school is organized across school districts, this review defined elementary school as a school with any of the grades, K through 5. Curricula included in this review are replicable, materials-based instructional programs that cover one or more of the following content areas: numbers, arithmetic, geometry, pre-algebra, measurement, graphing, and logical reasoning. This review considered only core, comprehensive math curricula.² Core math curricula are defined as instructional programs that extend over the course of one semester or more, are central to students’ regular school instruction, and are based on any combination of text materials, manipulatives, computer software, videotapes, and other materials. This review focuses on student achievement in mathematics as the key outcome.

The findings in this topic report summarize the first wave of WWC elementary school math intervention reports produced in 2006–07. We looked at 340 studies. Of these, 237 were assessments of interventions that qualified for our review; the other 103 could not be categorized by intervention.³ Of the 237 studies, 9 studies of 5 curricula met our evidence standards, 2 without reservations and 7 with reservations. Altogether, the WWC looked at 73 interventions: 5 had studies that met WWC standards with or without reservations, 67 had studies that did not meet WWC evidence screens, and 1 had a single-case study, which is still under review. (The identification of eligible programs ended in September 2005, and that of eligible studies, in July 2006.)

In looking at the one outcome domain for the five elementary school math curricula:

- *Everyday Mathematics* had potentially positive effects on math achievement. +

Four other curricula had no discernible effects on math achievement.

This review summarizes the first wave of intervention reports produced in 2006–07.
<http://ies.ed.gov/ncee/wwc/>

1. Findings for math interventions for the middle school level are available in the [WWC Middle School Math Topic Report](#).
2. Supplemental math interventions may be considered at a later date.
3. One of the 237 studies is a single-case study, which is still under review. The WWC is currently developing standards for the review of single-case studies.






Intervention Ratings for Elementary School Math

Each elementary school math program that had at least one study meeting WWC standards (with or without reservations) received a rating of effectiveness for math achievement. The rating aims to characterize the existing evidence, taking into account the quality of the research design, the statistical significance of the findings, the size of the difference in mean outcomes between students in the

intervention and comparison conditions, and the consistency in findings across studies.

The research can be rated as positive, potentially positive, mixed, no discernible effects, potentially negative, or negative (see the [WWC Intervention Rating Scheme](#)). Table 1 shows the effectiveness ratings and extent of evidence for the five elementary school math curricula.

Table 1 Effectiveness ratings for 5 programs for math achievement

Intervention	Rating of effectiveness	Extent of evidence
Everyday Mathematics® (www.wrightgroup.com)		Medium to large
Houghton Mifflin Mathematics (www.hmco.com)		Medium to large
Progress in Mathematics © 2006 (www.sadlier-oxford.com/math/index.cfm)		Small
Saxon Elementary School Math (http://saxonpublishers.harcourtachieve.com)		Small
Scott Foresman-Addison Wesley Elementary Mathematics (www.scottforesman.com)		Small

Note: WWC intervention reports describe each curriculum and provide information on the students, cost, and scope of use. To view the intervention reports, please click on the program name or go to <http://ies.ed.gov/ncee/wwc/>. Following each curriculum name is the developer's website address. The research evaluated addresses some but not all grade levels targeted by these curricula. Grade levels are related to student age and may affect outcomes. For a comparison of targeted grade levels and grade levels in the studies reviewed by the WWC, see Appendix A2.

Key

	Positive effects: strong evidence of a positive effect with no overriding contrary evidence		Potentially positive effects: evidence of a positive effect with no overriding contrary evidence		Mixed effects: evidence of inconsistent effects		No discernible effects: no affirmative evidence of effects		Potentially negative effects: evidence of a negative effect with no overriding contrary evidence		Negative effects: strong evidence of a negative effect with no overriding contrary evidence
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Average improvement indices

The WWC computes an average improvement index for each study as well as an average improvement index across studies of the same intervention (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 and the percentile rank of the average student in the comparison condition. It can take on values between -50 and +50, with positive numbers denoting results favorable to the intervention group. Unlike the rating of effectiveness, which is based on four factors, the improvement index is based only on the size of the difference between the intervention and comparison conditions.

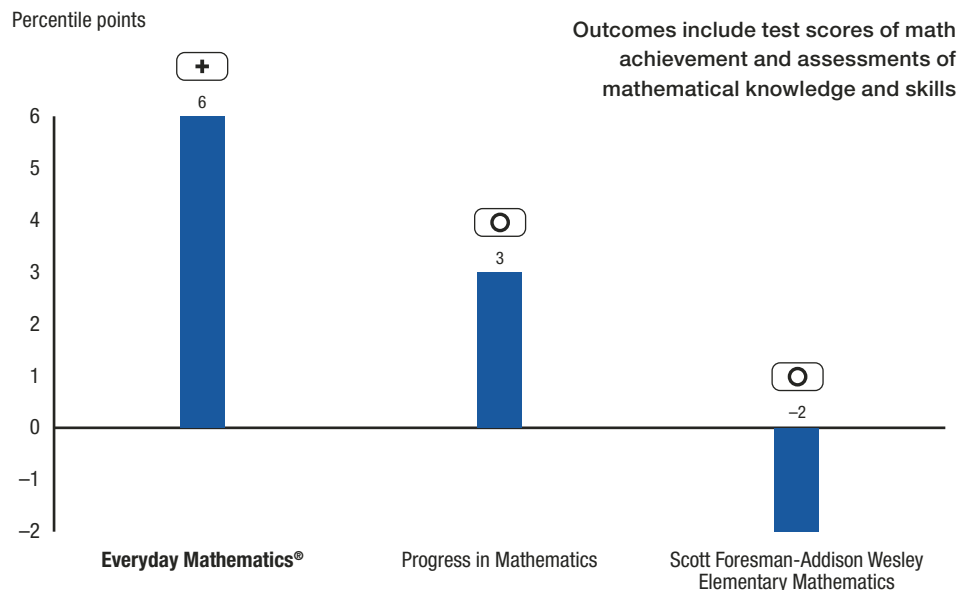
Math achievement

Math achievement is measured by three types of student outcome measures:

1. Standardized, nationally normed achievement tests that are appropriate for elementary students (TerraNova CTBS, Iowa Test of Basic Skills)
2. Standardized state or local tests of math achievement (Massachusetts Comprehensive Assessment System)
3. Research-based or locally developed tests or instruments that assess students' mathematical knowledge or skills.

We reviewed evidence of the effects on math achievement outcomes for five programs and, for these five, the average improvement index ranged from -2 to +6 percentile points (figure 1).

Figure 1 Math achievement: average improvement⁴



Note: Bold text indicates interventions with a medium to large extent of evidence.

4. To enable comparisons across interventions, improvement indices are calculated from student-level findings only. A student-level improvement index could not be computed for some of the findings for *Everyday Mathematics*. Two additional programs reviewed by the WWC (*Houghton Mifflin Math* and *Saxon Elementary School Math*) are not represented in this figure because student-level improvement indices could not be computed for any of the findings. For further details, please see [Technical Details of WWC-Conducted Computations](#).

Table 2 Curricula reviewed with no studies meeting WWC evidence screens⁵

Accelerated Math (http://www.renlearn.com)	MathSteps (http://www.eduplace.com/math/mathsteps/)
Adventures of Jasper Woodbury Series (http://peabody.vanderbilt.edu/projects/funded/jasper/Jasperhome.html)	MathWings by the Success for All Foundation[®] (http://www.successforall.net/elementary/mathwings.htm)
Als speciale kleuter tel je ook me! (Young Children with Special Needs Count, Too!) (no website available)	Moving with Math (http://www.movingwithmath.com/)
Appalachia Model Mathematics Program (no website available)	Mystery Motivator (no website available)
Barrett Math Program (no website available)	New Century Integrated Instructional System (http://www.ncecorp.com/mathematics.htm)
Bridges in Mathematics (http://www.mathlearningcenter.org/curriculum/bridges/about.asp)	New Century Mathematics (http://www.ncecorp.com/mathematics.htm)
Computer Assisted Instruction (no website available)	Number Power[®] (http://www.devstu.org/number_power/index.html)
Compass Learning (http://www.compasslearning.com)	Numeracy Recovery (no website available)
Computer Curriculum Corporation (CCC) (now Pearson Digital Learning, http://www.pearsondigital.com)	Opening Eyes to Mathematics by The Math Learning Center (http://www.mathlearningcenter.org/curriculum/elementary/open-eyes.asp)
Computer Managed Mastery Learning (no website available)	Orton-Gillingham[®] technique (http://www.orton-gillingham.com/)
Connecting Math Concepts (CMC) mathematics program (https://www.sraonline.com/products.html?&tid=10&sid=58)	Personalized System of Instruction (PSI) (no website available)
Consistency Management[®] (http://www.coe.uh.edu/cmcd/default.cfm)	Piacceleration Instruction (no website available)
Core Knowledge Curriculum (http://www.coreknowledge.org/CK/index.htm)	PLATO (http://www.plato.com/)
Countdown Video IGAP Intervention Tape (no website available)	Project 2000 (no website available)
Criterion Referenced Curriculum (CRC) (no website available)	Project MAS (no website available)
Des Moines Plan (no website available)	Project SEED (http://www.projectseed.org/)
Digi-Block[®] Learning System (http://www.digi-block.com/)	Project Teach and Reach (no website available)
Florida Primary Education Program (no website available)	Rational Number Project (http://www.education.umn.edu/rationalnumberproject/)
FUNDamentallyMATH[®] (http://www.fundamentallymath.com/)	Richmond Young Students Mathematics (no website available)
Geo-Logo, by Investigations in Number, Data, and Space[®] (http://investigations.terc.edu/index.cfm)	Rutgers-Kenilworth Program (no website available)
Growing With Mathematics (http://www.wrightgroup.com/index.php)	Sharon Wells Mathematics Curriculum (http://www.sharonwellsmath.com/)
Holt Mathematics (http://www.hrw.com/math/)	Silver Burdett Ginn Mathematics (http://www.sbgmath.com/)

(continued)

Table 2 Curricula reviewed with no studies meeting WWC evidence screens⁵ (continued)

Investigations in Number, Data, and Space [®] (http://investigations.terc.edu/)	Singapore Mathematics (http://www.singaporemath.com/)
Jostens Integrated Learning System (no website available)	Skills Reinforcement Project (no website available)
Knowing Mathematics (http://www.eduplace.com/intervention/knowningmath/)	Strategic Math Series (http://www.ku-crl.org/sim/strategies/math.shtml)
Kumon Mathematics Program (http://www.kumon.com/)	Successmaker (http://www.pearsondigital.com/successmaker/)
Lightspan Achieve Now (http://www.plato.com/Elementary-Solutions/Elementary-Mathematics/PLATO-Achieve-Now-Mathematics.aspx)	Teacher to Teacher Math Problem Solving Supplementary Curriculum (http://www.teachertoteacher.com/)
Logo (no website available)	Thinking Mathematics (http://www.aft.org/pubs-reports/downloads/teachers/ESEA_MATH.pdf)
Math Renaissance [®] (http://www.renlearn.com)	TIPS: Math (Teachers Involve Parents in Schoolwork) (http://www.csos.jhu.edu/P2000/tips/index.htm)
Math Trailblazers (http://www.mathtrailblazers.com/)	TouchMath [®] (http://www.touchmath.com/)
Mathematics in Action (textbook published by MacMillan) (no website available)	Visual Mathematics by The Math Learning Center (http://www.mathlearningcenter.org/curriculum/highschool/visual-math.asp)
Mathematics Plus (textbook series published by Harcourt)	Voyages (http://www.metrotlc.com/)
Mathematics Their Way [®] (http://www.center.edu)	Wasatch Interactive Learning ⁶ (http://www.plato.com/)
Mathematics Today by Harcourt Brace (no website available)	
MathFact (no website available)	

Note: Following each program name is the developer’s website address.

- The table includes all eligible programs with no studies meeting evidence standards. The only study evaluating the *Criterion Referenced Curriculum (CRC)* shown above had a single-case study and is still under review. The WWC is currently developing standards for the review of single-case studies.
- Wasatch Interactive Learning was acquired by PLATO Learning, Inc. in April, 2001. Wasatch courseware is now marketed and sold under the PLATO brand name.

For more information about the studies reviewed and WWC methodology, please see the [WWC Elementary School Mathematics Technical Appendices](#).