

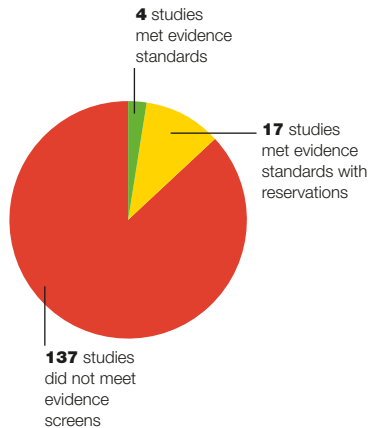
# What Works Clearinghouse



Middle School Math

July 30, 2007

WWC identified 158 empirical studies of 34 middle school math programs



The What Works Clearinghouse (WWC) reviewed interventions to promote middle school students’ math knowledge and skills.<sup>1</sup> Because there is some variation in how school districts organize middle school, we considered curricula aimed at students in grades 6 through 9, covering one or more of the following content areas: numbers and operations, algebra, geometry, measurement, and data analysis and probability. Only core, comprehensive math curricula were eligible for inclusion in this review.<sup>2</sup> These curricula 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.

We looked at 361 studies. Of these, 203 appeared to be studies of practices or other interventions that did not qualify for our review. Of the 158 remaining studies, 21 studies of 7 curricula met our evidence standards, 4 without reservations and 17 with reservations. Altogether, the WWC looked at 34 interventions: 7

had studies that met WWC standards with or without reservations and 27 had studies that did not meet WWC evidence screens. No eligible studies were identified for an additional 16 programs at the time of this review. (The identification of eligible programs ended in September 2005, and that of eligible studies in July 2006.)

The WWC rated the effectiveness of middle school math curricula based on the available research evidence. In looking at math achievement for the 7 curricula:

- *I Can Learn® Pre-Algebra and Algebra* had positive effects. **++**
- *Saxon Middle School Math* had positive effects. **++**
- *Cognitive Tutor* had potentially positive effects. **+**
- *The Expert Mathematician* had potentially positive effects. **+**
- *UCSMP Algebra* had potentially positive effects. **+**

Two other curricula had mixed effects on math achievement. **+ -**

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








1. Findings for math programs for the elementary school level are available in the [WWC Elementary School Math Topic Report](#).  
 2. Supplemental math programs may be considered at a later date.

## Intervention Effectiveness Ratings for Middle School Math

Each middle school math curriculum that had at least one study meeting WWC standards (with or without reservations) received a rating of effectiveness in 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 between the average math achievement for

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

The research evidence 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 for the 7 middle school math curricula.

Intervention name	Rating of effectiveness	Extent of evidence
<b>Cognitive Tutor® Algebra I</b> ( <a href="http://www.carnegielearning.com">http://www.carnegielearning.com</a> )		Medium to large
<b>Connected Mathematics Project (CMP)</b> ( <a href="http://connectedmath.msu.edu">http://connectedmath.msu.edu</a> )		Medium to large
<b>I CAN Learn® Pre-Algebra and Algebra</b> ( <a href="http://www.icanlearn.com">www.icanlearn.com</a> )		Medium to large
<b>Saxon Middle School Math</b> ( <a href="http://saxonpublishers.harcourtachieve.com/en-US/saxonpublishers.htm">http://saxonpublishers.harcourtachieve.com/en-US/saxonpublishers.htm</a> )		Medium to large
<b>The Expert Mathematician</b> ( <a href="http://www.expertmath.org">www.expertmath.org</a> )		Small
<b>Transition Mathematics</b> ( <a href="http://www.phschool.com/atschool/ucsmc/index.html">http://www.phschool.com/atschool/ucsmc/index.html</a> )		Medium to large
<b>University of Chicago School Mathematics Project (UCSMP) Algebra</b> ( <a href="http://www.phschool.com/atschool/ucsmc/index.html">http://www.phschool.com/atschool/ucsmc/index.html</a> )		Medium to large

**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
---	---	---	--	---	---	---	--	---	--	---	---

## 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 the comparison conditions.

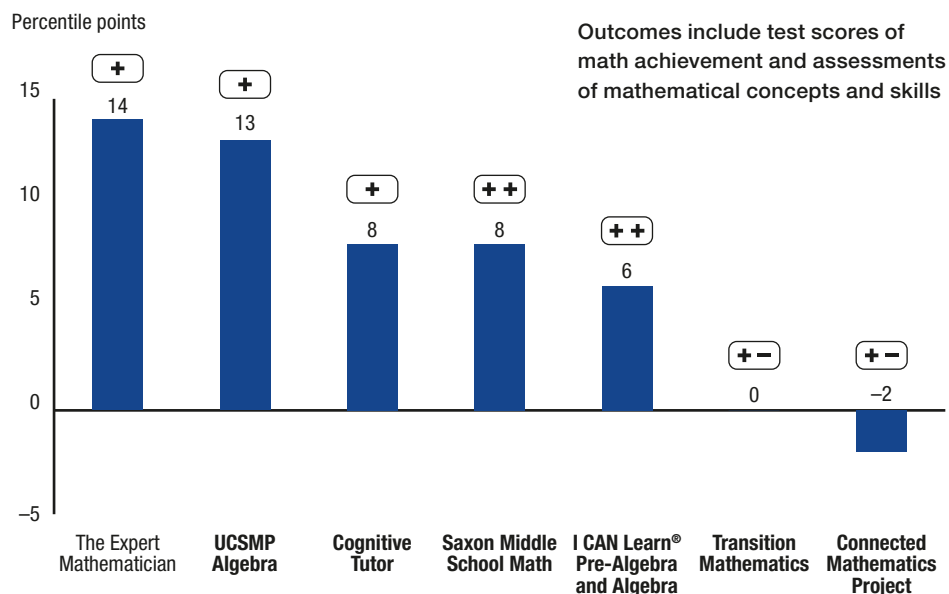
## Math achievement

Math achievement includes three types of outcome measures:

- Standardized, nationally normed achievement tests that are appropriate for elementary students (e.g., Comprehensive Test of Basic Skills, Wide Range Achievement Test)
- Standardized state or local tests of math achievement
- Research-based or locally developed tests or instruments that assess students' mathematical concepts or skills

We reviewed math achievement outcomes for 7 curricula, and the average improvement index ranged from -2 to +14 percentile points (figure 1).<sup>3</sup>

**Figure 1 Math achievement: average improvement**



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

3. To enable comparisons across interventions, improvement indices are calculated from student-level findings. In the case of the *Connected Mathematics Project (CMP)* and *Saxon Middle School Math*, the average improvement index does not represent all of the findings included in the WWC intervention reports, as some findings reviewed were reported on the classroom or school level and student-level improvement indices could not be computed. For further details please see [Technical Details of WWC-Conducted Computations](#).

**Table 2 Curricula reviewed with no studies meeting WWC evidence screens**

<b>A+ny where Learning System</b> ( <a href="http://www.amered.com/awl_products.php">http://www.amered.com/awl_products.php</a> )	<b>Logo</b> (no website available)
<b>Accelerated Math</b> ( <a href="http://www.renlearn.com">http://www.renlearn.com</a> )	<b>Macmillan/McGraw-Hill</b> ( <a href="http://www.mhschool.com/math/2003/student/index.html">http://www.mhschool.com/math/2003/student/index.html</a> )
<b>Addison-Wesley Mathematics</b> ( <a href="http://www.scottforesman.com/">http://www.scottforesman.com/</a> )	<b>Math Advantage</b> ( <a href="http://www.hbschool.com/menu/math_advantage.html">http://www.hbschool.com/menu/math_advantage.html</a> )
<b>Adventures of Jasper Woodbury Series</b> ( <a href="http://peabody.vanderbilt.edu/projects/funded/jasper/Jasperhome.html">http://peabody.vanderbilt.edu/projects/funded/jasper/Jasperhome.html</a> )	<b>Math Applications and Connections</b> ( <a href="http://www.glencoe.com/">http://www.glencoe.com/</a> )
<b>Algebra Project</b> ( <a href="http://www.algebra.org/">http://www.algebra.org/</a> )	<b>Math Renaissance®</b> ( <a href="http://www.renlearn.com">http://www.renlearn.com</a> )
<b>Algebraic Thinking</b> ( <a href="http://www.algebraicthinking.com/">http://www.algebraicthinking.com/</a> )	<b>Mathematics in Context (MiC)</b> ( <a href="http://showmecenter.missouri.edu/showme/mic.shtml">http://showmecenter.missouri.edu/showme/mic.shtml</a> )
<b>Appalachia Model Mathematics Program</b> (no website available)	<b>Mathematics Plus</b> (no website available)
<b>CompassLearning</b> ( <a href="http://www.compasslearning.com/">http://www.compasslearning.com/</a> )	<b>MathScape: Seeing and Thinking Mathematically</b> ( <a href="http://www2.edc.org/mathscape/">http://www2.edc.org/mathscape/</a> )
<b>Connecting Math Concepts (CMC)</b> ( <a href="https://www.sraonline.com/">https://www.sraonline.com/</a> )	<b>MathThematics</b> ( <a href="http://www.mcdougallittell.com/ml/math.htm?vl=4&amp;ID=100550000030872">http://www.mcdougallittell.com/ml/math.htm?vl=4&amp;ID=100550000030872</a> )
<b>CORD Applied Math</b> ( <a href="http://www.cordcommunications.com/Store/Contextual_Mathematics/CORD_Applied_Math.asp">http://www.cordcommunications.com/Store/Contextual_Mathematics/CORD_Applied_Math.asp</a> )	<b>Middle Grades Math</b> ( <a href="http://www.pearsonschool.com/index.cfm?locator=PSZ1B7">http://www.pearsonschool.com/index.cfm?locator=PSZ1B7</a> )
<b>Core Plus Mathematics Project</b> ( <a href="http://www.wmich.edu/cpmp/">http://www.wmich.edu/cpmp/</a> )	<b>Middle School Mathematics through Applications Program (MMAP)</b> ( <a href="http://mmap.wested.org/">http://mmap.wested.org/</a> )
<b>Countdown Video IGAP Intervention Tape</b> (no website available)	<b>Moving with Math® Extensions</b> ( <a href="http://www.movingwithmath.com/summer_math/welcome2.htm">http://www.movingwithmath.com/summer_math/welcome2.htm</a> )
<b>Destination Math</b> ( <a href="http://web.riverdeep.net/portal/page?_pageid=818,1381089&amp;_dad=portal&amp;_schema=PORTAL">http://web.riverdeep.net/portal/page?_pageid=818,1381089&amp;_dad=portal&amp;_schema=PORTAL</a> )	<b>Moving with Math® Math by Topic</b> ( <a href="http://www.movingwithmath.com/middle_school/middle_school.htm">http://www.movingwithmath.com/middle_school/middle_school.htm</a> )
<b>FUNDamentallyMATH®</b> ( <a href="http://www.fundamentallymath.com/">http://www.fundamentallymath.com/</a> )	<b>Opening Eyes to Mathematics by The Math Learning Center</b> ( <a href="http://www.mathlearningcenter.org/curriculum/elementary/open-eyes.asp">http://www.mathlearningcenter.org/curriculum/elementary/open-eyes.asp</a> )
<b>Heath Mathematics Connections</b> (no website available)	<b>Partnership for Access to Higher Mathematics (PATH Mathematics; no website available)</b>
<b>Holt Middle School Math</b> ( <a href="http://go.hrw.com/gopages/ma-msm.html">http://go.hrw.com/gopages/ma-msm.html</a> )	<b>PLATO</b> ( <a href="http://www.plato.com/">http://www.plato.com/</a> )
<b>Integrated Mathematics, Science, and Technology (IMaST)</b> ( <a href="http://www.cemast.ilstu.edu/programs/imast/index.shtml">http://www.cemast.ilstu.edu/programs/imast/index.shtml</a> )	<b>Real Math basal mathematics program</b> ( <a href="https://www.sraonline.com/rm_home.html">https://www.sraonline.com/rm_home.html</a> )
<b>Key Math Teach and Practice</b> ( <a href="http://ags.pearsonassessments.com/group.asp?nGroupInfoID=a6880">http://ags.pearsonassessments.com/group.asp?nGroupInfoID=a6880</a> )	<b>Reasoning Mind</b> ( <a href="http://www.reasoningmind.org/">http://www.reasoningmind.org/</a> )
<b>Larson Developmental Math Series</b> ( <a href="http://college.hmco.com/instructors/catalog/demos/larson.html">http://college.hmco.com/instructors/catalog/demos/larson.html</a> )	<b>Singapore Mathematics</b> ( <a href="http://www.singaporemath.com/">http://www.singaporemath.com/</a> )
<b>Lightspan Achieve Now</b> ( <a href="http://www.plato.com/Products/PLATO-Achieve-Now-Mathematics.aspx">http://www.plato.com/Products/PLATO-Achieve-Now-Mathematics.aspx</a> )	<b>The Six Through Eighth Grade Mathematics (STEM) Project</b> (no website available)
	<b>Scott Foresman Math Diagnostic &amp; Intervention System</b> (no website available)
	<b>Successmaker</b> ( <a href="http://www.pearsondigital.com/successmaker/">http://www.pearsondigital.com/successmaker/</a> )
	<b>Unitedstreaming™</b> ( <a href="http://www.unitedstreaming.com/">http://www.unitedstreaming.com/</a> )

**Note:** Following each program name is the developer's website address. The table includes all eligible programs with no studies and all eligible programs with no studies meeting evidence standards. Note that some of the programs listed in this table had evaluation studies that did not meet the WWC evidence screens because the programs were supplemental curricula rather than core curricula. Supplemental curricula may be considered when this topic review is updated.

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