

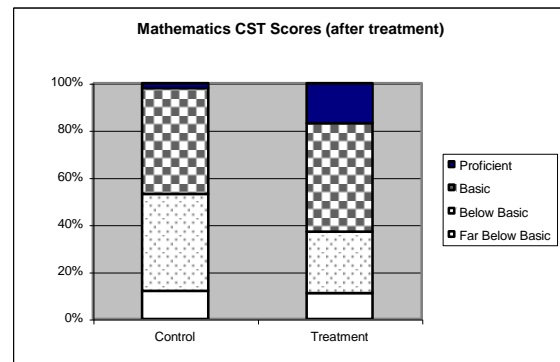
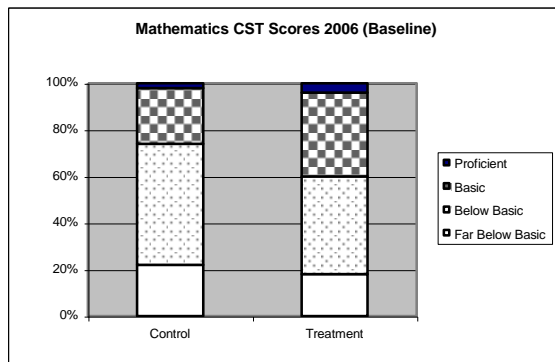
INTRODUCTION TO ALGEBRA STORIES OF SUCCESS!

Introduction to Algebra was developed in response to a need in California for an algebra readiness textbook for eighth grade students struggling to prepare for algebra. Mathematics educators and mathematicians at UCLA along with experts in teaching students with special needs and English learners combined best practices and research to create the program. Treatment-control studies, quantitative data, and case studies combine to tell stories of success for *Introduction to Algebra*.

The Center for Mathematics and Teaching (www.mathandteaching.org) currently publishes *Introduction to Algebra* and provides training for its teachers. Please contact Shelley Kriegler (shelley@mathandteaching.org) for more information this program or the work of this non-profit organization.

Introduction to Algebra Evaluation Study 2007

In 2006-07, 379 students in low performing school district in Northern California took a pre-algebra course as 8th graders. 294 students used the UCLA *Introduction to Algebra* curriculum (“treatment group”), while 85 students used a traditional curriculum (“control group”). Analysis of the 7th Grade California Standards Test in mathematics for the two groups showed they were roughly similar in ability.



Treatment teachers participated in professional development, and their students completed the *Introduction to Algebra* curriculum with reasonable fidelity. Control teachers also participated in training sessions, and used a traditional general mathematics textbook with students. At the end of the 8th grade, all students took the General Mathematics California Standards Test (CST). Those results showed that the treatment group outperformed the control group. Specifically, 17% of the treatment group scored proficient or advanced on the CST, while only 4% of the control group scored at this level. Furthermore, 44% of the treatment group improved at least one proficiency level while only 38% of the control group improved at least one proficiency level.

Data collected and analyzed by Public Works, Inc.

Stories of Success

Introduction to Algebra, combined with training, increases test scores.

Our school district adopted *Introduction to Algebra* as our program for non-Algebra 1 eighth graders. I attended seven days of UCLA-sponsored staff development on the program between August, 2008 and May, 2009. Students are enthusiastic about our new program and my colleagues and I find it to be quite effective, especially in strengthening the students' generally weak computational skills.

Introduction to Algebra is more focused than most Grade 8 textbook offerings. Its course content emphasizes the sixteen "algebra readiness" standards listed in Appendix E of the 2005 Mathematics Framework for California Public Schools, and the book's target is students who score Basic, Below Basic, and Far Below Basic on the Grade 7 Math California Standards Test (CST). During our first year of use, the Below Basic (BB) and Far Below Basic (FBB) students worked on math for two periods a day while Basic (B) students had a more typical one period a day for math. On average all students improved by $\frac{1}{2}$ growth band in one year (e.g. from high FBB to low BB, or from low B to high B) on their Grade 8 Math California Standards Test.

Excerpt from a Master's Work by Lisa Tremblay
Altimira Middle School, Sonoma, CA

Introduction to Algebra prepares students for success in algebra.

At a Southern California high school in 2008, 86 entering 9th grade students who struggled in mathematics used the second half of the *Introduction to Algebra* materials in summer school. The following school year, 85% of the students passed the first semester of algebra as 9th graders, while the national average for all students is typically less than 50%.

Data provided by school district

This result is consistent with stories from the field. For example, in 2009, a high school algebra teacher contacted the authors of *Introduction to Algebra* because he wanted to know more about the program. After teaching his students for one semester, he discovered that "most of his students who had taken *Introduction to Algebra* were well prepared for algebra, while more than half of his students who had had taken a more traditional pre-algebra course were struggling in his class."

Teacher –anonymous

Reorders imply a story of success.

Introduction to Algebra is a consumable program, and districts that use the program must reorder it annually. With school programs competing for limited dollars, a reorder offers evidence that a district is satisfied with results.

	2007-2008	2008-2009	2009-2010	2010-2011
New Orders	25*	49	21	17
Re Orders		14	41	54
Percent of reorders		56%	65%	87%

*Includes districts that piloted multiple programs the program during the adoption year.

More Stories of Success

Observers find *Introduction to Algebra* classrooms to be cognitively demanding.

As part of a California Mathematics Science Partnership Grant, a mid-sized school district in Central California implemented *Introduction to Algebra* with low achieving 8th and 9th grade students. Classroom observations by coaches revealed that, based on measures of concept development, questioning strategies, and student interaction, students in *Introduction to Algebra* were experiencing a more “cognitively demanding” program than their peers who were in a traditional algebra 1 course.

Synthesis of Coaching Logs
Stockton, California

***Introduction to Algebra* in 7th Grade Helps Low Achievers Get Back On Track**

In a small rural district with a high concentration of English learners, 6th grade proficiency rates between 2006 and 2009 ranged from 21%-31% on the California Standards Test. After trying a variety of curricula and strategies, the teachers decided to use *Introduction to Algebra* with their below basic and far below basic students as their 7th grade curriculum in 2009-10. In Spring of 2010, 44% of the 7th grade class was proficient in mathematics—the highest proficiency rate in district history. *Introduction to Algebra* helped the lowest achievers from 6th grade accelerate their learning so that they were ready for a comprehensive 8th grade program or algebra.

In addition to successful test scores, teachers reported that the program supported their beliefs and efforts to use strategies and models that help students develop concepts, and that their training helped improve the teaching of their regular classes. Teachers also reported that greater student engagement made it possible for them to use 80 minute class periods effectively.

Reported by Coach Pam Hutchison
with data from the California Department of Education

But...sometimes school districts do not reorder for a good reason!

A small rural school district in Northern California used *Introduction to Algebra* with low achieving 7th and 8th grade students in 2009. The teacher reported she would not be using the program in 2010 because ALL her students are now ready for algebra. “*Introduction to Algebra* addressed the needs of my students much better than a traditional pre-algebra text. All other publishers with algebra readiness programs seemed to have dumbed down their pre-algebra book. Students like the packets as they are not as intimidating as the large textbooks.”

Jessica German
Whitmore Elementary School, Whitman, CA

Report of Data: Intensive Summer Program in Northern California Using *Introduction to Algebra*, 2009

In a low performing high school district in the San Francisco area, 701 underperforming mathematics students were invited to participate in an intensive 4-week summer algebra readiness program for incoming 9th graders. The average 7th grade CST score among the students was 290 (below basic). Of those invited, 72 signed up to participate, 59 completed the program, and 56 continued in the district beginning in the Fall semester. Students participated in about four hours of mathematics instruction and tutoring daily.

Two pre-post tests measured student achievement. As an external measure, students took the Pre-Algebra test created for the UC/CSU Math Diagnostic Testing Project (MDTP). The second was the pre-post assessment provided by publisher. Results showed significant gains ($p < .01$) by students in the program on both tests.

Test	Pre-test score	Post-test Score	Difference (Post-Test score minus Pre-Test score)	Percentage change (difference/pre-test score)
Introduction to Algebra	48.8%	67.7%	+18.9%	+38.6%
UC/CSU MDTP	45.5%	51.5%	+ 6%*	+13.2%

At the end of the program, teachers recommended 76% of the students for Algebra 1.

First semester grades for underperforming students who took algebra after the summer program were compared to students invited into the program who did not complete it, and all other students in Algebra 1. The data shows that students who completed the summer program earned an A, B, or C in Algebra 1 at approximately the same rate students considered ready for algebra prior to the summer program, and they significantly outperformed their peers who did not participate in the summer program.

	Students recommended after completion of summer program (n=45)	Students invited to the summer program but who did not attend or complete it (n=630)	All other students in Algebra 1 (n=251)
A, B, or C in Algebra 1	58%	41.4%	59%
D or F in Algebra 1	42%	58.6%	41%

Results from this study are encouraging, but limitations must be noted. Although the two low achieving groups were statistically equivalent prior to the summer program based on scores, motivation (one group completed the summer program, while the other group did not) may also have contributed to these results.

Data provided by school district