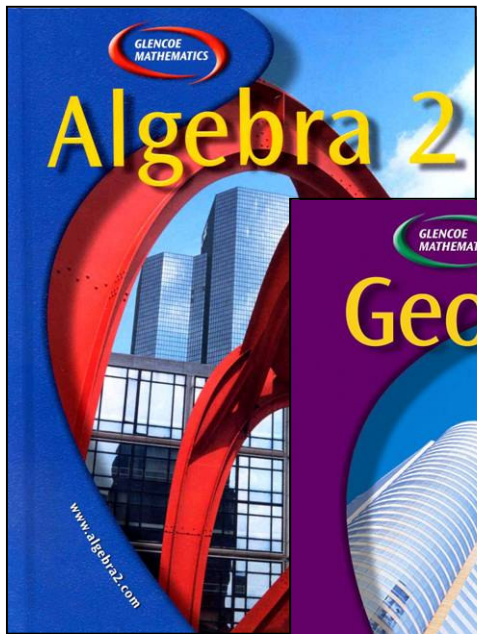
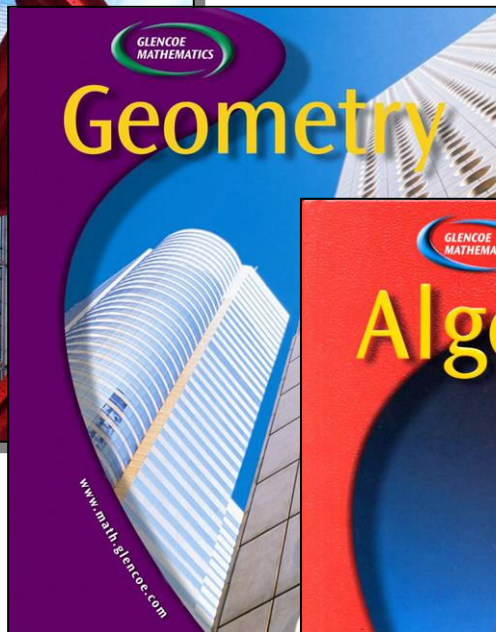




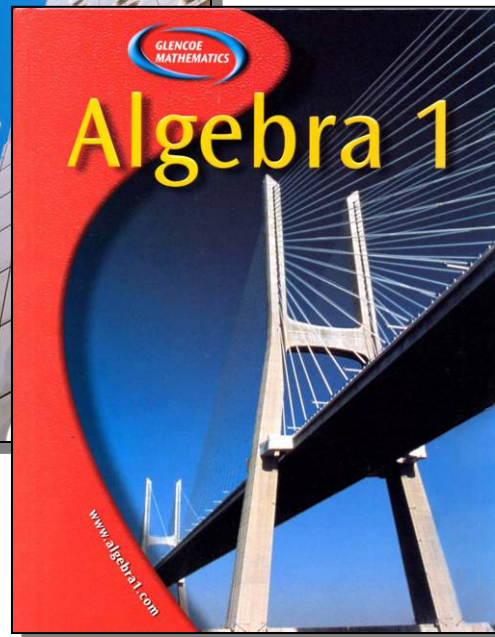
HIGH SCHOOL LEARNER VERIFICATION RESEARCH SUMMARY



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**GLENCOE HIGH SCHOOL MATHEMATICS
LEARNER VERIFICATION RESEARCH SUMMARY**

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RESEARCH OVERVIEW

Glencoe's High School Mathematics Series is the product of ongoing, classroom oriented and educational research activities involving students, teachers, curriculum supervisors, administrators, parents, and college-level mathematics educators and researchers.

The programs that make up the Glencoe Mathematics Series are currently used by millions of students and tens of thousands of teachers. The key reason why Glencoe mathematics programs continue to ensure success in the mathematics classroom is the result of the Glencoe author team as a combination of practicing classroom teachers, curriculum supervisors, and college-level educators and learning specialists.

Prior to the publication of the *Algebra 1* ©2003; *Geometry* ©2004, and *Algebra 2* ©2003 programs, the following extensive research was conducted:

- ✓ Extensively reviewed educational research on learning and mathematics and recommendations from groups such as NCTM
- ✓ Analysis of returns from independently contracted mailings and telephone surveys
- ✓ Review of all comments and correspondences from users of prior editions
- ✓ Nation-wide discussion groups involving mathematics teachers, department chairpersons, supervisors, and educational learning specialists
- ✓ Face-to-face interviews with mathematics teachers
- ✓ In-depth analysis of manuscripts by a wide range of reviewers and consultants
- ✓ Field tests in which students and teachers used pre-publication manuscript in the classroom
- ✓ Follow-up interviews, observations, and surveys of users of Glencoe Mathematics programs

Continuous feedback from teachers, curriculum supervisors, and students who currently use Glencoe mathematics programs is incorporated as Glencoe plans and publishes new programs.

The following page summarizes changes made to the new editions of *Algebra 1* ©2003, *Geometry* ©2004, and *Algebra 2* ©03 resulting from our extensive research.

***ALGEBRA 1 – GEOMETRY – ALGEBRA 2* RESEARCH RESULTS**

Summary of changes and activities undertaken in the publication of the all new *Algebra 1* ©2003, *Geometry* ©2004, and *Algebra 2* ©2003 series.

The publications of these programs were developed with the consideration of a multitude of **research reports ranging from content and cognitive development to effective teaching methods**. The next seven points describe the major changes incorporated in the new programs as a result of **research on reading and writing in mathematics**. A detailed list of educational research is available upon request:

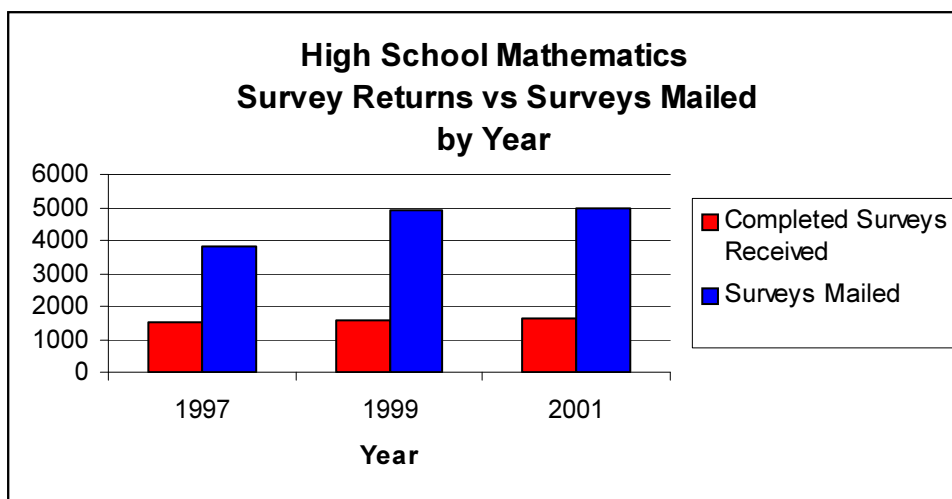
- ✓ Added Dinah Zike’s Foldables®, an interactive three-dimensional graphic organizer activity, into every chapter opener in the series to serve as a communication tool for students. For more details, refer to page T14 in *Algebra 1* ©2003 or *Algebra 2* ©2003 Teacher Wraparound Edition. The new *Geometry* ©2004 edition also will have a similar statement on page T14.
- ✓ Incorporated changes based upon the recommendations from Lynn T. Havens, Reading Consultant from Project CRISS (**CR**eating **I**ndependence through **S**tudent-owned **S**trategies). Refer to pages T6-T7 in the Teacher Wraparound Editions for more details on reading and writing strategies in mathematics.
- ✓ Ten mathematics consultants reviewed the **accuracy of the mathematics** and the **effectiveness of the instruction**.
- ✓ 150 teacher reviewers were used in reviewing the Student Editions for balance of exercises, pacing of lessons, and development of concepts. The reviewers also made recommendations for effective teaching materials and their organization.
- ✓ Twelve members of the Teacher Advisory Board reviewed **alignment to content and assessment standards** and the overall organization of each program.
- ✓ To help educators **successfully reach every child** as part of the **No Child Left Behind Act**, we incorporated over a dozen new features with special emphasis on the Student Edition and our website. For a detailed summary, please refer to page T15 in any of the Teacher Wraparound Editions.
- ✓ In response to research and the recommendations of our many advisors on the importance of Staff Development in the success of all students, Glencoe has created a robust and convenient **staff development plan** in both print and on-line formats. Refer to pages T16-T17 in any of the Teacher Wraparound Editions.

The next pages summarize our in-depth and quantitative research surveys, commentaries, and testing results.

THE GLENCOE HIGH SCHOOL MATHEMATICS SURVEY PROJECT: 1997-2001

In 1997, 1999, and 2001, Glencoe contracted with an independent research firm to thoroughly assess trends and issues in high school mathematics. A significant portion of the project were to: (1) Determine the degree of success students were experiencing in algebra 1, geometry, and algebra 2 courses; and (2) Identify the key components of a program that appeared to lead to math success.

Surveys were conducted every other year to identify trends over time. The use of an outside agency ensured the integrity of the data collected. Randomly selected high schools from all fifty states and the District of Columbia were sent surveys in each of the years. A very impressive survey return rate of 32% was obtained as shown in the chart below.



Sample questions from the survey

There were approximately seventy questions asked in each year of the survey. Questions on state-mandated standardized tests were added for years 1999 and 2001. The following are a few selected questions that appeared on the surveys.

Question 1: *Which of the following mathematics courses are you currently teaching?*
Ten categories: Applied Algebra, Basic Algebra, Pre-Algebra, Algebra 1, Algebra 1 in two years, Informal Geometry, Geometry, Algebra 2, Other, and No Response.

Question 2: *What is your primary mathematics program, or textbook?* Seventy choices were possible. Six publishers received 93% of the selections. Glencoe was mentioned 33% followed by 28%, 11%, 10%, 8%, and 3% for other publishers. Sixty publishers/programs accounted for 6% and 1% made no response.

Question 9: *Does the Student Edition of your mathematics program contain too much (16%), too little (6%), or an appropriate amount of reading (76%)? No Response (1%)*

Question 37: *What, if anything, could the publisher do to improve your mathematics program? Intervention and Standardized Test Practice ranked very high.*

Question 38: *What standardized tests are the students in your high school required to take? State-mandated (72%), SAT9 (23%), SAT (16%), and ACT (16%) were mentioned the most.*

Question 39: *Since your district adopted the mathematics program you listed in Question 2 of this questionnaire, have your students standardized test scores, on average, increased, decreased, or remained the same? See page 14, Algebra 2 Results.*

Question 40: *What college entrance exam do the majority of students in your school take? SAT 66%; ACT 41%; note, some schools reported both ACT and SAT scores.*

Question 44: *Should a student edition of a mathematics program include math-related internet activities? Yes 78%, No 19%, No response 3%*

Question 45: *Which of the following types of internet references should be included in the Student Edition of a mathematics program? Ten categories including No Response.*

Top Five Choices

Chapter Reviews	58%
Downloadable Worksheets	56%
SAT/ACT Preparation	55%
Interactive Quizzes & Tests	43%
Updated Data Links	42%

Question 50: *Do you currently use test prep (SAT, ACT) software?*

Currently Use	16%
Currently Have, but Do Not Use	13%
Do Not Have, but Would Like	38%
Not Interested in Having or Using	10%
No Response	23%

Question 69: *Which of the following best describes the community in which you teach?*

Large Metropolitan/Urban	22%
Suburban	38%
Rural/Town/Village	37%
No Response	3%

Question 70: *In what state is your school located? All states represented proportionately to their student population.*

***GLENCOE ALGEBRA 1* ©2003**
LEARNER VERIFICATION RESEARCH SUMMARY

STUDY OBJECTIVE

This study measures the effectiveness of *Glencoe Algebra 1* ©2003, an algebra program published by Glencoe/McGraw-Hill.

Teachers who participated in this study administered a pre-test prior to teaching Chapter 3 from *Glencoe Algebra 1* ©2003. To assess student progress, a post-test was administered after the chapter was taught. The outcome is summarized in the Results section beginning on page 5.

Over 200 students in Grades 7 to 10 participated in this research. The students were enrolled in rural, suburban, and urban communities. The schools were located in four states: Florida, Illinois, New York, and North Carolina.

Forty-seven percent of the participating students were males, and fifty-three percent were females. Twenty-four percent were minorities.

***GLENCOE ALGEBRA 1* ©2003**
LEARNER VERIFICATION RESEARCH SUMMARY

PROGRAM COMPONENTS AND TRAINING
(Similar components and training were provided for all Glencoe programs.)

Teachers who participated in the study were provided the following materials:

- Student Edition Booklet, one per student.
- Student Workbook, one per student, including
 - ✓ Study Guide and Intervention;
 - ✓ Skills Practice;
 - ✓ Practice;
 - ✓ Reading to Learn Mathematics; and
 - ✓ Enrichment.
- Pre-Test and Post-test, one per student.
- Teacher's Guide.
- Teacher's Resource Masters, including:
 - ✓ Open-ended Assessment;
 - ✓ Vocabulary Review Questions;
 - ✓ Mid-chapter Test;
 - ✓ Cumulative Review;
 - ✓ Standardized Test Practice; and
 - ✓ Answer Keys to all student worksheets.
- Pre-test and Post-test Masters with Answer Keys.

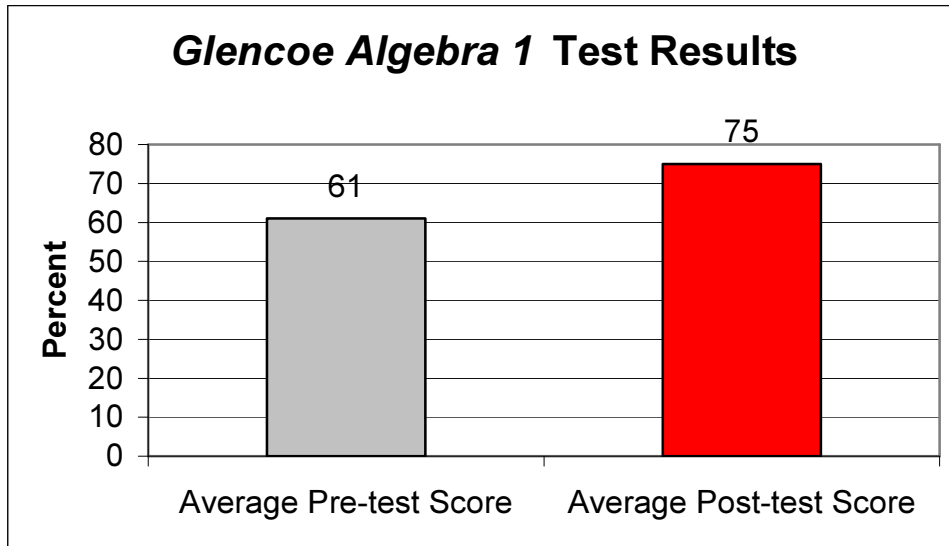
The McGraw-Hill research staff provided the teacher in-service training. The training sessions averaged forty-five minutes per teacher.

GLENCOE ALGEBRA 1 ©2003
LEARNER VERIFICATION RESEARCH SUMMARY

RESULTS

- The research indicates that test scores increased among students using *Glencoe Algebra 1* ©2003.
- Eight out of ten students earned higher scores after using *Glencoe Algebra 1* ©2003.
- Scores improved among both male and female students.
- Scores improved among both minority and non-minority students.
- Overall, the gap between the average pre-test score and a perfect score closed by 36%. Stated differently, on average, scores increased 23% percent after students used *Glencoe Algebra 1* ©2003. Refer to tables below on the next page.

**The gap between the average pre-test score
and a perfect score closed by 36%.**



The overall results from each classroom are listed in Table 1. In one class, the gap between the average pre-test score and a perfect score closed by 52%; in two other classes, the gap closed by 50%.

Table 1

School Summary	Number of Students	Average Pre-test Score	Average Post-test Score	Pre-test Gap (100%-Average)	Post-test Gap	GRP*
Column total or average	205	61%	75%	39%	25%	36%

* Gap Reduction Percentage (GRP)

A test of significance (t-test) was used to determine whether the results from the post-test are significantly different from the pre-test results (i.e., a difference large enough not to be expected by chance).

On average, the resulting t-test value indicates that the scores from the post-test are significantly higher than the pre-test scores.

The results of the t-test can be found in Table 2 below.

Table 2

t-test results	n	Average Pre-test Score	Average Post-test Score	t-text value	p-value
Total (or average) in category	205	61%	75%	14%	0%
df = 204					

While Table 2 reflects the total for all schools, the t-test analysis was conducted for each individual school as well.

***GLENCOE ALGEBRA 1* ©2003**
LEARNER VERIFICATION RESEARCH SUMMARY

POST-STUDY EVALUATION BY TEACHERS

Each teacher completed post-study evaluations based on their experience using Chapter 3 from *Glencoe Algebra 1* ©2003. This section lists the questions and a summary of the responses.

Question 1: Were there sufficient examples?

Responses: 85% Yes
15% Sometimes
0% No

Question 2: Did the examples link well to the exercise sets?

Responses: 100% Yes
0% Sometimes
0% No

Question 3: Rate the following exercise types according to the amount of each type available. Choices: Too many, Right amount, Too few.
Most common response listed.

Applications:	Right Amount
Concept Check:	Right amount
Critical Thinking:	Right amount
Getting Ready:	Right amount
Guided Practice:	Right amount
Mixed Review:	Right amount
Skill Exercises:	Right amount
Test Practice:	Right amount
Word problems:	Right amount

Question 4: Do you think the “Homework Help” feature in the margin of the exercise sets was helpful to your students?

Responses: 100% Yes
0% No

Question 5: Did you use the “Reading Mathematics” activity?

Responses: 70% Yes
30% No

Question 6: How would you rate the use of manipulatives in the chapter?
Choices: Too many, Right Amount, Too few.

Responses: 0% Too many
100% Right amount
0% Too few

Question 7: Was there any value in having the two types of Practice Masters (Skills Practice and Practice)?

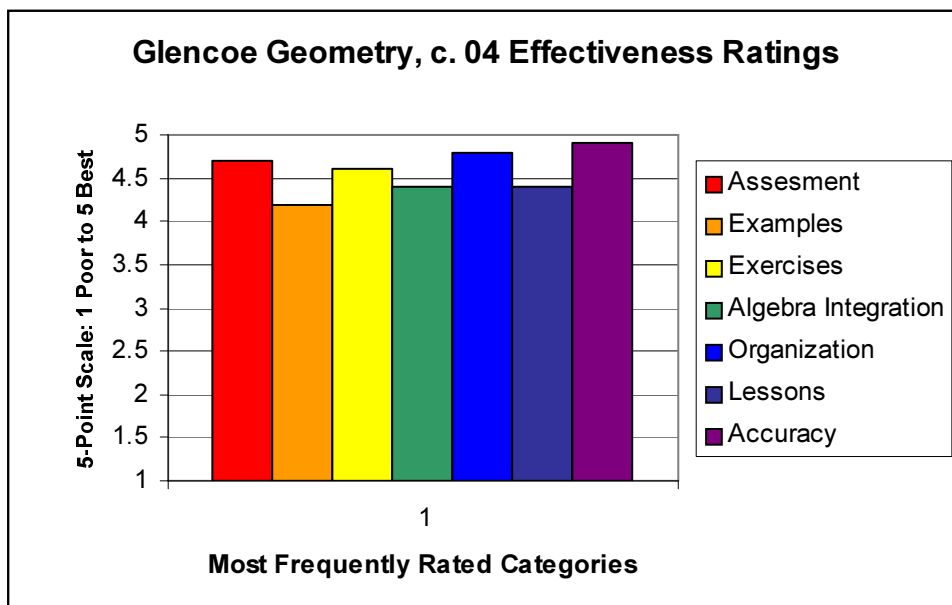
Responses: 70% Yes
30% No

***GLENCOE GEOMETRY* ©2004**
LEARNER VERIFICATION RESEARCH SUMMARY

RESULTS

Over fifty geometry teachers reviewed the manuscript and design of the new 2004 copyright during a six month period from April to September, 2002. Nearly 700 comments were received. Of the ten categories constituting contributions that would improve student success in geometry, the following seven categories received over 95% of the comments.

These comments were rated from 1 (least effective for student success) to 5 (most effective for student success). Please note that the vertical scale has been adjusted to range from 1 to 5 because 1 is the lowest possible score.



Similar ratings were received by the *Glencoe Algebra 1* and *Glencoe Algebra 2* ©2003 programs which were published earlier in 2002. Geometry only is included here because its design was based on the extensive research conducted for the algebras. The *Glencoe Geometry* results show that the research conducted on the algebras on effectiveness carried over to the geometry.

GLENCOE ALGEBRA 2 ©2003
LEARNER VERIFICATION RESEARCH SUMMARY

RESULTS

Glencoe Algebra 2 ©2003 underwent the same intensive research development that *Glencoe Algebra 1* ©2003 and *Glencoe Geometry* ©2004 obtained.

Algebra 2 field testing strongly focused on the ACT and SAT math achievement as well as the content issues that bring student success to pre-calculus and the AP Calculus and Statistics courses.

Development of the *Glencoe Algebra 2* ©2003 focused on increasing ACT and SAT scores and providing the content foundation students need to continue their high school math studies.

Because the program is new, we will continue to monitor the success of *Glencoe Algebra 2* ©2003 students in reaching pre-calculus and AP courses.

Mathematics portion of the ACT and SAT success trends

Analysis provided for 1999 and 2001 only as the questions on standardized test results were not part of the 1997 survey. The table below shows the results for those who responded that could be identified as Glencoe users.

	Year	Percent	Year	Percent
Scores increased	1999	15%	2001	23%
Scores remained the same	1999	26%	2001	42%
Scores decreased	1999	2%	2001	4%
Too Soon to Tell	1999	45%	2001	22%
Did not take SAT or ACT	1999	6%	2001	2%
Left Blank/ Did Not Know	1999	6%	2001	7%

Scores increasing from 15% to 23% were deemed significant while scores decreasing from 2% in 1999 to 4% in 2001 were deemed insignificant as the small percentages can fluctuate slightly from year to year and it was observed that overall, Glencoe users had higher test scores.

The higher the average, the more likely that scores could fall rather than rise further (regression to the mean in statistical terms). The fact that test scores continued to rise for more users than fell was considered evidence that the Glencoe program clearly supported student success on the ACT and SAT. The 2001 data was also influenced by more teachers reporting their students' results than was obtained in the 1999 survey.

Ongoing contact with users on the new program, while early, show scores increasing above the 23% achieved in the 2001 survey. The most recent customer visit in the Midwest was to the Chicago Public Schools on November 20, 2002.

CONTACTS

**For more information on Glencoe Mathematics visit us at
www.math.glencoe.com.**

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