Growing with Mathematics®

National Evaluation Study

Summary Report

Research Conducted By:

The Educational Training, Evaluation, Assessment and Measurement Department
University of Oklahoma
Department of Public and Community Services
College of Continuing Education

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Introduction

Growing with Mathematics is a core mathematics program that is appropriate for all student populations. The mathematical content and sequence of the program and the teaching methods it promotes were determined through extensive field testing and in-depth research. At each grade level, all components and learning experiences are carefully designed to match students' interests and abilities.

Growing with Mathematics is a PreK to 5 curriculum that integrates the best practices of elementary education and mathematics education. Its development was informed by key research that provides insight into how children learn and the factors that enable effective mathematics education. The *Growing with Mathematics* program reflects the National Council of Teachers of Mathematics' (NCTM) *Principles and Standards for School Mathematics* (2000).

NCTM has identified five content strands that form the basis of an exemplary mathematics curriculum: Number and Operations, Algebra, Geometry, Measurement, and Data Analysis and Probability. *Growing with Mathematics* is organized around these content strands and emphasizes content that promotes critical thinking, problem solving, and in-depth development of concepts. Children learn through active involvement, and communication is integral to the learning process to help children internalize concepts and acquire new skills.

Expert Panels Evaluate *Growing with Mathematics*

Northwest Regional Educational Laboratory

In 1999 a panel from the **Northwest Regional Educational Laboratory (NWREL)** in Portland, Oregon, evaluated *Growing with Mathematics* for possible inclusion in its Catalog of School Reform Models. Evaluators looked at the research and background of development, the general approach of the program, provisions for varied groups of student populations, results from districts, and implementation assistance available from the publisher. *Growing with Mathematics* was approved and placed in the catalog, which was updated in May 2001.

U.S. Department of Education

In 2000 the **U.S. Department of Education** identified *Growing with Mathematics* as a Promising Mathematics Program. In order to be selected for the "Promising Program" list, an expert panel composed of four different committees carefully studied *Growing with Mathematics* materials. The committees looked at the philosophy and research that guided the program, learning goals, content, instructional model, design and format, relevance to individual and societal needs, as well as results from users of the program. The evaluators stated, "the program's well-developed learning goals are challenging, clear, and appropriate for core students as well as gifted and talented, Title I, special education/special needs, and Spanish-speaking students."

National Science Foundation

In 2001 the **National Science Foundation (NSF)** recognized *Growing with Mathematics* as a Research-Based Mathematics Program. It was listed as one of four elementary Research-Based Mathematics Education Core Curriculum Programs. To receive this recognition, a program must enable students to acquire a deep understanding, solve problems creatively, apply knowledge to new situations, work productively, and enjoy their learning experiences. *Growing with Mathematics* was the only elementary program on the NSF approval list that was not funded by the NSF. NSF approval means that schools and districts can apply for an NSF grant to support professional development for the implementation of *Growing with Mathematics*.

University of Oklahoma Program Evaluation

In 2004 the University of Oklahoma conducted a third party nationwide evaluation of the *Growing with Mathematics* curriculum. The quasi-experimental research study followed U.S. Department of Education What Works Clearinghouse guidelines to evaluate the effectiveness of the *Growing with Mathematics* curriculum. The research found that *Growing with Mathematics* students significantly outperformed the matched comparison group in the acquisition of conceptual mathematics skills and computational skills.

Theoretical Framework and Review of Related Literature

The latest revision of the *Growing with Mathematics* program incorporates the suggestions and recommendations of the 2000 NCTM *Principles and Standards for School Mathematics* document. Both the 2000 NCTM *Principles and Standards* and the NAEYC Guidelines had a major influence in the development of the Pre-K level of *Growing with Mathematics*. The publishing of this level in 2001 was closely tied to the K–5 levels, laying the building blocks for concepts that are used throughout the rest of the program.

The present edition of *Growing with Mathematics* reflects current theories for teaching and learning mathematics. Relevant and significant research findings have been taken from the fields of cognitive psychology, sociocultural theories, and mathematics education. Some theories that have been incorporated include the following:

- Cognitive psychology focuses on thought processes, memory, and problem solving. Research about children's learning provides valuable insights into the nature of activities that help children build understanding and knowledge (Berk 2000). The activities in the program encourage children to interact with their world in a meaningful and challenging way.
- The language focus of the *Growing with Mathematics* program has been influenced by the research of sociocultural theorists, such as Vygotsky. The program strongly reflects the philosophy that children learn through active involvement and can be influenced through instruction (English and Halford 1995). Communication between adults and peers, as well as peer-to-peer communication, helps children internalize and acquire new skills (Berk 2000).

Over the past two decades, significant research has taken place regarding the best practices for teaching specific content areas of mathematics. *Growing with Mathematics* has incorporated these research findings into the overall development of the topic sequence, individual lessons, and specific activities. Here are some examples.

1. The emphasis on place value and number sense (Cobb and Wheatley 1988; Fuson et al. 1997) and number representations assist children to succeed in mathematics (Cooper, Heirdsfield, and C.J. Irons 1996). The research shows that children need many different kinds of number experiences to help them deal with real-life situations. (Jones, Langrall, Thornton, and Nisbet 2002; Kilpatrick, Swaffird, and Findell). Mental computation is stressed in the program through number sense activities (Math Chat books), activities in the lessons, and games and resources, such as target mats.
   - Four types of number representations provide a basis for children to naturally work with numbers. These are: counting, quantity, rank or relative position, and place value. As stated within the NCTM *Principles and Standards for School Mathematics,* working with a range of number models helps children "develop

flexibility in thinking about numbers, which is a hallmark of number sense."

- Research on counting has been incorporated into the early grades of *Growing with Mathematics*. The Cognitively Guided Instruction approach (CGI) to the early grades (Carpenter, Fenema, Franke, Levi, and Empson 1999) includes a model of a progression of strategies children use to solve addition and subtraction word problems. Findings by Thompson (1995) suggest that as children progress through school they continue to use counting as an important part of their problem-solving repertoire, combining the counting skills with other learned skills and acquired knowledge.
- Research by Bob Wright (1998) describes observations relating young children's knowledge of numerals to number word knowledge. His research on counting is reflected in the early number work in *Growing with Mathematics*.
- The use of visualization and imagery is an important part of the *Growing with Mathematics* program. Research by Bob Wright and others in New South Wales, Australia, has confirmed the significance of visualization as a tool for learning mathematics. Subitizing, the quick identification of the number of a collection of objects (concrete or pictorial), is a strong part of the *Growing with Mathematics* early number work. This skill helps children add, subtract, multiply, and divide. Benchmarks, also mentioned in the 2000 NCTM *Principles and Standards for School Mathematics,* are a focus of the work with numbers. Students use these reference points to calculate mentally (for example, using 10 as a benchmark when solving 9 + 5). Benchmarks are also used when students are learning fractions (1/2 is a benchmark that other fractions can be compared to). Many of the non-book components of *Growing with Mathematics* promote visualization as well: namely, cards in the Resource Kits for Grades K and 1 show different pictorial representations of the same quantity, five and ten frames, number tracks, pocket charts for place value, number mats, part-part-total mats, etc. Mix-and-Match Number Flip Books at the Pre-K and K level help students visualize quantities.
- The program stresses the use of thinking strategies for promoting mastery of addition and subtraction facts (Thornton 1990; Isaacs and Carroll 1999). Strategies such as count-on, count-back, doubles and making a ten are taught in *Growing with Mathematics* and lead to better understanding of numbers and success with problem solving.

2. The importance of language and communication in learning mathematics is reflected in the program (C.J. and R. Irons, NCTM Yearbook, 1989). In

Growing with Mathematics, the building of concepts and skills begins with the learner's prior experiences. The learning sequences build upon the child's own language and interests, and the child's language is the starting point from which mathematical language and symbolic language grow. Concrete and pictorial materials are the bridge to mathematical language and symbols. Emphasis on the pictorial stage is a very strong part of the program and is often left out of the process with other programs. Throughout the *Growing with Mathematics* program a variety of activities ensure children are constantly discussing, representing, and reasoning mathematically.

3. The approach to geometry reflects the research of Copley 2000; Whiteley 2001; and Yakimanskaya 1991. In *Growing with Mathematics*, the beginning focus is on the real world as children interact with three-dimensional objects. Two-dimensional shapes are introduced after the work with three-dimensional shapes to build upon students' experiences.

4. Research shows that to become sophisticated and critical users of statistical information children need to be provided with regular opportunities to gather, organize, display, and interpret their own data (Whitin, D.J., 1997). Whitin's research is reflected in the program beginning at the Pre-K level. In the early grades, children have opportunities to display data in nontraditional ways prior to constructing formal bar, line, and pie graphs. When children are given ownership for gathering and displaying data, they come to realize that data can be represented in different ways. In the Kindergarten Resource Kit a selection of graphing mats help students organize data, such as weather graphs and sorting circles. In Grade 1 there is a graphing mat and a Venn diagram mat. The emphasis on data analysis in the program leads children to learn how to analyze information critically — i.e., is it accurate, or is it distorted?

5. Algebraic thinking is stressed in the 2000 NCTM *Principles and Standards for School Mathematics* as an important strand from Pre-K forward. Systematic experience with patterns helps build an understanding of the idea of function. *Growing with Mathematics* incorporates the recommendations of the Standards in pattern work, work with number relationships, and in approaching how things "change" over time. Many non-book resources are available at the lower grade levels to build algebraic concepts, such as pin-people magnets for showing equality in Kindergarten, and pattern sponge stamps that feature pattern-block images at Grades K and 1.

Research Methods

The Educational Training, Evaluation, Assessment, and Measurement Department at the University of Oklahoma conducted a nationwide curriculum evaluation study during the 2003–2004 school year on Wright Group/McGraw-Hill's *Growing with Mathematics* program. The sample size for the study was 144 classrooms representing Grades K to 5. These classrooms were spread across ten schools and included over 1,400 students. In this study 87 classrooms used the *Growing with Mathematics* curriculum, and 57 classrooms in the comparison group used other mathematics curriculum. The schools that participated in the study were located in Arkansas, Hawaii, Iowa, Oklahoma, and New Jersey. Schools ranged in size from 206 students to 1,117 students, with an average size of 497 students.

To control for differences in student demographics between the *Growing with Mathematics* users and the comparison group, students in two groups were matched as much as possible on grade, race, and pretest scores using the *TerraNova* Mathematics and Plus Math Computation Tests. This matching process provided groups with relatively equal academic achievement coming into the school year, and provided a more accurate analysis of the program treatment effects. Students who could not be matched using the three control variables were not included in the analysis.

School Demographics

Demographics	*Growing with Mathematics* Group	Comparison Group
African American	3.2%	7.6%
American Indian/Alaska Native	2.2%	2.9%
Asian/Pacific Islander	32.8%	34.3%
Hispanic	9.2%	12.6%
White/Other	52.1%	42.1%
Male	52.7%	50.6%
English Language Learners	6.2%	15.3%
Free/Reduced Price Lunch	51.1%	63.3%
Number of Schools	6	5
Average Number of Staff	36	32
Average Number of Students	518	460

Student Achievement Tests

Student achievement was measured using *TerraNova*, *The Second Edition*, CTB/McGraw-Hill. The *TerraNova* is an extensively researched and nationally normed test. Achievement was measured in the areas of comprehension and computation.

Comprehension was assessed with the Mathematics Test, which used eight Objective Performance Index (OPI) scores across all six grades (K to 5). Computation skills were assessed with the Mathematics Computation Test, which used six OPI scores across Grades 1 to 5.

The skills that were assessed by each test were as follows:

Objective Performance Index Scores

Mathematics Test Grades K–5 (assessed comprehension skills)	**Mathematics Test Grades 1–5** (assessed computation skills)
Number & Number Relations	Add Whole Numbers
Computation & Numerical Estimation	Subtract Whole Numbers
Operation Concepts	Multiply Whole Numbers
Measurement	Divide Whole Numbers
Geometry & Spatial Sense	Decimals
Data Analysis, Statistics, and Probability	Fractions
Patterns, Functions, and Algebra	
Problem Solving and Reasoning	

In total there were three different assessment measures available for analysis: the overall Mathematics test score, the overall Mathematics Computation test score, and the various OPI scores available by grade.

Teacher Survey

In May 2004, classroom teachers at both the *Growing with Mathematics* and comparison schools were asked to complete a questionnaire about classroom implementation of their mathematics curriculum during the 2003–2004 school year. The teacher survey collected information about teacher demographics, their education and experience, and how the teachers structured their classrooms. The survey also included questions related to standards and assessment, professional development activities, and their perceptions of the curriculum compared to what they had previously used in the classroom. There was a 97% response rate.

Results – Comprehension

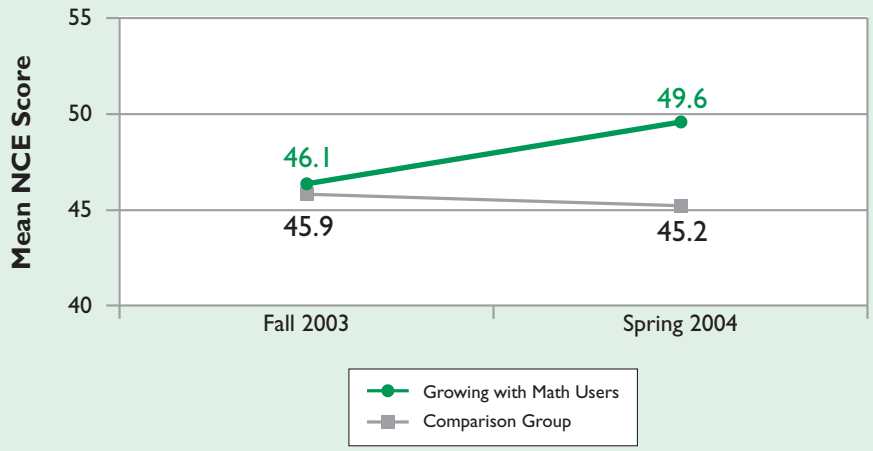
Overall Comprehension Gains

Across Grades K–5, students using the *Growing with Mathematics* curriculum showed significantly greater gains in their *TerraNova* Mathematics Test NCE scores, which tested mathematics comprehension skills.

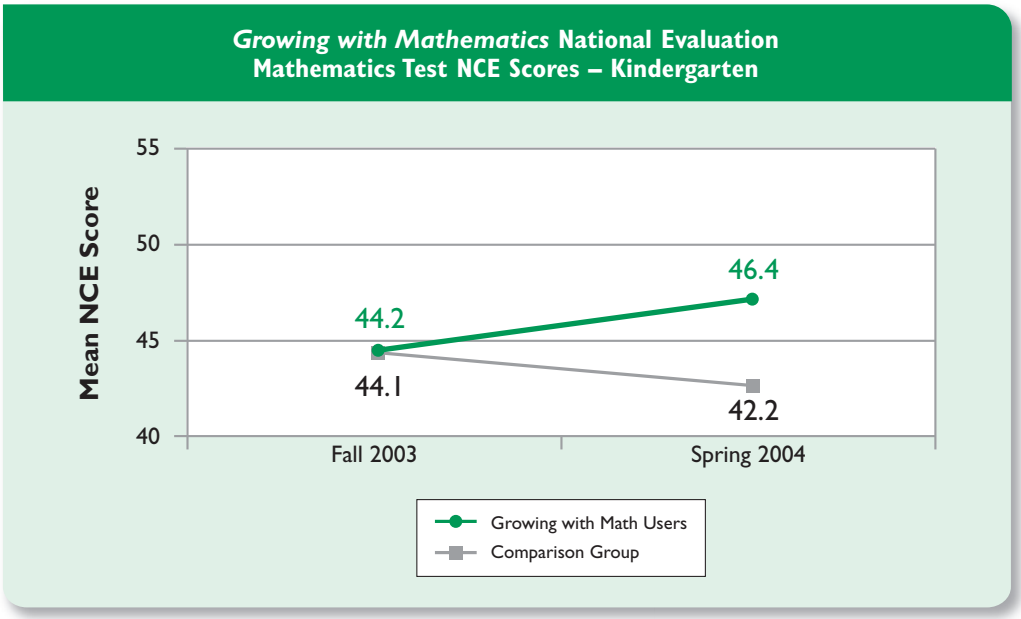
Both the *Growing with Mathematics* and the control groups started the year with NCE scores that averaged slightly below the national norm. At the end of the school year the *Growing with Mathematics* students improved their standing in relation to the national norm, while students in the control group basically maintained pace with the national norms.

Combined scores for students in all grades taught with the *Growing with Mathematics* curriculum were found to be statistically significant on every single Objective Performance Index measure in the Mathematics Test. This provides evidence to support the possible conclusion that *Growing with Mathematics* was overall more effective than the control group on all tested measures.

***Growing with Mathematics* National Evaluation**
Mathematics Test NCE Scores – All Grades



Comprehension Gains – Kindergarten



Grade K students using the *Growing with Mathematics* curriculum showed significantly greater gains in their *TerraNova* Mathematics Test NCE scores than Kindergarten students in the control group.

Both the *Growing with Mathematics* and the control groups started the year with similar NCE scores. At the end of the school year, the *Growing with Mathematics* students improved their scores an average of 2.2 Normal Curve Equivalent (NCE) points, while the comparison group scores lost an average of 1.9 NCE points throughout the year. The average *Growing with Mathematics* Kindergarten gain in math exceeded the gain scores of 60% of the comparison group.

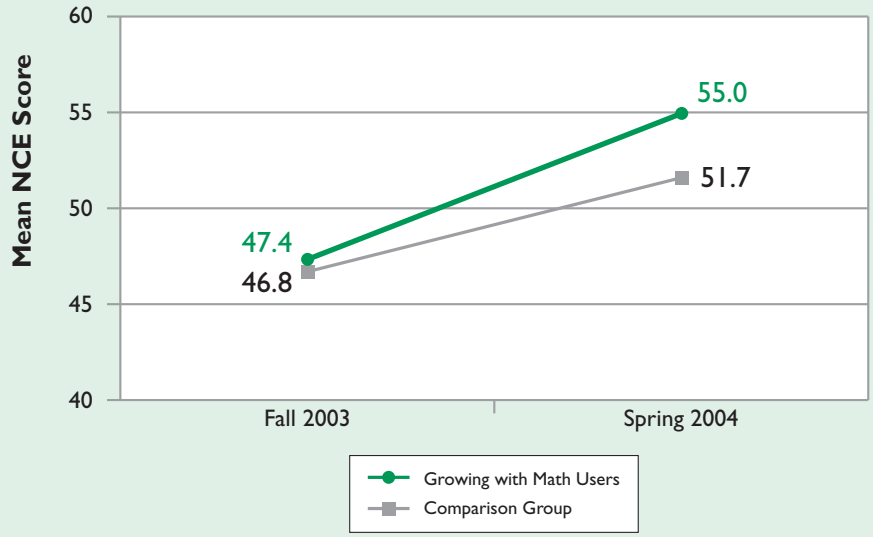
Scores for students taught with the *Growing with Mathematics* curriculum in Kindergarten were found to be statistically significant on the Objective Performance Index scores for Measurement and Geometry & Spatial Sense.

Comprehension Gains – Grade 1

First grade students using the *Growing with Mathematics* curriculum showed significantly greater gains in their *TerraNova* Mathematics Test NCE scores than Grade 1 students in the control group.

Growing with Mathematics students gained an average of 7.6 Normal Curve Equivalent (NCE) points over the course of the year, increasing their average scores from 47.4 to 55.0 points. The comparison group increased its average scores from 46.8 to 51.7 points—a gain of only 4.9 points.

Growing with Mathematics National Evaluation
Mathematics Test NCE Scores – Grade 1

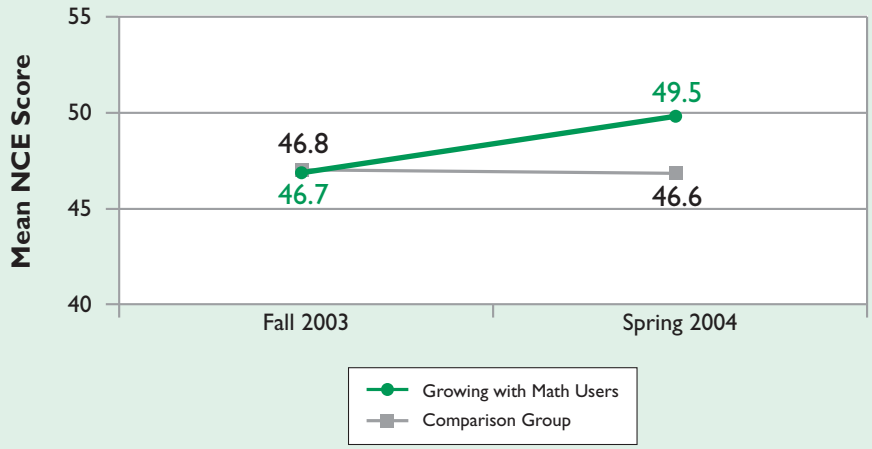


Comprehension Gains – Grade 2

Overall, students in Grade 2 that were taught with the *Growing with Mathematics* curriculum showed significantly greater gains in their *TerraNova* Mathematics Test NCE scores than Grade 2 students in the control group.

NCE scores for Grade 2 students in the comparison group fell over the course of the year, from 46.8 to 46.6 points. *Growing with Mathematics* students increased their scores by nearly 3 NCE points, from 46.7 to 49.5 points.

Growing with Mathematics National Evaluation
Mathematics Test NCE Scores – Grade 2



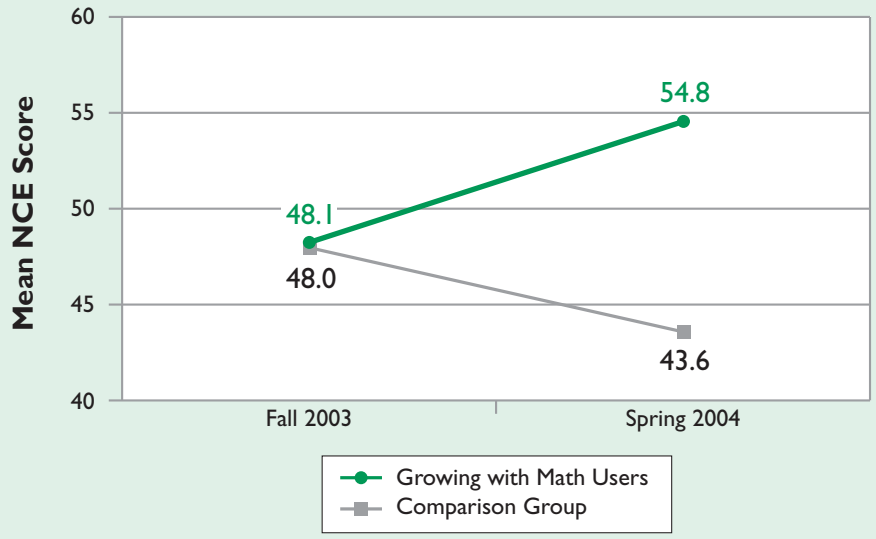
Comprehension Gains – Grade 3

Students using the *Growing with Mathematics* curriculum in Grade 3 showed significantly greater gains in their *TerraNova* Mathematics Test NCE scores on all of the Objective Performance Index measures than Grade 3 students in the control group.

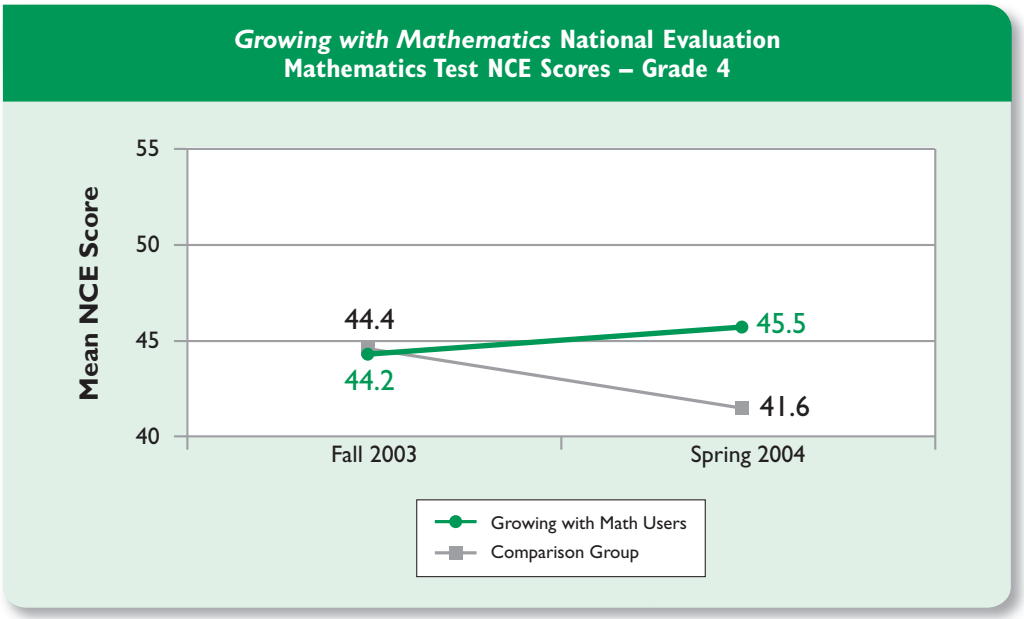
Compared to the national norms, overall the *Growing with Mathematics* Grade 3 students gained an average of 6.8 NCE points during the year while the comparison group lost an average of 4.4 NCE points.

Scores for the students that were taught with the *Growing with Mathematics* curriculum in Grade 3 were statistically significant on every single measure in the Mathematics Test. This provides evidence to support the conclusion that *Growing with Mathematics* is more effective on all tested measures at Grade 3.

Growing with Mathematics National Evaluation
Mathematics Test NCE Scores – Grade 3



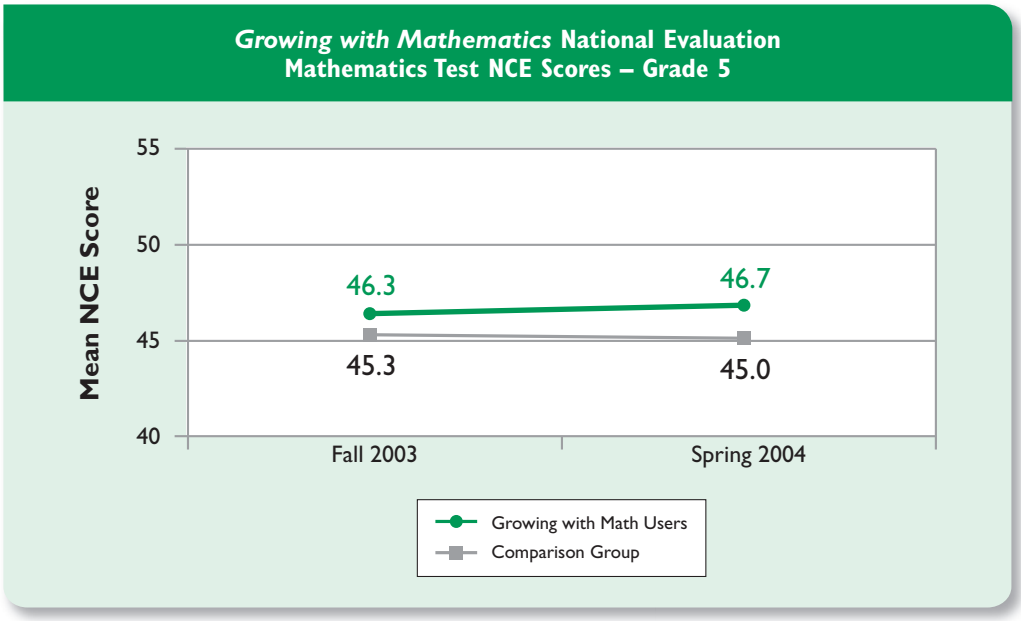
Comprehension Gains – Grade 4



Overall, fourth grade students who were taught with the *Growing with Mathematics* curriculum increased their NCE points throughout the year, while the comparison group lost twice as many NCE points. The scores for the *Growing with Mathematics* students increased from 44.2 points to 45.5 points, while scores for the comparison group decreased from 44.4 points to 41.6 points.

Comprehension Gains – Grade 5

Overall, Grade 5 students that were taught with the *Growing with Mathematics* curriculum maintained pace with the national norms, with a slight increase in their NCE score during the year. The comparison group saw a slight decrease in the NCE score over the course of the year. Average scores for the *Growing with Mathematics* students increased from 46.3 to 46.7 points, while the average scores for students in the comparison group decreased from 45.3 to 45.0 points.

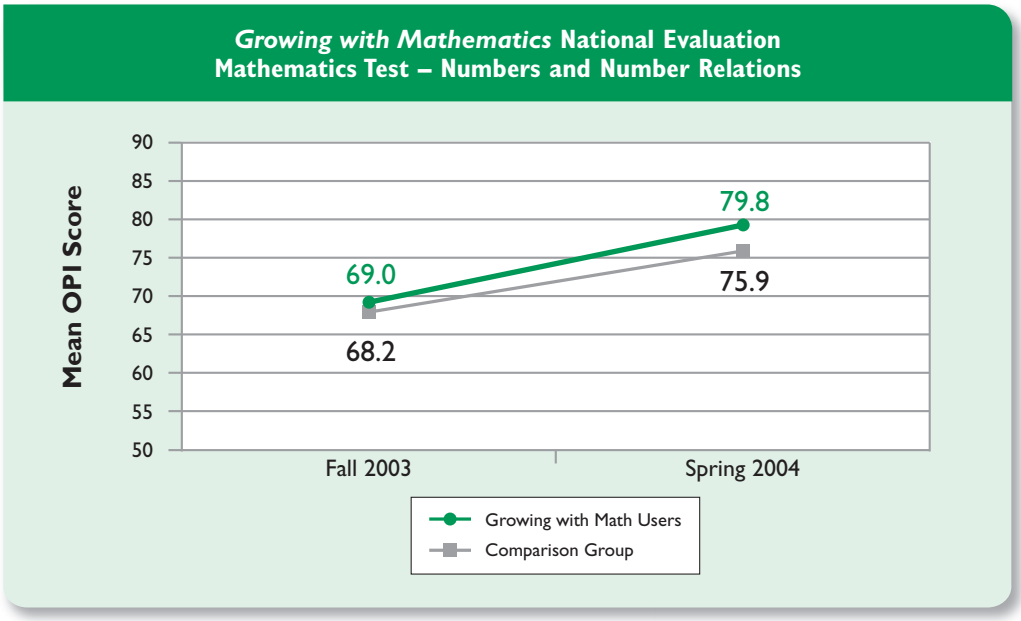


Number and Number Relations

Specific computation skills were measured using the Mathematics Objective Performance Index (OPI) scores. These scores are an estimate of the number of items that the student would have answered correctly if there were 100 similar items for each objective.

The Number and Number Relations skill demonstrates an understanding of numbers, number sense, and number theory by ordering numbers, representing numbers in equivalent forms, identifying relationships, interpreting numbers in real-world situations, and applying number concepts.

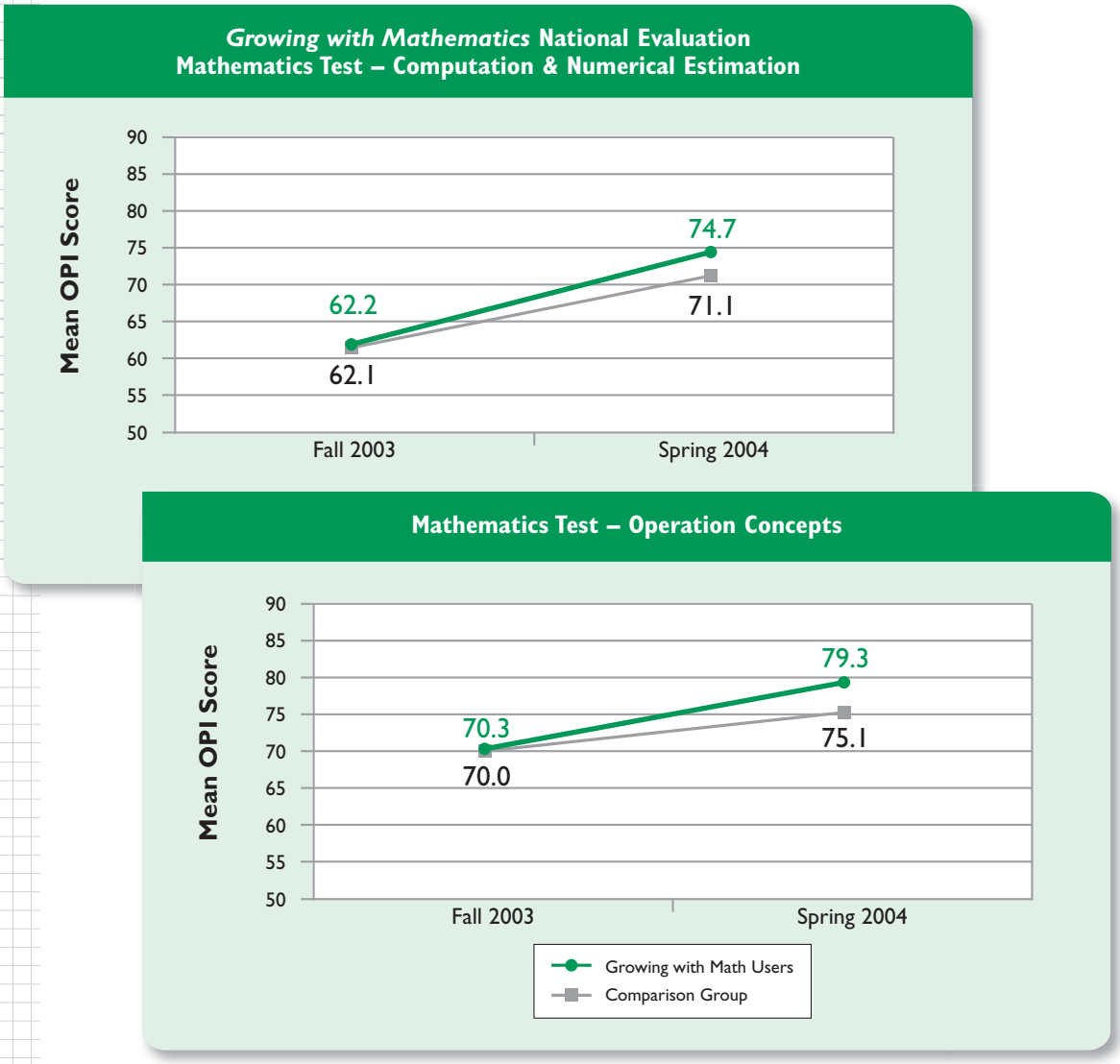
Across all grades, *Growing with Mathematics* students showed significantly greater gains in their Number and Number Relations scores than the comparison group. The *Growing with Mathematics* students gained an average of 10.8 points during the school year, compared to a gain of 7.8 points by the comparison group.



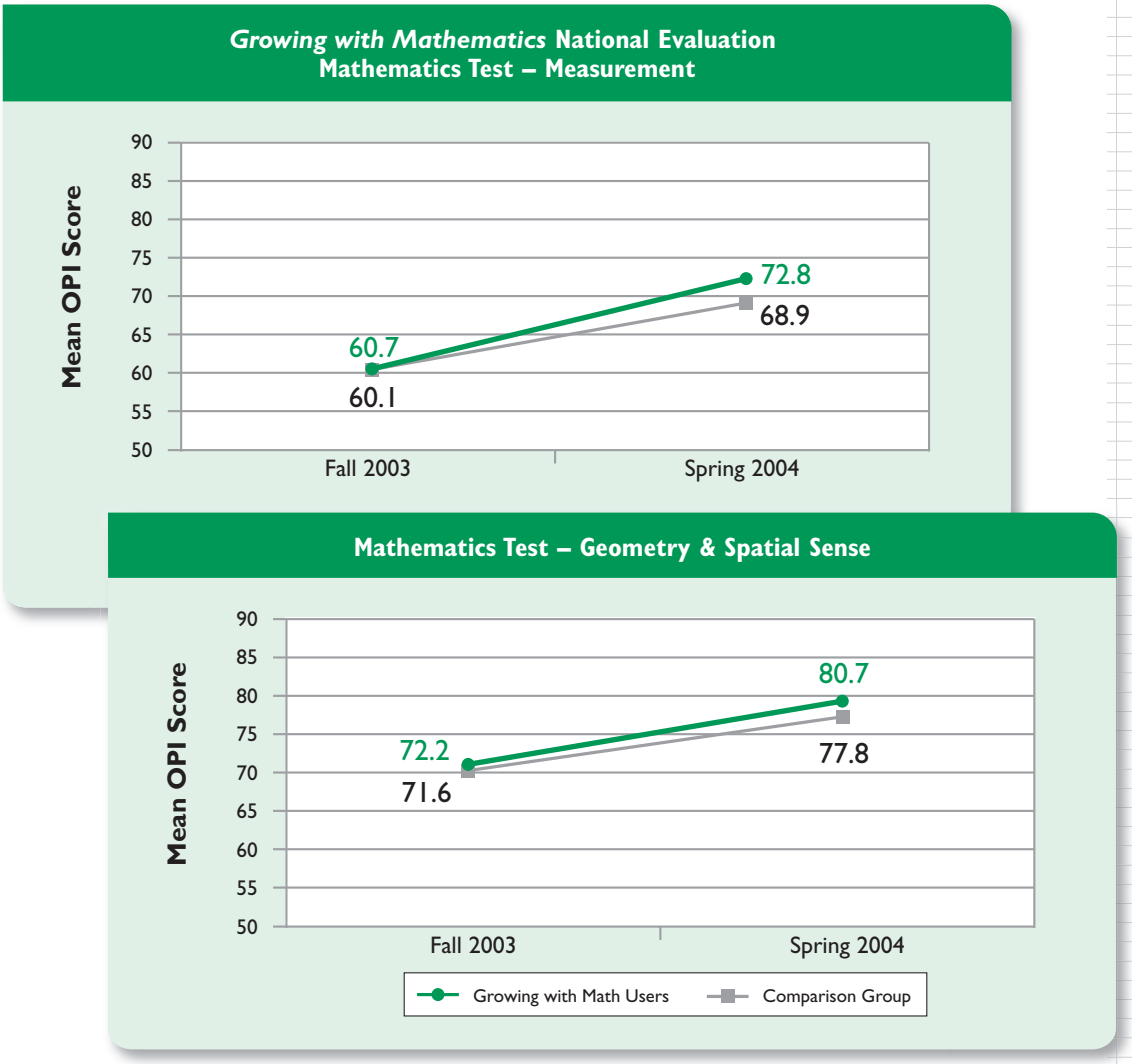
Computation and Numerical Estimation & Operation Concepts

The Computation and Numerical Estimation skill demonstrates proficiency in computation procedures, solving real-world computation problems, applying a variety of estimation strategies, and determining the reasonableness of results. The Operation Concepts skill measures an understanding of the properties and relationships of operations, the relationship between mathematical representations and problem situations, and the application of operational processes to solve problems.

Overall gains made by students taught with the *Growing with Mathematics* program exceeded the overall gains made by students in the control group by at least 3.5 points for both Computation and Numerical Estimation and Operation Concepts skills.



Measurement & Geometry and Spatial Sense



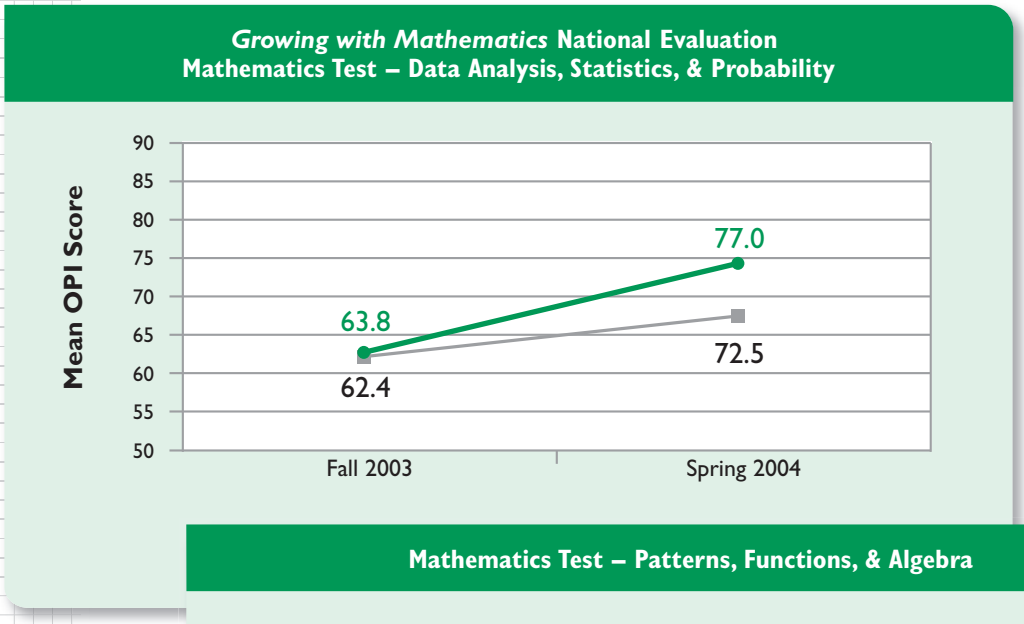
The Measurement skill seeks to demonstrate an understanding of measurement systems, units, and tools by describing, calculating, or estimating size, location, and time; by using the concepts of perimeter, area, volume, capacity, weight, and mass; and by identifying appropriate degrees of accuracy. The Geometry and Spatial Sense skill measures spatial sense and an understanding of geometry by visualizing and identifying two- and three-dimensional objects, classifying shapes, recognizing symmetry, using transformations, applying geometric formulas, and evaluating properties of geometric figures.

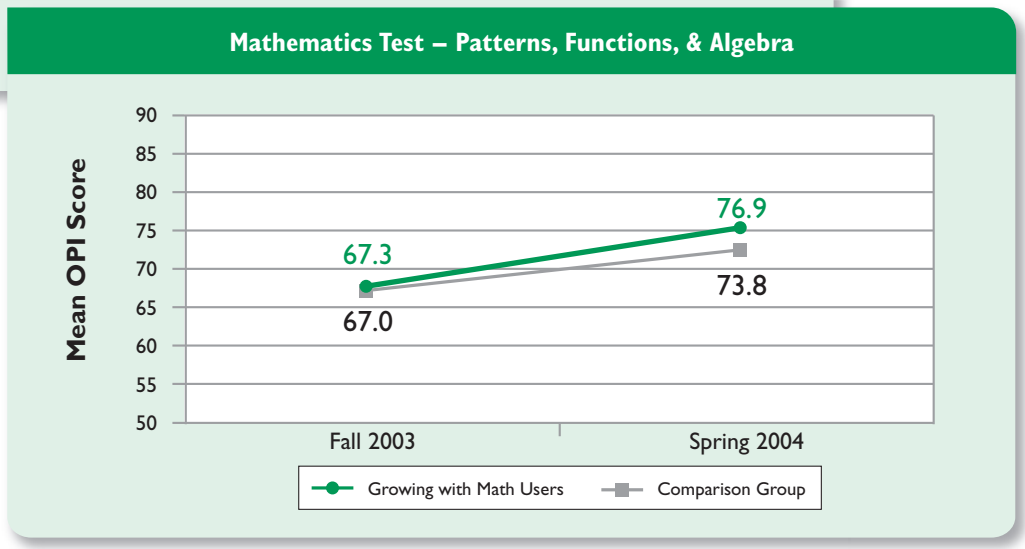
Measurements scores for the *Growing with Mathematics* students increased by 12.1 points throughout the year, while the comparison group's scores increased by 8.8 points throughout the year. In the Geometry and Spatial Sense area, *Growing with Mathematics* students increased their overall scores by 8.5 points while the comparison group saw an overall increase of 6.2 points.

Data Analysis, Statistics, and Probability & Patterns, Functions, and Algebra

The Data Analysis, Statistics, and Probability skill measures the ability to analyze, interpret, and evaluate data in various forms and apply the concepts and processes of data analysis, statistics, and probability to real-world situations. The Patterns, Functions, and Algebra skill recognizes and extends patterns and demonstrates an understanding of functional relationships, algebraic processes, variables, and inequality.

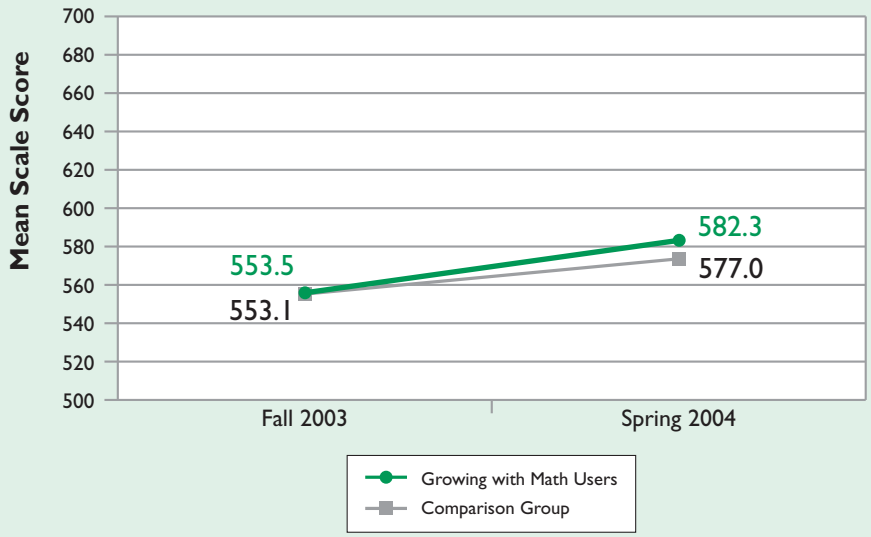
Scores for the *Growing with Mathematics* students exceeded the OPI scores for the control group by about three points in both areas measured. *Growing with Mathematics* students increased their overall Data Analysis, Statistics, and Probability scores by more than 13 points, compared to an increase of nearly 10 points for the comparison group. Overall Patterns, Functions, and Algebra scores for the *Growing with Mathematics* students increased by almost 10 points, compared to less than 7 points for the comparison group.



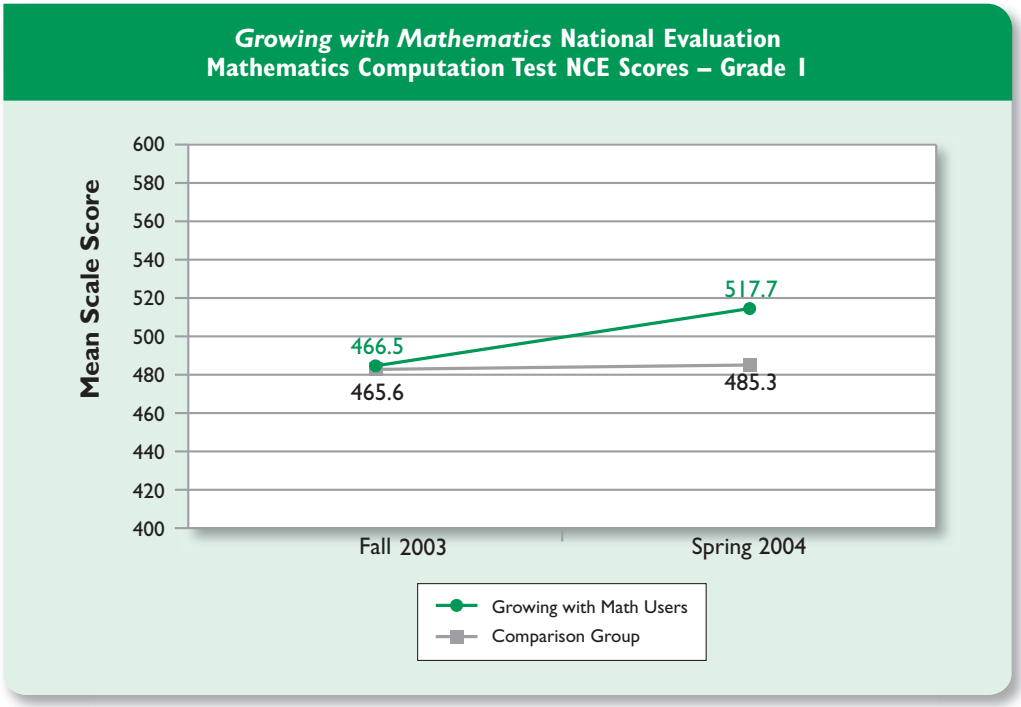


Results – Computation

Growing with Mathematics National Evaluation
Mathematics Computation Test NCE Scores – Grades 1–5



Computation Gains – Grade 1



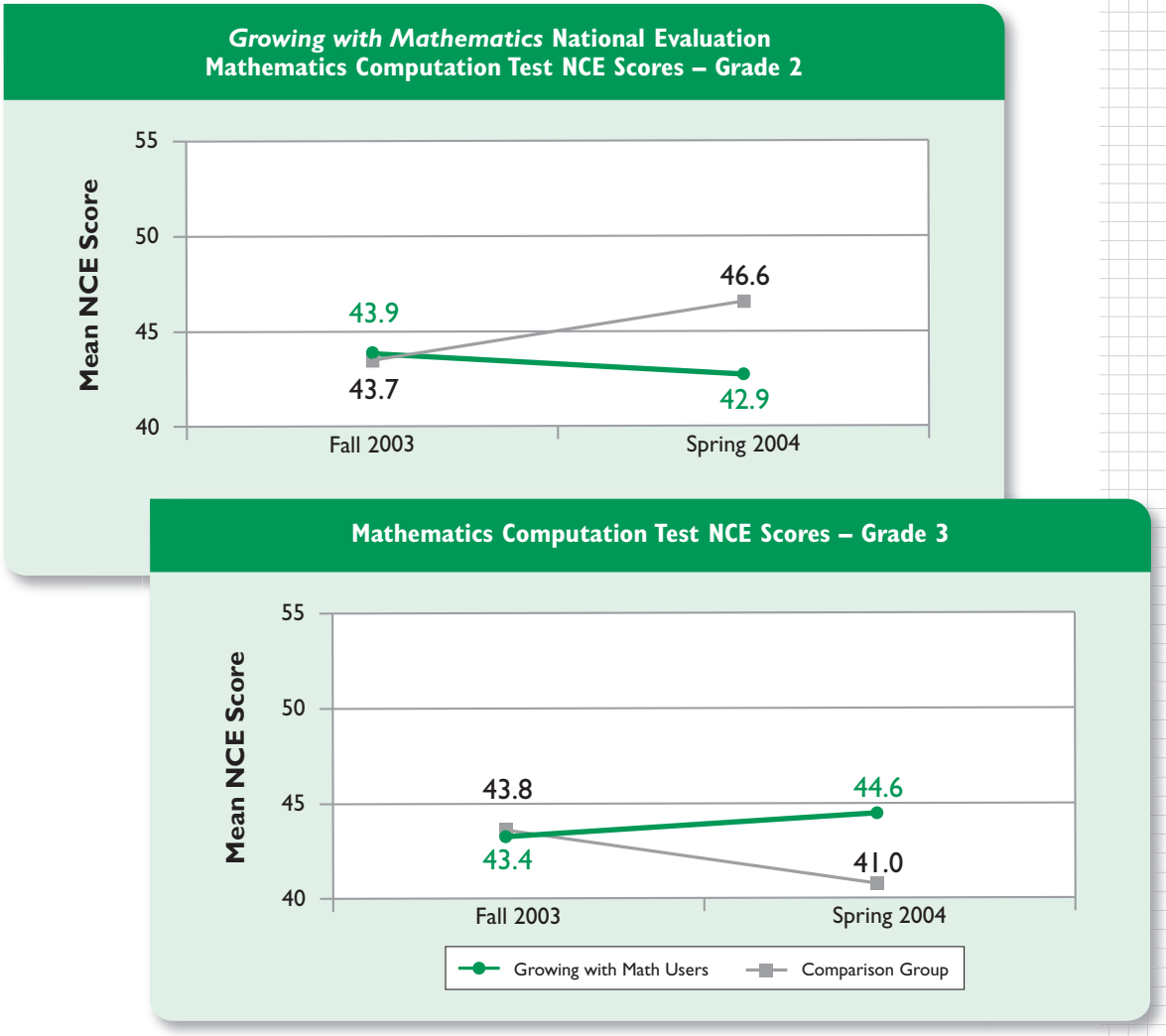
Overall Computation Gains

Across all Grades 1–5, students using the *Growing with Mathematics* curriculum showed significantly greater gains in their *TerraNova* Mathematics Computation Scale Scores, which tested mathematics computation skills. CTB/McGraw-Hill does not calculate Math Computation NCE scores at the beginning of the school year for first grade. Thus, the overall analyses for the computation score was calculated using the Scale Scores. Scale Scores were used for Grade 1, while scores for Grades 2–5 were reported based on their NCE scores.

Both the *Growing with Mathematics* and the comparison groups started the year with similar Scale Scores. At the end of the school year the *Growing with Mathematics* students had increased their scores by nearly 29 points, while the comparison group had increased their scores by almost 24 points.

Combined scores for students in all grades taught with the *Growing with*

Computation Gains – Grades 2 & 3

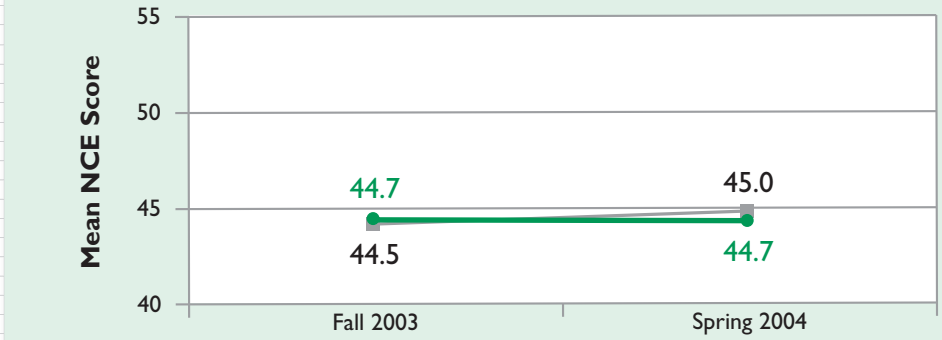


Mathematics curriculum were found to be statistically significant on the Mathematics Computation Test Objective Performance Index measures for the skills Adding Whole Numbers, Subtracting Whole Numbers, and Decimals. This provides evidence to support the conclusion that overall *Growing with Mathematics* was more effective on these tested measures than the comparison group.

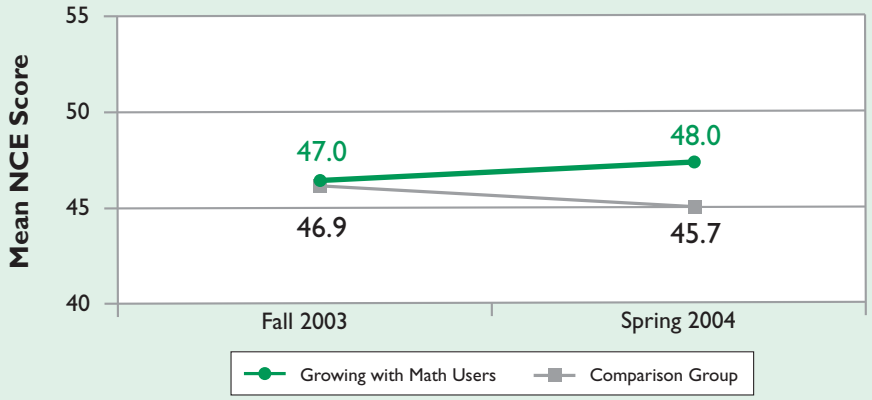
First grade students using the *Growing with Mathematics* curriculum showed significantly greater gains in their *TerraNova* Mathematics Test Scale Scores than the first grade students in the control group. The *Growing with Mathematics* first graders saw their computation scores increase over the course of the year by 11%, or 51.2 points, while scores for the comparison group only increased by 4%, or 19.7 points.

CTB/McGraw-Hill does not calculate Math Computation NCE scores at the beginning of the school year for first grade. Thus, Scale Scores were used for math computation analyses at this grade.

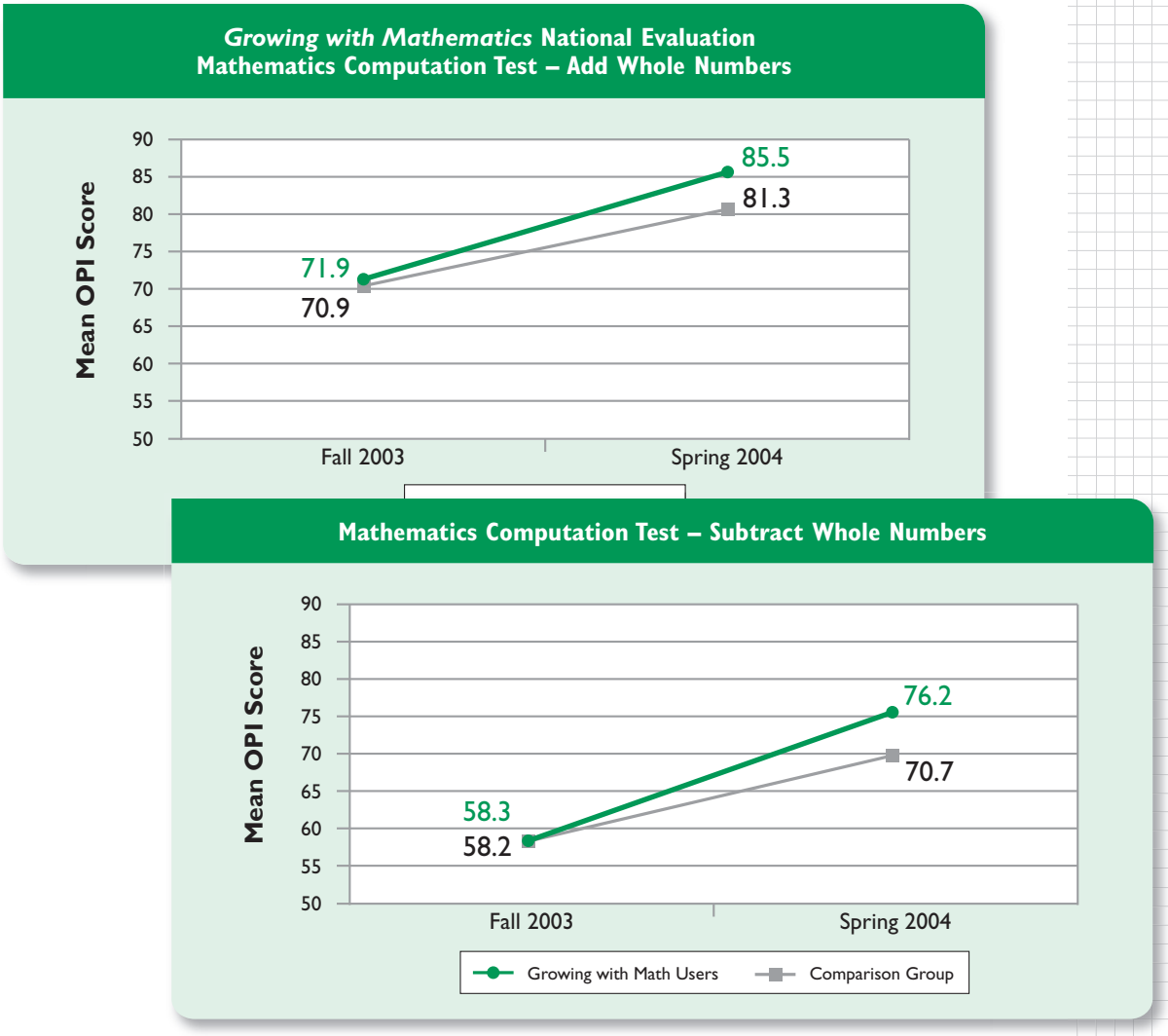
Growing with Mathematics National Evaluation
Mathematics Computation Test NCE Scores – Grade 4



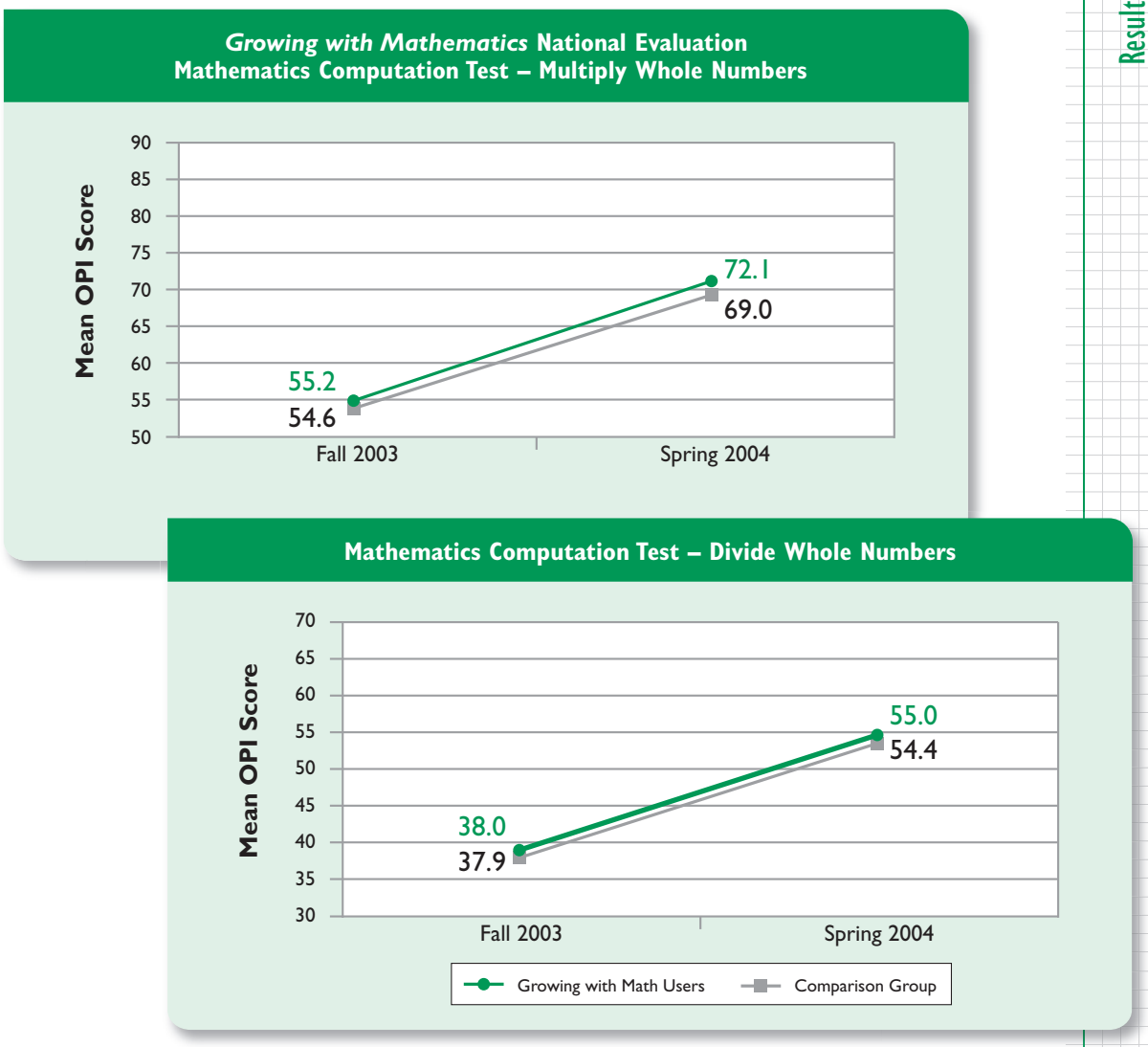
Mathematics Computation Test NCE Scores – Grade 5



Students using the *Growing with Mathematics* curriculum in Grade 3 showed significantly greater gains in their *TerraNova* Mathematics Computation NCE scores than the comparison group. Both groups started the year averaging slightly lower than the national norms. By spring testing scores for the *Growing with Mathematics* group had improved relative to the national norms, while the comparison group's scores fell by an average of 2.8 NCE points.



Multiply and Divide Whole Numbers

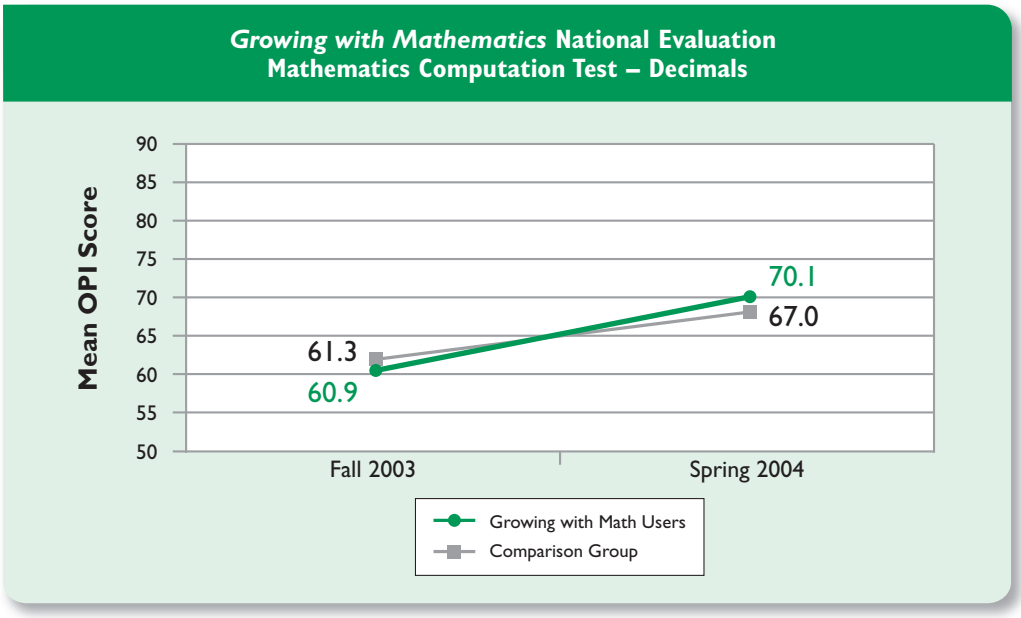


Computation Gains – Grades 4 & 5

Grade 5 students using both the *Growing with Mathematics* curriculum and those in the comparison group started the school year averaging slightly lower than the national norms. By spring testing, the *Growing with Mathematics* students had increased their average NCE score by one point, while the average NCE score for the comparison group decreased by more than one point.

There were no significant differences between the *Growing with Mathematics* fourth grade students and the fourth grade students in the control group in regards to their

Mathematics Computation NCE scores.



Summary of Results

Add and Subtract Whole Numbers

Growing with Mathematics students showed significantly greater gains on their OPI scores for the skill Adding Whole Numbers. They increased their scores by 13.6 points during the school year, while the control group increased their scores by 10.4 points.

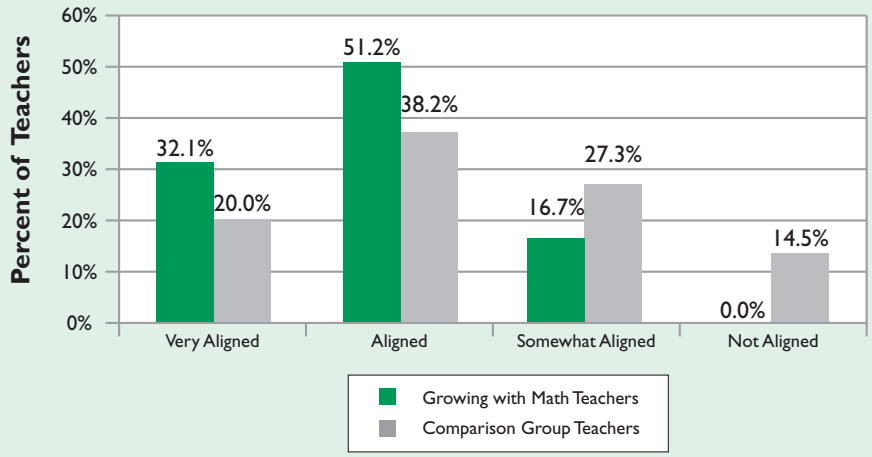
Growing with Mathematics students also showed significantly greater gains for the skill Subtracting Whole Numbers. *Growing with Mathematics* students gained 18.0 points during the school year, while the control group gained 12.4 points.

Growing with Mathematics scores for the skill Multiplying Whole Numbers exceeded the gains made by the comparison group by 2.5 points. *Growing with Mathematics* gains for the skill Dividing Whole Numbers also exceeded the gains made by the comparison group. Scores for the *Growing with Mathematics* students for the Dividing skill increased by 17 points throughout the year and the control group's scores increased by 16.5 points.

Decimals

Growing with Mathematics students showed significantly greater gains on their OPI scores than the comparison group, with an average gain of 9.2 points, compared to the average gain of 5.7 points made by the comparison group.

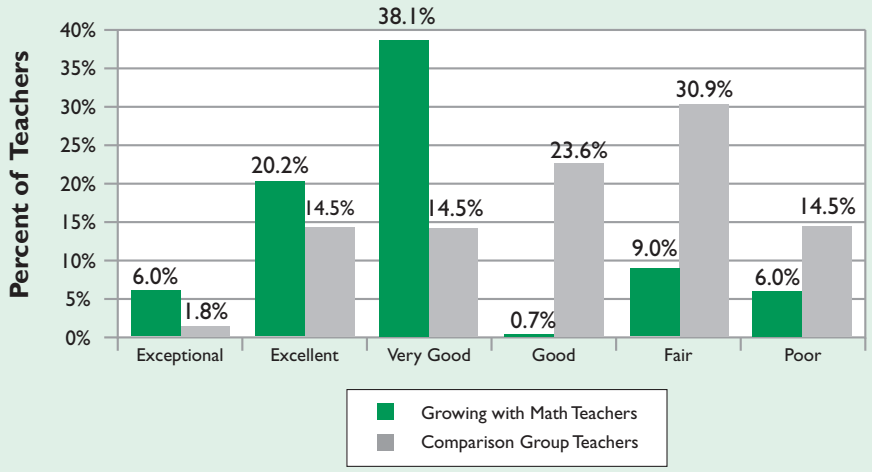
Mathematics Curriculum Alignment with State and District Standards



Comprehension

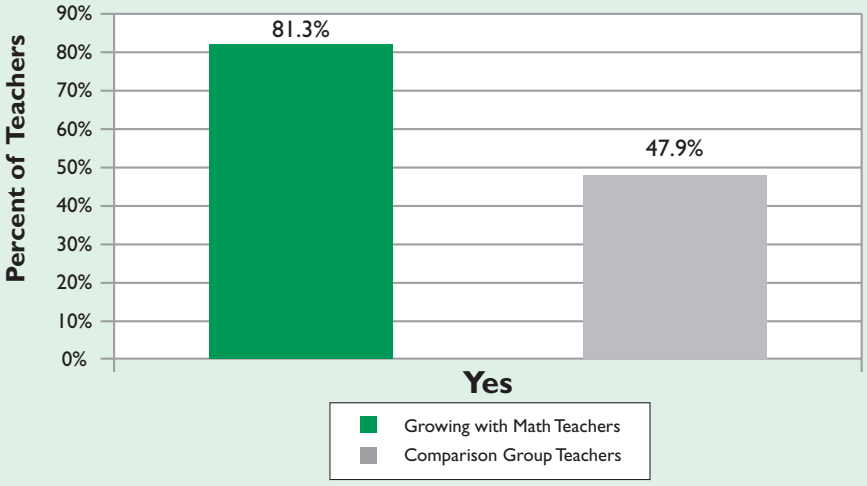
- Across all of the grades, *Growing with Mathematics* students showed significantly greater gains in the *TerraNova* Mathematics Test NCE Scores, which tested mathematics comprehension skills.

Teacher Ratings of Their Current Mathematics Text / Curriculum Series



- The trend was that the *Growing with Mathematics* students made greater gains in their NCE scores relative to the national norms than the comparison group.
- Overall, *Growing with Mathematics* students saw a growth of 3.5 points over the school year, while the overall scores for the comparison group decreased by 0.7 points over the course of the school year.

Percentage of Teachers Who Would Recommend Their Current Mathematics Text/Curriculum



Growing With Mathematics Research Base

curriculum exceeded the gains of the comparison group by 3–4 points, with Grade 3 *Growing with Mathematics* students exceeding the gains made by the comparison group by over 11 points. These gains were found to be statistically significant.

- Overall, students in the *Growing with Mathematics* group achieved greater gains in all of the Mathematics Test OPI scores. These gains were statistically significant in all of the skills assessed, including Number and Number Relations; Computation and Numerical Estimation; Operation Concepts; Measurement; Geometry and Spatial Sense; Data Analysis, Statistics, and Probability; and Patterns, Functions, and Algebra.

Computation

- Across all of the Grades 1 to 5, *Growing with Mathematics* students showed significantly higher gains in the *TerraNova* Mathematics Computation Scale Scores, which tested mathematics computation skills.
- Overall, scores of *Growing with Mathematics* students increased by 28.8 points, whereas the comparison group's scale scores increased by 23.9 points.
- Students taught with the *Growing with Mathematics* curriculum achieved greater gains in all of the Mathematics Computation Test OPI scores. These gains were found to be statistically significant for the skills Adding Whole Numbers, Subtracting Whole Numbers, and Decimals. In addition, *Growing with Mathematics* students outperformed the comparison groups for the skills Multiplying Whole Numbers and Dividing Whole Numbers.
- The findings provide rigorous evidence that *Growing with Mathematics* students consistently outperformed their peers in many areas of mathematics comprehension and computation. Thus, the *Growing with Mathematics* students significantly outperformed the matched comparison group in the acquisition of conceptual mathematics skills and computational skills.

Teacher Feedback

- Over 95% of the participating teachers completed a survey that gathered information on teacher demographics, education and experience, and perceptions of their current curriculum compared to what they previously used in the classroom. In addition, the surveys provided feedback regarding the teacher's curriculum in respect to standards and assessment, professional development, and recommendations for further implementation.
- There was a significant difference between the *Growing with Mathematics* teachers and the comparison group teachers reporting of how aligned their text/curriculum was with state or district standards. Eighty-three percent (83%) of the *Growing with Mathematics* teachers reported that their text/curriculum was aligned or very aligned with state or district standards, compared to 58% of the comparison teachers.

For more information about the
Growing With Mathematics® program
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