THE IMPACT OF *NO CHILD LEFT BEHIND* ON SCIENCE EDUCATION

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Not since the Soviet Union's launch of the Sputnik satellite—47 years ago has the need to improve science education in America been as clear and as urgent as it is today. America's competitive edge in the global economy, the strength and versatility of its labor force, its capacity to nourish research and innovation are all increasingly dependent on an education system capable of producing a steady supply of young people well prepared in science and mathematics.

In the face of many converging trends, efforts to reform and strengthen science education have been largely piecemeal and unfocused; yielding only modest gains. Nearly all states now have established academic standards in science and as announced at the Department of Education Science Summit in 2004 the annual testing of students in science as mandated by the *'No Child Left Behind'* will be extended, in the 2007–08 school year to include science.

For the past few years, the words *'No Child Left Behind'* and *'Scientific Research'* have been linked in conversations about educational standards, measurable achievement, and teacher quality. What do these conversations mean and how might they affect people directly involved in education?

NCLB and Science Teachers

How does the *No Child Left Behind* law translate into science education and how might it affect the everyday life of a teacher? As of the first day of the 2002-2003 school year, all teachers hired in Title I school-wide programs were required to be certified as 'highly qualified'. By the end of the 2005-2006 school-year, *No Child Left Behind* will require states to fill the nation's classrooms with teachers who are knowledgeable and experienced in math and science. An increase in pay for these qualified math and science teachers is a strong possibility.

Under the law, the definition of 'highly qualified teacher' can be determined by each state, as well as the method for determining the qualification. The minimum requirements are that teachers must have a bachelor's degree, full state certification, and demonstrate content knowledge in the subjects they teach.

Teachers who teach *core academic subjects* must meet the definition of 'highly qualified'. Core subjects are defined as English, reading, math, ***science,*** foreign languages, civics and government, economics, arts, history and geography. New elementary school teachers must demonstrate the required competency by passing a state-approved test. Experienced teachers may take a subject matter test or demonstrate competency through the state-developed High, Objective, Uniform State Standard of Evaluation (HOUSSE). The HOUSSE standards are also developed by each state to reflect the needs of the state's educational priorities.

States have considerable flexibility in determining how teachers demonstrate competency in Science. Requirements about subject-specific certification, such as in chemistry or physics, are also made by the state departments. A state may certify teachers as general science teachers or use other broad categories such as life sciences or physical sciences.

NCLB and Scientific Research

NCLB requires that federal funding go only to programs that are backed by scientifically based research—which is defined as research that involves the application of rigorous, systematic and objective procedures to obtain reliable and valid knowledge relevant to education activities and programs. (*A Toolkit for Teachers,* U.S. Department of Education, Washington, D.C., 2004, page 30). More simply stated, this means that programs used in the classroom should show evidence of increasing achievement.

PRELIMINARY DATA COLLECTION AND ANALYSIS:
Laying the Groundwork for Future Research

Test Score Baseline of Macmillan/McGraw-Hill Urban Districts Compared to Their State Averages

Introduction

Evaluating the effectiveness of introducing new texts, kits, and teaching methods into a school or school district requires that both its implementation and impact can be measured and analyzed. Effective implementation requires that the texts and materials are complete and didactically sound and that the teachers are trained to understand the materials and to use them effectively. Only if both are attained can one reasonably expect to have a meaningful impact on student achievement, such as reflected by their state's high-stakes testing. The purpose of this report is both to identify critical success factors to track during a new science text adoption, and to provide a basis for determining the impact of the Macmillan/McGraw-Hill (MMH) textual materials on student test scores in elementary science.

Critical Factors for Successful Implementation

Improving science achievement test scores depends on meeting two necessary preconditions: Standards-based, inquiry-oriented, high-quality materials which teachers actually utilize which provide effective instructional strategies that allow all students to learn science content in depth; and Indicators for both quality of materials and quality of instruction are needed for evaluating the implementation process.

Important indicators to assess quality of materials are:

- Accurate standards-based science content designed for the course of study.
- Key science concepts are developed in depth for conceptual understanding.
- Key science concepts are addressed in the context of their connections with the real world.
- The materials have a logical coherent conceptual framework within and between instructional units.
- Investigations provide students the opportunity to use science inquiry and develop abilities to think and act in ways associated with inquiry.
- The work students do is consistently accessible to diverse learners, providing opportunities for all students to achieve.
- Assessments that measure student understanding of key science concepts have all of the features of high-quality assessments.

Indicators to assess implementation processes are:

- For new adoptions, the extent to which ALL materials are available to individual teachers prior to the start of school.
- The frequency and intensity of professional development of teachers prior to implementation, the quality of the training, and the extent to which teachers avail themselves of such training.
- The frequency and intensity of professional development of teachers during the school year, the quality of the training, and the extent to which teachers avail themselves of such training.
- The extent to which teachers test students' mastery and understanding of key concepts through formal and/or informal periodic assessments, identify misconceptions, and adjust instructional sequences accordingly.
- The extent to which teachers utilize strategies that ensure students are engaged in inquiry-based learning.
- Teacher's attitude and effective engagement in the incorporation of literacy strategies (reading, writing, speaking & listening) in their science instruction.

Evaluating the Impact of Macmillan/McGraw-Hill Science

Historical achievement patterns of school districts adopting MMH elementary science are important to establish a pre-implementation baseline to judge the impact of adopting MMH materials. In addition, it is essential to know the racial/ethnic composition of district enrollment in relation to its achievement patterns. Table 1 organizes the facts pertinent to the state tests for science achievement for the identified districts using MMH science, including the school year when MMH science was first implemented district-wide.

Examination of the identified MMH urban district adopters listed on Table 1 reveals that: 1) few states test in more than one grade, 2) state science testing has been ongoing for at least four years in several of these districts, 3) state science testing has only just started in some of these districts and is about to start in others, and 4) only one district (St. Louis, MO) has used MMH science long enough to compile science test results over time. An additional observation about Table 1 is that several MMH urban sites (i.e. Houston and the four in California) do not have a prior history of science test results because state testing of science has only just started or is about to start. While future comparisons to state results are possible in these districts, interpretation is complicated by lack of pre-implementation baselines.

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Table 1: **State Assessment Facts for Districts Using MMH Elementary Science Texts**

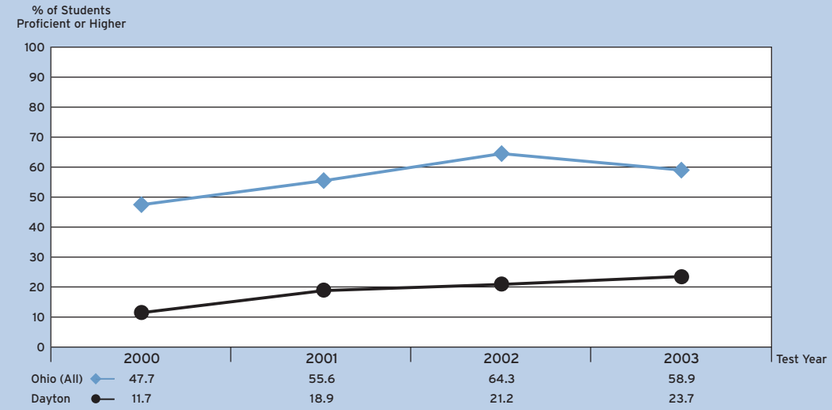
District Name/State	Name of State Assessment	Year Science Test Started	Grade(s) Tested in Science	Year MMH Science Starts
San Bernadino/CA	California Standardized Testing And Reporting System (STARS)	2003-4	Grade 5	2000-1
Pomona/CA	STARS	2003-4	Grade 5	2000-1
Davis/CA	STARS	2003-4	Grade 5	2000-1
Irvine/CA	STARS	2003-4	Grade 5	2000-1
Jacksonville/FL	Florida Comprehensive Assessment Test	2002-3	Grade 5	2000-1
DeKalb County/GA	Criterion-Referenced Competency Tests (CRCT)	2002 (no test 2003)	Grades 3,4,5	2002-3
Springfield/IL	Illinois Standards Achievement Test	Ongoing*	Grade 4	2003-4
Wichita/KS	Kansas State Science Assessment	2000-1	Grade 4	2000-1
Lafayette/LA	Louisiana Educational Assessment Program (LEAP-21)	Ongoing*	Grade 4	2003-4
Baltimore County/MD	Maryland School Assessment	No Science Test	None	2002-3
Springfield/MO	Missouri Assessment Program	Ongoing*	Grade 3	2003-4
St. Louis/MO	Missouri Assessment Program	Ongoing*	Grade 3	2001-2
Dayton/OH	Ohio Proficiency Test	Ongoing*	Grade 4	2003-4
Oklahoma City/OK	Oklahoma Core Curriculum Tests (OCCT)	Ongoing*	Grade 5	2000-1
Knoxville/TN	Tennessee Comprehensive Assessment Program (TCAP)	2001 (Only Norm-referenced scores in Science)	Grades 3,4,5	2003-4
Nashville/TN	Tennessee Comprehensive Assessment Program (TCAP)	2001 (Only Norm-referenced scores in Science)	Grades 3,4,5	2003-4
Shelby County/TN	Tennessee Comprehensive Assessment Program (TCAP)	2001 (Only Norm-referenced scores in Science)	Grades 3,4,5	2003-4
Amarillo/TX	Texas Assessment of Knowledge and Skills	2002-3	Grade 5	2000-1
Carrollton/TX	Texas Assessment of Knowledge and Skills	2002-3	Grade 5	2000-1
Houston/TX	Texas Assessment of Knowledge and Skills	2002-3	Grade 5	2000-1
Irving/TX	Texas Assessment of Knowledge and Skills	2002-3	Grade 5	2000-1
Virginia Beach/VA	Virginia Standards of Learning	Ongoing*	Grade 3 Grade 5	2003-4

** Note: "Ongoing" indicates that criterion/standards-referenced testing in science began before 2000-1, and has continued each year without interruption.*

MMH Science Pre-Implementation Trends
As previously stated, few sites have a history of previous results on their state's science test sufficient to constitute a multiple-year, pre-implementation baseline. The following two examples present the pre-implementation baseline comparisons of science achievement on state tests.

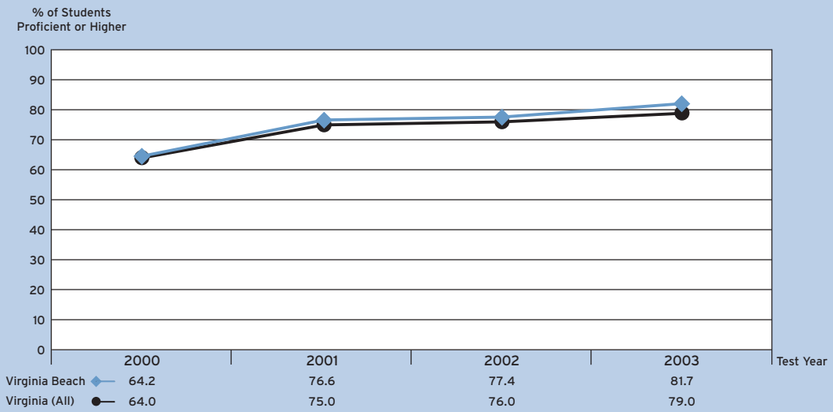
Dayton, OH (Figure 1): Figure 1 shows that Dayton students consistently performed at a much lower level of achievement compared to the state average for the past four years. While the percent of Dayton's students achieving proficiency or higher increased by about 10% during these four years, the same degree or improvement was seen in the average for the state as a whole.

Figure 1: **Baseline Implementation Data For Macmillan/McGraw-Hill Science**
Ohio Proficiency Test in Grade 4 Science
Comparing Dayton Schools to State Average for Last 4 Years



Virginia Beach, VA (Figure 2): Figure 2 shows that Virginia Beach students in Grade 5 consistently performed better, but just barely, than the state average for the past four years. An improvement trend was evident during this period, both for Virginia Beach and the state average.

Figure 2: **Baseline Implementation Data For Macmillan/McGraw-Hill Science**
Virginia Standards of Learning Test in Grade 5 Science
Comparing Virginia Beach Schools to State Average for Last 4 Years



Summary
This preliminary analysis sets the stage for continuing study of available test score data. The science achievement of students using the MMH Science program from all districts will be collected and studied over time to follow the progress of students and to provide information to support the continued development of the program. An efficacy study will also be undertaken to examine the impact of the science program in a scientifically controlled environment. An independent research group will be contracted to conduct the study in collaboration with academic experts in the field of science education.

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NCLB and Science Assessment

NCLB requires that beginning in 2007, states measure students' progress in science at least once in each of three grade spans (3–5, 6–9, 10–12) each year. The improved achievement of identified subgroups such as English Language Learners, students of color, and special education students is now a priority because the achievement goals that districts and schools must meet through Adequate Yearly Progress (AYP) are the same for all students. A school or district cannot meet the AYP standard unless EACH of the subgroups makes the target EVERY year.

Teachers are also expected to make data-driven decisions about instruction in the classroom through the use of *dynamic assessments.* These assessments are embedded in the ongoing classroom instruction. Teachers can use the information from these regularly administered classroom assessments to shape the instruction of the students and to measure their progress over time.

SUCCESS IN ELEMENTARY SCIENCE: St. Louis Public Schools

Higher Scores on the Latest Missouri Assessment Program Science Shows Biggest Improvement of Any Subject

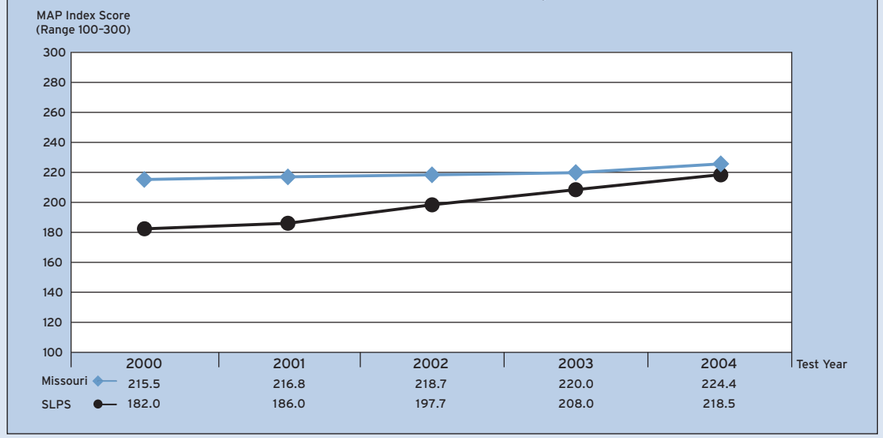
Overview

The results of the latest scores on the Missouri Assessment Program (MAP) tests show that elementary students in the St. Louis Public School district continue to "catch up" to the Missouri State average in science, communication arts, and mathematics. MAP test scores[1] of students in SLPS elementary schools have improved at such a fast rate over the past five years that the District will actually meet the state average in all three subjects by next year or the following year just by continuing to improve at this rate.

Data

Figures 1 through 3, for Science, Communication Arts and Mathematics, respectively, illustrate just how dramatic this improvement has been. In all three subjects, students in the tested elementary grades of SLPS have improved more than the state average for the past five years, with science achievement being the most improved from 2000–2004, followed in order by communication arts and mathematics.

Figure 1: **Science**
Grade 3 Test Scores on the Missouri Assessment Program (MAP): St. Louis Public Schools vs. Missouri Average for Last Five Years



[1] *MAP scores are presented as Index Scores ranging from 100 to 300. Scores were calculated by the formula developed by the Missouri Department of Elementary and Secondary Education (DESE) for purposes of comparing scores among different demographic groups and among different schools.*

NCLB AND SCIENCE ASSESSMENT

Figure 2: **Communication Arts**
Grade 3 Test Scores on the Missouri Assessment Program (MAP): St. Louis Public Schools vs. Missouri Average for Last Five Years

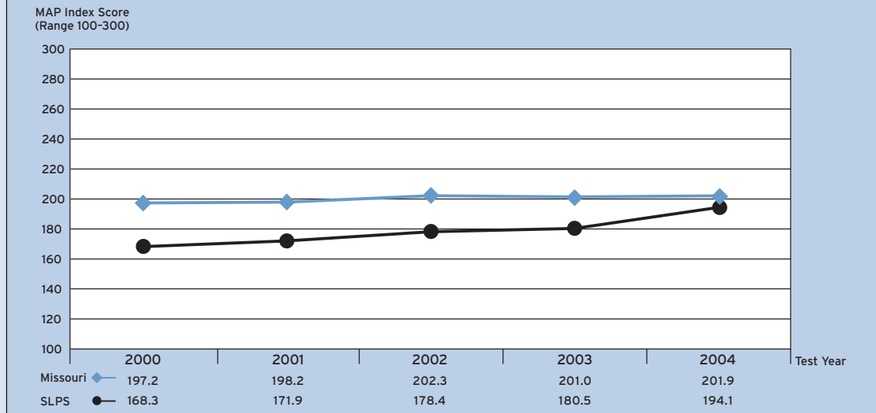
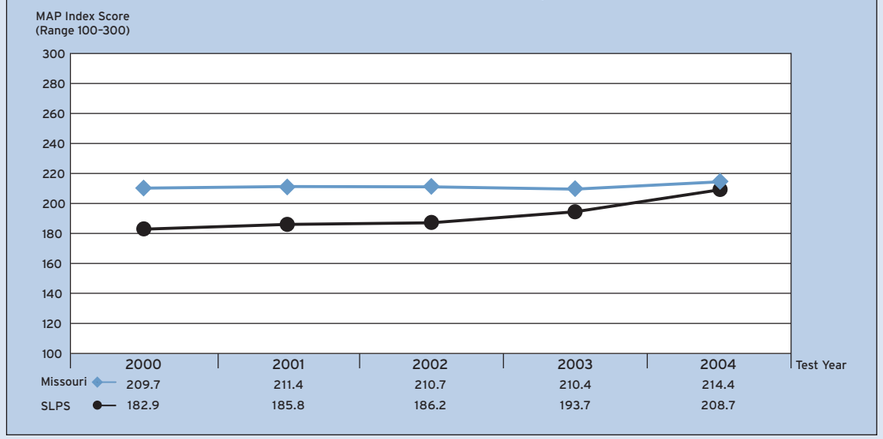


Figure 3: **Mathematics**
Grade 3 Test Scores on the Missouri Assessment Program (MAP): St. Louis Public Schools vs. Missouri Average for Last Five Years



The degree of improvement across all three subject areas is quantified in Figure 4. Figure 4 shows that elementary students in SLPS improved much more than their counterparts in the rest of Missouri, and also improved much more than students in the middle and high schools of SLPS.

As indicated by Figure 4, the greatest degree of improvement was seen in elementary school science, with an improvement on MAP of 20.1% from 2000 to 2004. And most of this improvement occurred during Test Years 2002, 2003, and 2004, years that correspond to the adoption of new text materials in science from Macmillan/McGraw-Hill.

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Figure 4: **Percent Improvement in MAP Test Index Scores from 2000 to 2004 by Grade and Subject. St. Louis Public Schools (SLPS) Compared to the Missouri Average.**

Grade	Subject	District	MAP Index Score Year 2000	MAP Index Score Year 2004	% Improve
Three/Four	Comm. Arts	SLPS	168.3	194.1	15.3
Three/Four	Science	SLPS	182.0	218.5	20.1
Three/Four	Mathematics	SLPS	182.9	208.7	14.1
Three/Four	Comm. Arts	Missouri	197.2	201.9	2.4
Three/Four	Science	Missouri	215.5	224.4	4.1
Three/Four	Mathematics	Missouri	209.7	214.4	2.2
Seven/Eight	Comm. Arts	SLPS	154.8	153.9	–0.6
Seven/Eight	Science	SLPS	136.5	134.9	–1.2
Seven/Eight	Mathematics	SLPS	134.4	144.3	7.4
Seven/Eight	Comm. Arts	Missouri	190.8	191.2	0.2
Seven/Eight	Science	Missouri	169.3	168.6	–0.4
Seven/Eight	Mathematics	Missouri	167.6	173.4	3.5
Ten/Eleven	Comm. Arts	SLPS	154.2	142.5	–7.6
Ten/Eleven	Science	SLPS	135.4	127.1	–6.1
Ten/Eleven	Mathematics	SLPS	135.8	129.3	–4.8
Ten/Eleven	Comm. Arts	Missouri	182.9	185.2	1.3
Ten/Eleven	Science	Missouri	166.2	167.4	0.7
Ten/Eleven	Mathematics	Missouri	162.2	171.1	5.5

Implications

An Urban Systemic Initiative from the National Science Foundation (NSF) to improve Mathematics and Science has been in place in SLPS since 1998–9. Although intended to improve student achievement in K through 12, objective **improvement has been confined almost exclusively to the elementary grades** (the one exception being a small improvement in middle school mathematics). Similar patterns of improvements being limited to the elementary level have also been reported by other NSF Urban Systemic Initiative sites. These findings suggest that systemic reform of curriculum and teaching in middle and high schools may be too late to provide much help for students already lacking in prerequisite fundamental knowledge, skills and abilities that should have been acquired in previous grades. This hypothesis would be further strengthened if the higher-achieving students now emerging from elementary schools continue to achieve in middle and high schools.

STATEWIDE SUCCESS IN SCIENCE:
A Quantitative Evaluation of Districts Using the Macmillan/McGraw-Hill Science Series in Elementary School

Background

Sixty (60) districts use MMH Science Series in Elementary Schools in Missouri as of the current school year (2004–2005). Thirty-eight (38) of these were selected according to the following criteria: 1) public, non-charter school, 2) had results posted on the web site of the Missouri Department of Elementary and Secondary Education (DESE) for either or both of the last two test years (2003 and/or 2004) for the Missouri Assessment Program (MAP) test in Science in Grade Three, 3) adoption must have included the MAP-tested Grade, Grade Three, and 4) must have adopted MMH Science prior to the current school year (2004–2005).

This study compares results on the Grade Three Science MAP test before these districts adopted MMH Science (test year 2000) and again on the results of the most recent MAP test (Spring, 2004). The results of MMH Districts are contrasted to those for all other Districts in Missouri, (i.e., those using texts other than MMH for teaching Science in Grade Three.)

The calculated composite scores are weighted in accordance with the number of students tested in each of these districts. The MAP data recorded are the percentage of all students in the District who achieved at one of the Top Two Levels of performance, Proficient and Advanced, and the number of Grade Three students tested each year. Also the composite total percent in the Top Two Levels statewide was recorded for both study years, as was the total number of students tested statewide in both these years.

Results

The results of number of students tested and percent of students in Top 2 Levels is shown in Table 1 for each of the three study groups (i.e., all Districts Statewide, all MMH Districts, and all non-MMH Districts) for both of the test years studied (i.e., 2000 and 2004). Figure 1 presents the results of two groups of major interest, (i.e., districts using MMH Science and the remaining Districts not using MMH Science.)

Table 1: **Comparing MMH, non-MMH and Statewide Results for MAP Science in 2000 and 2004**

District	Year 2000 (pre-adoption) % Prof/Advan	Year 2000 (pre-adoption) # Tested	Year 2004 (post-adoption) % Prof/Advan	Year 2004 (post-adoption) # Tested
All Missouri Districts	44.9	69928	51.2	42758
MMH Districts	30.3	11959	44.5	9440
Non-MMH Districts	47.9	57969	53.1	33318

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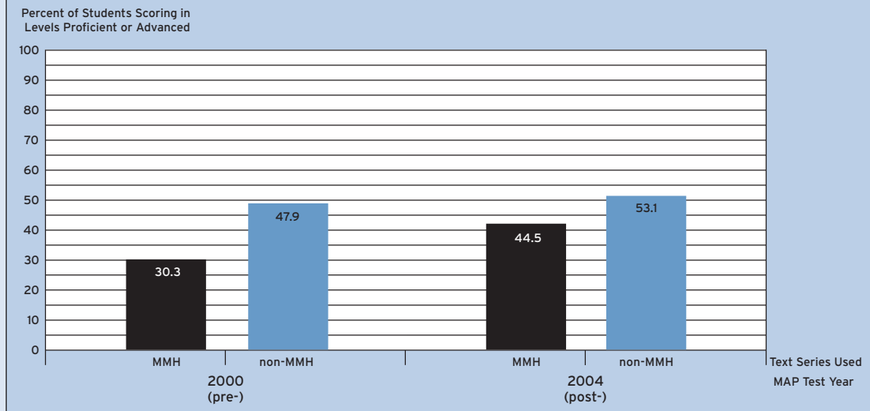
Figure 1: **Comparison between MMH and non-MMH Districts**

Gains Made on Missouri's MAP Science Test in Grade Three by Districts Now Using Macmillan/McGraw-Hill (MMH) Science Vs. Districts Not Using MMH.

(Note: Test Year 2000 was Prior to Using MMH in 38 Districts that later adopted MMH)



Discussion

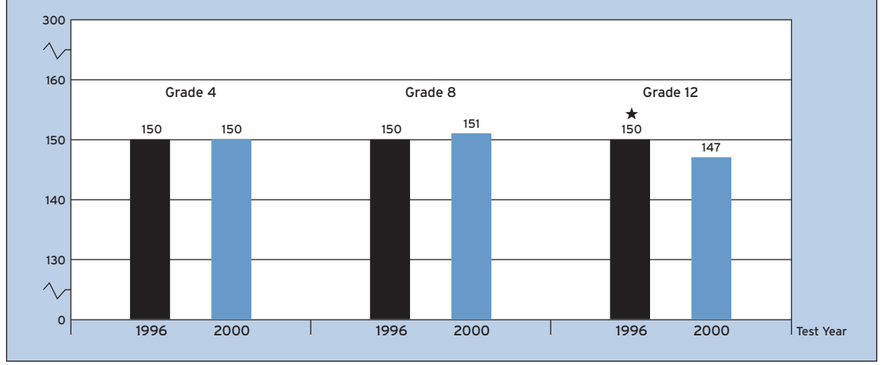
The data clearly outline a major trend in Missouri. Prior to adopting MMH, districts tended to score considerably lower on the State's Science MAP test than the Districts who were not using MMH in the years before the Macmillan adoption. In fact, the Districts that would later adopt MMH, had scored more than 17 percent lower than non-MMH sites in a year (2000) just before adoptions started. **Yet just four years later (2004), the test results of the same districts, now using MMH texts, had closed about one half of the original gap with respect to non-MMH, separated now by less than nine points.** Included among the MMH districts are the two largest urban school districts in the state, St. Louis and Kansas City.

Most (25 of 38) of the Macmillan/McGraw-Hill Science user districts have improved by an average of 22% from their pre-adoption baseline through the first year of implementation. The larger districts tend to be among those showing the greatest gains using the Macmillan Science Program.

Understanding National Science Achievement

What's behind the call for increased attention to Science education? One reason lies in the results of the latest ***National Assessment of Educational Progress Science Assessment*** (2000). The findings of this assessment showed no significant achievement change in grades 4 and 8, and a decline in achievement performance in grade 12, since 1996. (National Center for Educational Statistics, NAEP, 2000 Science Assessment.) The only area of increase that could be found was for 8th grade students who were already performing in the top 10 percent of students (Figure 1).

Figure 1: **NAEP 2000 Science Assessment**
Average Science Scores, Grades 4, 8, and 12: 1996-2000

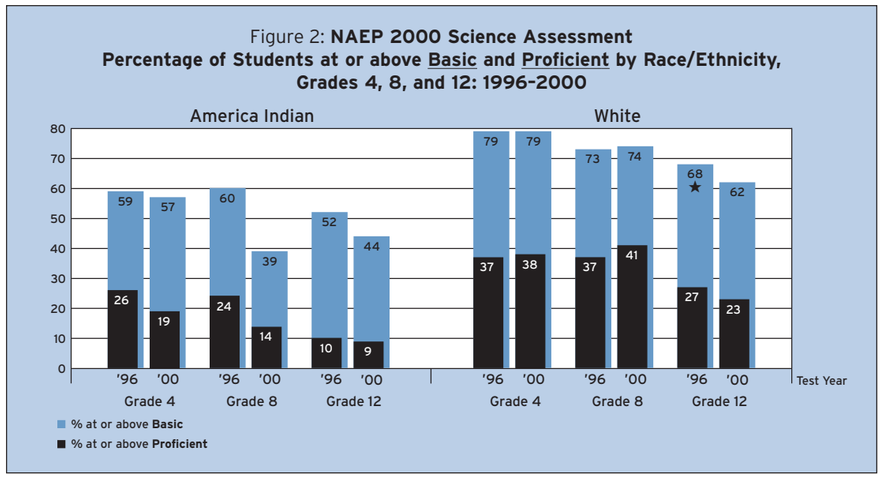


SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 and 2000 Science Assessments.

In total, 47,000 students from 2,100 schools across the country were tested in the national NAEP Science sample. The separate state-by-state sample included 180,000 students from 7,500 schools.

The test was designed so that results could be calculated for subgroups of students. For most of the subgroups, average scores in 2000 were not significantly different than in 1996. However, for two subgroups, American Indian students at grade 8 and White students in grade 12, there was a decline in science scores (Figure 2).

Figure 2: **NAEP 2000 Science Assessment**
Percentage of Students at or above Basic and Proficient by Race/Ethnicity, Grades 4, 8, and 12: 1996-2000



SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 and 2000 Science Assessments.

States scores in the state-by-state sample were ranked to be higher, no different, or lower than the national average. Of the 40 states that participated in the NAEP Science Assessment, 18 had higher score averages than the nation, including states such as Missouri and Ohio for both 4th and 8th grade.

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What does the test look like?
The NAEP science assessment includes both multiple-choice and constructed-response questions. The example below demonstrates the importance of open-ended response questions.

Short Constructed-Response Question

Scored on a three-level scale: "Unsatisfactory," "Partial," "Complete"

This question, which probed the practical reasoning abilities of the student in the field of earth science, asked students to apply the concepts of weathering and erosion to a practical situation involving the deterioration of a stone monument placed in New York City.

This "Complete" response to the question stated two valid reasons for the damage to the stone monument and gave a possible way of preventing its further deterioration.

Overall percentage "Complete"	Percentage "Complete" within achievement level intervals		
	Basic 143–169	Proficient 170–207	Advanced 208 and above
28	28	47	71

Cleopatra's Needle is a large stone monument that stood in an Egyptian desert for thousands of years. Then it was moved to New York City's Central Park. After only a few years, its surface began crumbling.

Sample "Complete" Response:

What probably caused this crumbling?

Because of the polution and acid rain.

New York City wants to keep Cleopatra's Needle in the same location in Central Park. How can the city prevent further damage to the stone?

They could put a roof over it or something to protect it from the rain.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1996 and 2000 Science Assessments.

CLOSING THE ACHIEVEMENT GAP:
Macmillan/McGraw-Hill Science

A recent evaluation of Grade Three students in St. Louis Public Schools (SLPS) identified important trends in achievement on the Missouri Assessment Program (MAP). Figure 1 shows clear evidence of two important trends in MAP Science: 1) that both black and white SLPS students are quickly catching up to the state average, and 2) that black students in SLPS are improving even more rapidly than the state average. For instance, white third graders in SLPS scored slightly higher than the state average in 2003, for the very first time, and repeated this in 2004. And black third graders narrowed their achievement gap in MAP Science, compared to the state average for all students, from an initial difference of nearly 40 score units in 1999 to just less than 9 score units in 2004. Most of the difference in this achievement gap was made up during the three most recent years, 2002–2004, when the District adopted the Macmillan/McGraw-Hill Science series. If the same rate of improvement prevails, then the achievement gap for black students in Grade Three Science could be closed in just one more year.

How well the black students of SLPS are doing in Grade Three Science is perhaps best illustrated by comparing them to black students who attend public schools in the 23 surrounding districts of St. Louis County, many of which are both more affluent and have many more high-achieving white students. For the past three years, black students in SLPS schools have averaged higher scores on the Grade Three MAP test in Science compared to the average for all black students in all of the 23 school districts combined of St. Louis County.

Figure 1: **Missouri Assessment Program (MAP) Results for Grade 3 Science in St. Louis Public Schools (SLPS) by Students' Race and by Test Year Compared to the Missouri (MO) Average for All Students**

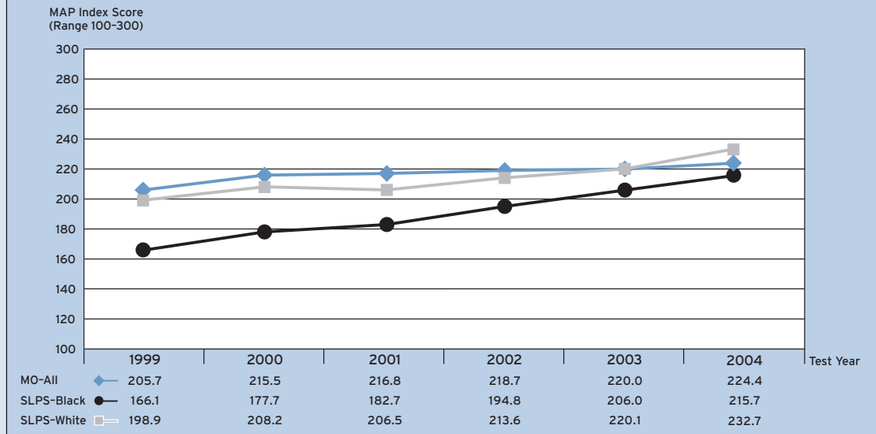
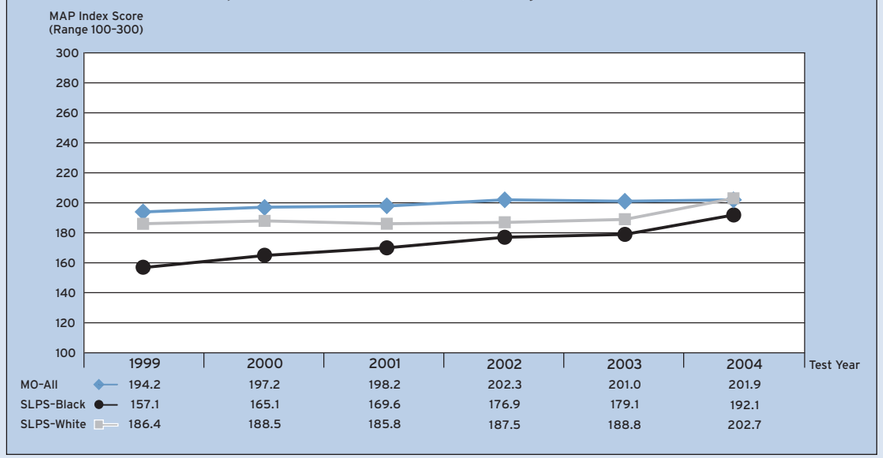


Figure 2 shows a similar improvement in achievement scores by black students in SLPS on the Grade Three MAP test in Communication Arts. Black students in SLPS Grade Three have narrowed an initial achievement gap to the state average from 37 score units in 1999 to just less than 10 score units in 2004. One factor that clearly improved communication skills was an emphasis on reading and writing within the elementary science curriculum. This emphasis was due to the new teaching practices introduced by a systemic reform initiative that SLPS received from the National Science Foundation, along with Macmillan/McGraw-Hill textual materials in science.

Figure 2: **Missouri Assessment Program (MAP) Results for Grade 3 Communication Arts in St. Louis Public Schools (SLPS) by Students' Race and by Test Year Compared to the Missouri (MO) Average for All Students**



NOTE: The MAP Index Score takes all data into account, assigning different weights to the percentage of students scoring in each of the five achievement levels of the MAP: Advanced, Proficient, Nearing Proficient, Progressing and Step 1. The lowest score possible would be 100 if all students were in the lowest achievement level of Step 1. Conversely, achieving the highest possible score of 300 would occur if all students achieved at the highest achievement level of Advanced.

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No Child Left Behind and Science: The Total Impact

If fully implemented, the overall impact of NCLB on Science Education will result in significant and far-reaching changes in the way we teach Science in the Unites States. To date, there are many credible hypotheses about the requirements of science educational materials. Few of these hypotheses, however, have been tested and replicated under rigorous, experimental conditions. The research conducted now and throughout the NCLB duration could provide the kind of instructional clarity that is available to Early Reading teachers today.

Macmillan/McGraw-Hill believes in the importance of data-driven decision making and is aggressively pursuing the keys to making highly effective curriculum materials. Evidence of this pursuit of excellence is demonstrated in a number of ways:

1. There is methodical attention to the latest research to maintain the cutting edge perspective.
2. There is a materials production cycle that rigorously tests prototype materials in a variety of demographic settings.
3. There are objective, blind reviews of the materials in development, seeking advice from teachers, administrators, and academic experts in science content and science education.
4. And finally, Macmillan/McGraw-Hill believes in testing the 'final product' under experimental conditions to uncover strengths and weaknesses for the future.

In effect, NCLB has laid down a challenge to publishers to demonstrate the quality of their science programs. Macmillan/McGraw-Hill has confidently accepted.

NCLB: TOTAL IMPACT ON SCIENCE

Macmillan/McGraw-Hill Science 2005

- Science content is scientifically researched, standards-based and has empirical evidence of success of raising student test scores.
- Concepts are taught through using the 5-E Inquiry Instructional Learning Model called for in the National Science Education Standards on Inquiry.
- Consistent spiraling of science concepts provides developmentally appropriate content at each grade level for a greater depth of understanding.
- Integrated reading strategies provide the support for all students to learn to read in the content area with strong vocabulary and writing practice.
- Science is made relevant to the child's world, through child-centered text tied to powerful visual connections.
- Science Readers with activities makes science content accessible to all students.
- Inquiry skill lessons, Explore Activities, Quick-Labs and Science-Center Activities help all students learn the tools and skills of science investigations.
- Strong teaching materials are designed with built-in strategies to maximize the teacher's planning time and to support teachers of science—from the novice to the expert.
- Complete technology support is integrated into the instructional pattern of each and every lesson.
- Multiple assessment opportunities are available for informational practice and to measure student understanding.

MACMILLAN/McGRAW-HILL