

PARTNERSHIP FOR REFORM IN SCIENCE AND MATHEMATICS

2003-2006



IMPACT REPORT-MARCH 2007

PRISM's Ten Strategies

1. Offering customized professional learning in science and mathematics for K-12 teachers
2. Offering P-5 Science and Mathematics Endorsements for teachers
3. Providing opportunities to participate in P-16 Learning Communities, focused on improving teaching and learning in science and mathematics
4. Providing the Institute on the Teaching and Learning of Science and Mathematics
5. Improving teacher preparation programs in science and mathematics
6. Recruiting teachers to teach science and mathematics
7. Improving K-12 teacher working conditions
8. Implementing Georgia's Performance Standards in science and mathematics
9. Providing needed information to parents about the importance of taking challenging science and mathematics courses
10. Changing the higher education faculty reward structure

Vision

Increase science and mathematics (SM) achievement for all K-12 students in order to improve their readiness for post-secondary education and careers by enhancing teacher quality, raising expectations for all stakeholders, and closing the achievement gaps through the collaboration of K-16 partners.

PRISM is a comprehensive research, development and implementation project designed to test key strategies to increase student learning and achievement in science and mathematics in schools and colleges, to codify what works, to use it to influence statewide change in policy and practice, and to inform the nation about successes that should be replicated to rebuild America's competitive advantage in science and mathematics. In January 2003, the P-16 Department, within the University System of Georgia (USG), submitted a proposal for a Comprehensive Mathematics and Science Partnership (MSP) Grant to the National Science Foundation (NSF). This proposal was written through a partnership of seven University System colleges and universities and 15 public school systems in four geographical regions of the state with the University System and Georgia Department of Education. The award was announced in September 2003. The P-16 Department serves as the coordinating unit and fiscal agent for NSF's award of \$34.6 million over 5 years (2003-2008).

Approximately 170,000 K-12 students, 10,000 K-12 faculty and 575 University System faculty are or will be involved in PRISM over the five years of the grant.

PARTNERS WORKING TOGETHER

PRISM partners:

- 15 school districts with 275 schools: Atlanta Public Schools, Bryan, Bulloch, Camden, Candler, Chatham, Clarke, Effingham, Evans, Glynn, Jackson, Oconee, Screven, Toombs, and Vidalia City
- 7 colleges and universities: Armstrong Atlantic State University, Coastal Georgia Community College, Georgia Perimeter College, Georgia Southern University, Georgia State University, Georgia Institute of Technology's Center for Education Integrating Science Mathematics and Computing (CEISM), and the University of Georgia
- 4 regions in Georgia: Northeast, East Central, Southeast and Metro Atlanta
- 2 state partners: University System of Georgia and Georgia Department of Education

A LOOK AT PRISM K-12 PROFESSIONAL LEARNING

Customized Professional Learning

Research has shown that in order for professional learning to be effective, it should be tied to student learning content standards and classroom instruction; sustained over time; connected with higher education; and be part of a larger effort to improve instruction (No Child Left Behind Act, 2001). K-12 SM teachers in the 15 PRISM districts have been provided the opportunity to participate in professional learning customized to their individual, school, and/or regional needs while being collaboratively designed and delivered.

To date, PRISM has provided customized professional learning to 6,554 individual K-12 faculty members in the PRISM regions. These participants have developed inquiry-based teaching strategies, deepened content knowledge, and participated in on-going action research projects. Many of these faculty members have participated in multiple professional learning opportunities. Elementary teachers have had the opportunity to earn a P-5 Endorsement in Mathematics. Twenty four PRISM elementary teachers in nine PRISM districts have earned the P-5 Mathematics Endorsement. This represents 26% of the currently practicing teachers with this endorsement in Georgia.



Another type of effective professional learning established through PRISM has been the P-16 Learning Community. These communities provide unique opportunities for K-12 and college and university faculty to collaborate in order to study and learn together. Many of the PRISM learning communities are school-based, some are district-based and others are regionally-based. Participants regularly come together to examine student data, discuss teaching strategies, and study specific content based on identified needs in order to refine effective practices on the teaching and learning of SM. Two hundred fifty-two K-16 Learning Communities have been established at the school, district, and/or regional level. Higher education faculty have served as participants in 123 of these learning communities.

Developing Teacher Leadership



Lead Teachers learning about different methods of offering professional learning

PRISM has increased the capacity for teacher leadership in the schools. Over 350 PRISM Lead Teachers received training through the PRISM Lead Teacher Academies in developing and delivering science and/or mathematics professional learning, facilitating P-16 learning communities, data collection methods, and in serving as a change agent.

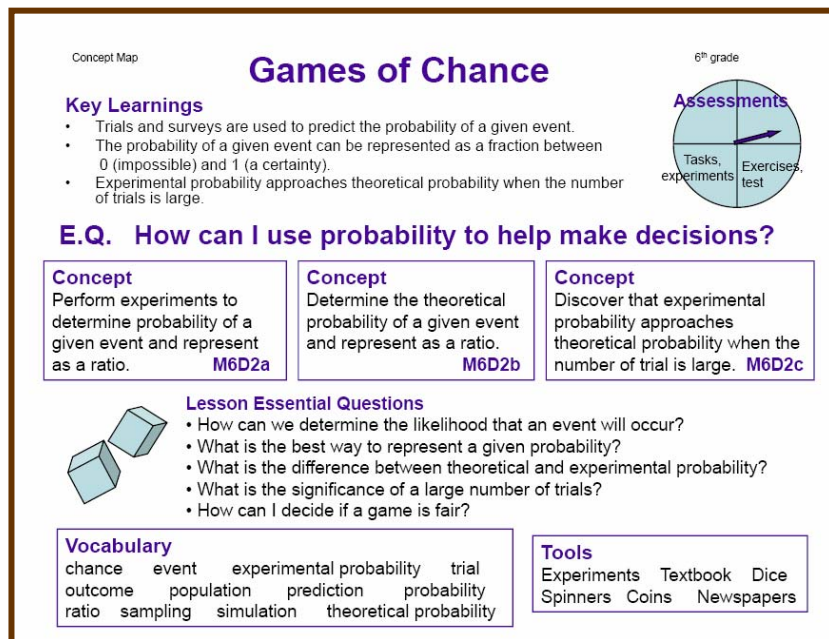
A pilot Academic Coach program was implemented in January 2006. An elementary school-based Science Academic Coach in Chatham County taught demonstration lessons, provided professional learning in inquiry-based teaching and showcased student work to demonstrate the effectiveness of inquiry instruction by teachers. In Fall 2006, two additional Academic Coach pilot programs were implemented. Bulloch County has a 6-12 Mathematics Coach and Effingham County has a 6-12 Science Coach.

IMPLEMENTING THE GPS

Development of the Georgia Performance Standards in Science and Mathematics

Georgia's Department of Education has developed a new and more rigorous K-12 curriculum. PRISM has provided support to ensure higher education faculty's engagement and involvement in development of the Georgia Performance Standards (GPS) for Science and Mathematics. PRISM funding has supported the development of tools for K-12 teachers to use in implementing the GPS, and for faculty members to use in preparing teacher candidates to be ready to teach the GPS in Georgia's schools. PRISM funding has also created the Regional Educational Service Agencies (RESA) Collaborative in Science and Mathematics, providing professional learning for regional science and mathematics specialists and the Georgia Department of Education science and mathematics staff. PRISM's support has deepened the collaboration between higher education and the Georgia Department of Education through the development and implementation of the GPS in Science and Mathematics.

Sample of a Concept Map from
Grade 6 Mathematics—
for more information go to
www.georgiastandards.org




Creating Awareness Around the Importance of Science and Mathematics

A statewide, multi-faceted awareness campaign has been ongoing since January 2006. There have been 201 outdoor billboard ads, 135 bus shelter ads, 120 MARTA train cards, 405 television spots/public service announcements, 10 Savannah Transit bus wraps, 50 Savannah Transit internal bus ads, 1 two-page spread in Georgia Trend Magazine, 8 Parent Magazine ads, and 27 articles in various newspapers across Georgia. In addition, parent guides are being distributed to PRISM parents and teachers receive posters about careers in science and mathematics for their classroom. Math/Science Family Nights are being co-sponsored as a companion program to the awareness campaign; over 50 are planned for the 2006-2007 school year with the expectation that thousands of families across the four PRISM regions will receive first-hand information on how to support student achievement by incorporating science and mathematics learning at home.

Parents and students working together at Metter Primary—October 2006



Who cares about math and science?



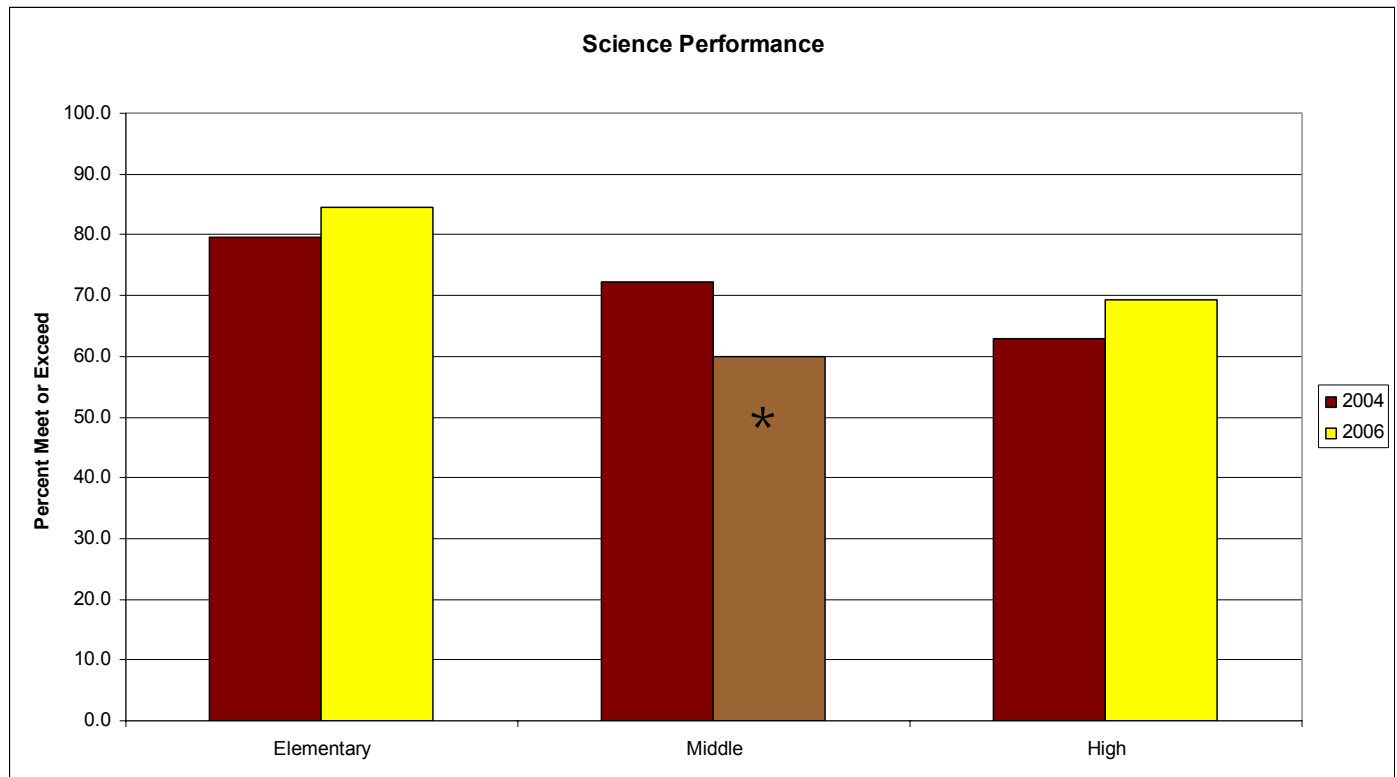
More people than you might think, in some pretty cool careers: animal behaviorist + astronomer + entomologist + code-breaker + ecologist + game developer + oceanographer + software specialist + veterinarian + rocket scientist + quantum physicist + psychologist + DNA researcher + special effects artist + web designer + criminologist + astronaut + medical illustrator + political strategist + park ranger + meteorologist + FBI agent + forensics expert + marine biologist + venture capitalist + geophysicist + landscape architect + chef + physical therapist + immunologist + neuroscientist + neurosurgeon + homemaker + speech pathologist + cancer researcher + urban planner + environmental advocate + animator + paleontologist + organic farmer + robotics engineer + artificial intelligence expert + musical engineer + interior designer

MATH + SCIENCE = SUCCESS

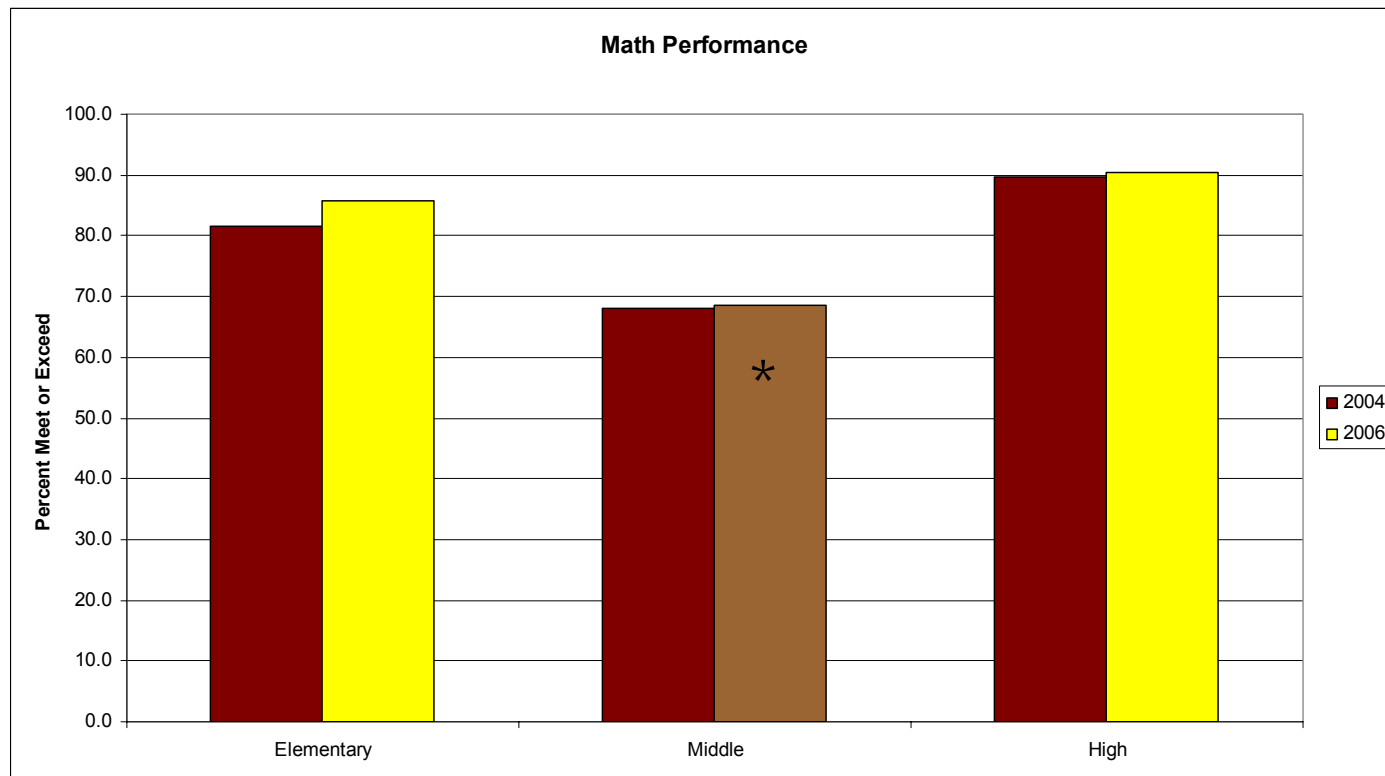
MATHSCIENCESUCCESS.ORG

A LOOK AT K-12 STUDENT ACHIEVEMENT DATA ACROSS PRISM DISTRICTS

An analysis of the schools participating in PRISM shows improvement in student proficiency in mathematics at all levels and in science at the elementary and high school levels. At the elementary level, large gains were in the percent of students meeting or exceeding proficiency in both mathematics and science. High school mathematics performance also saw a slight increase (see chart page 5). Middle grades mathematics and science and high school science are harder to interpret because the tests changed, but despite a more rigorous curriculum the pass rate increased in middle school mathematics and high school science. Science performance at the middle school level decreased. This is consistent with research indicating that declines in student performance are expected immediately following implementation of a new curriculum.



*2006 test data for science are not comparable to that from previous years' in middle grades science because new tests were administered on the CRCT in grades 6 and 7 to reflect the new GPS.

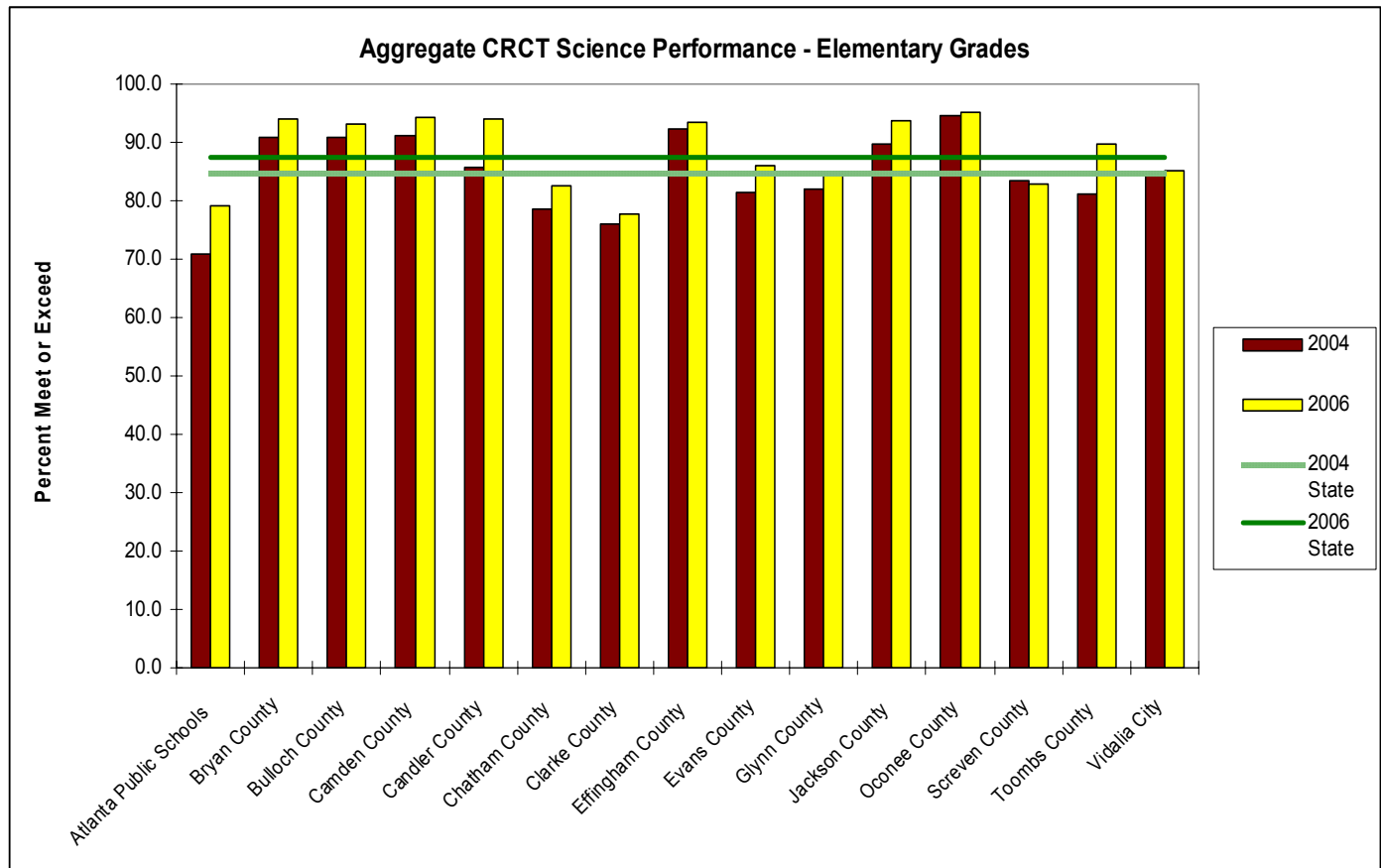


*2006 test data for middle grades mathematics are not comparable to that from previous years' because new tests were administered in grade 6 to reflect the new GPS. Grades 1-5, 7, 8 and 11 were tested on the QCC.



Students working with temperature probes in a high school chemistry class after their teacher had participated in a calculator-based lab professional learning class taught by a university faculty member.

CHANGES IN THE CRITERION-REFERENCED COMPETENCY TEST AT THE ELEMENTARY LEVEL IN SCIENCE



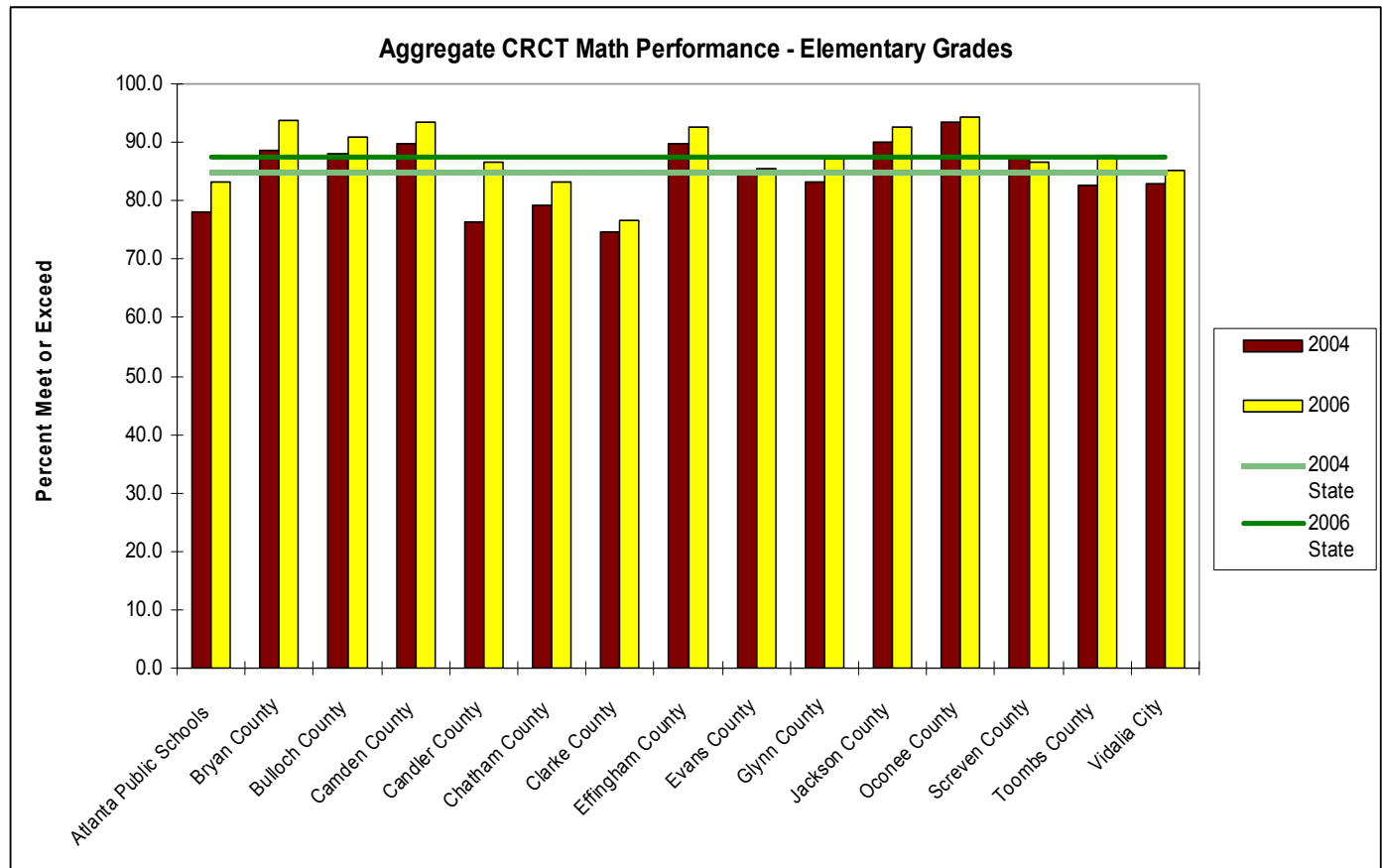
2006 Results in Science

14 of 15 PRISM districts increased their percentage of students meeting or exceeding proficiency in science when compared with the 2004 results.

The number of PRISM districts exceeding the state pass rate increased from 7 to 8.

7 PRISM districts posted pass rates > than 90%, 2 more than in 2004.

CHANGES IN THE CRITERION-REFERENCED COMPETENCY TEST AT THE ELEMENTARY LEVEL IN MATH



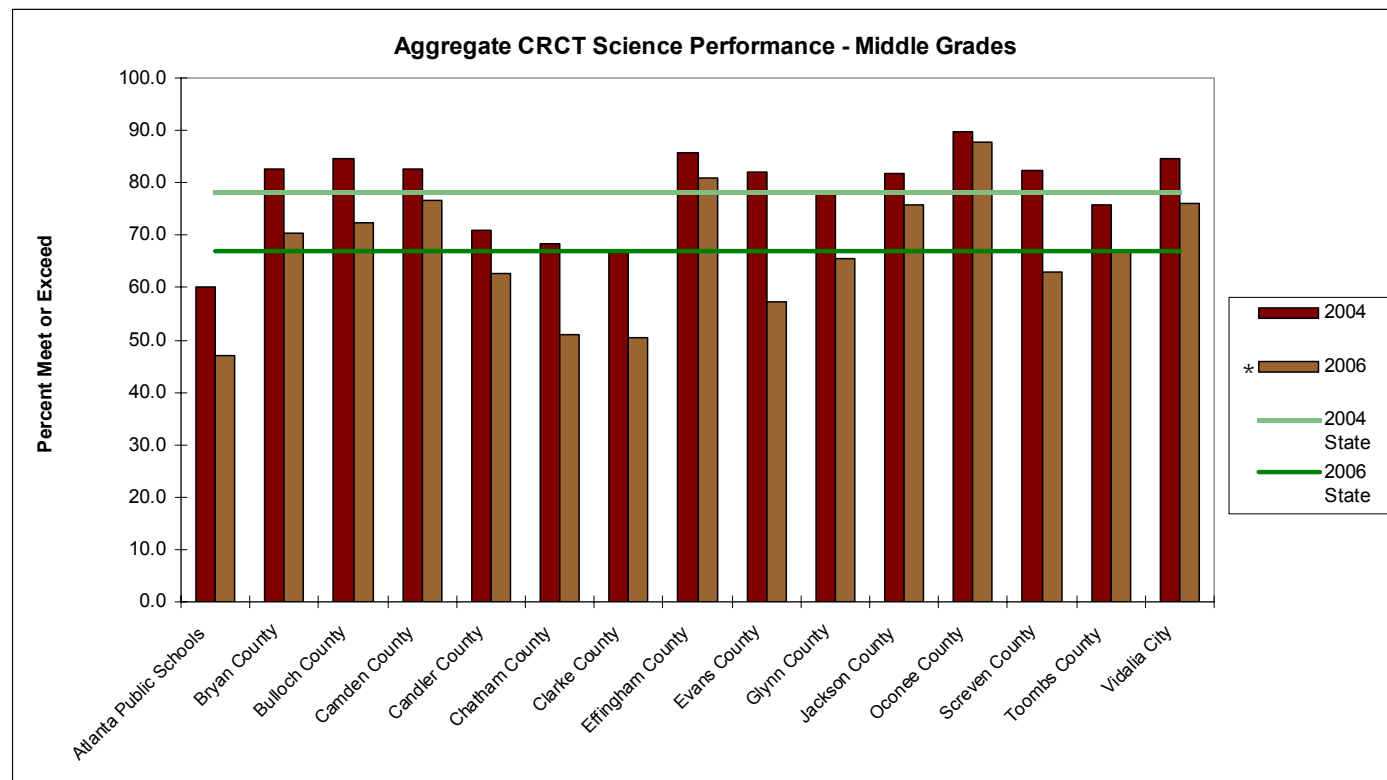
2006 Results in Math

14 of 15 PRISM districts increased their percentage of students meeting or exceeding proficiency in mathematics when compared with the 2004 results.

The number of PRISM districts exceeding the state pass rate decreased from 8 to 7.

6 PRISM districts posted pass rates > than 90% , 4 more than in 2004.

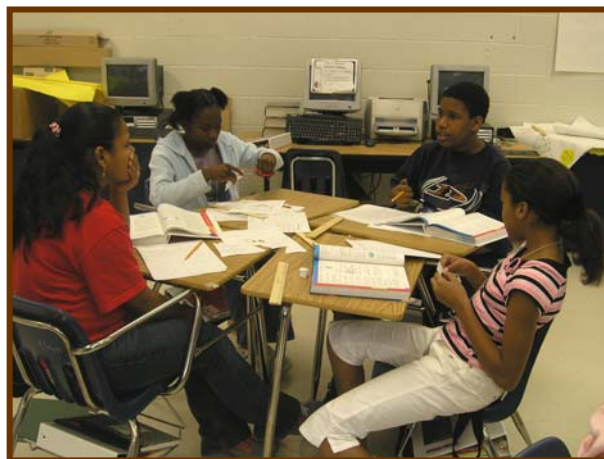
CHANGES IN THE CRITERION-REFERENCED COMPETENCY TEST AT THE MIDDLE SCHOOL LEVEL IN SCIENCE



2006 Science Results

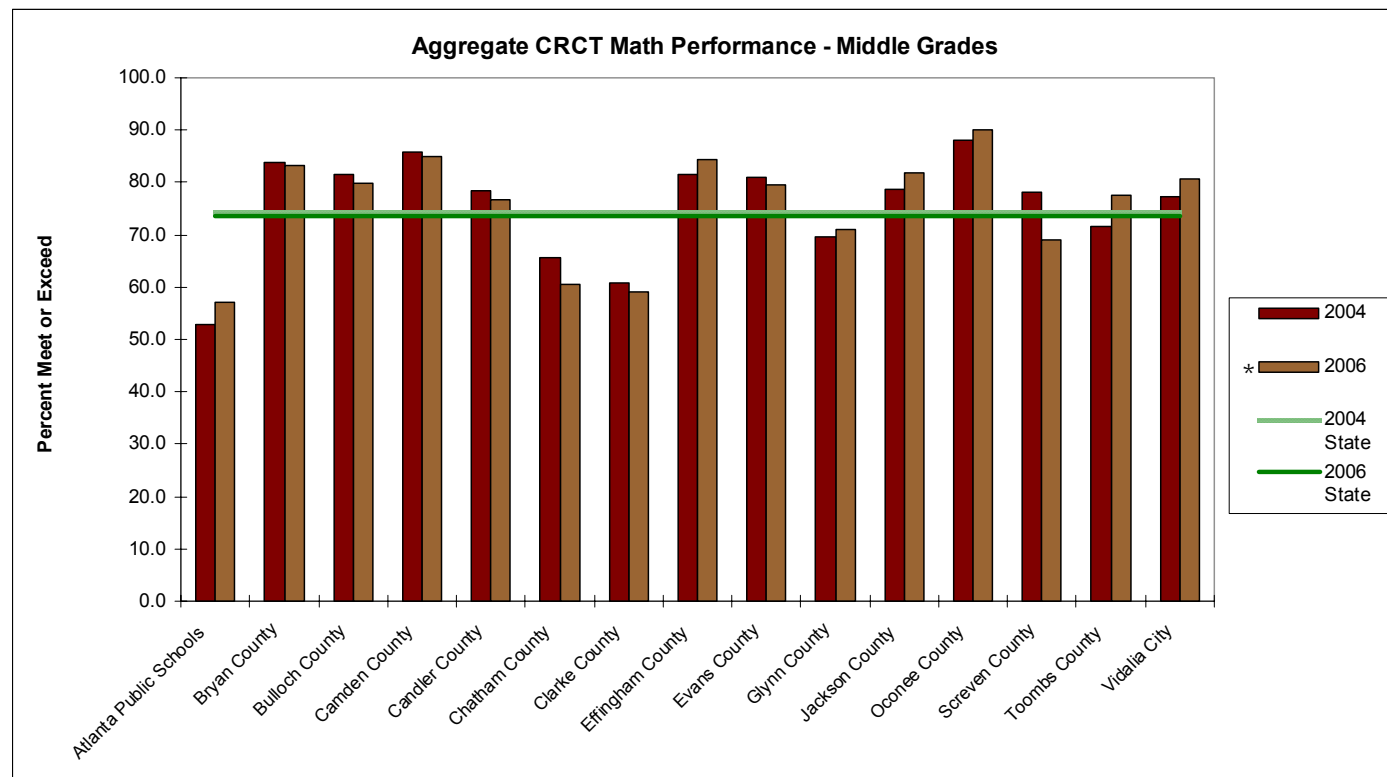
*The new GPS curriculum was implemented in grades 6 and 7 during the 2005-06 school year, therefore, the results are not comparable to 2004. Tests in these grades were new as well. Typically after a new curriculum and assessment are implemented test scores decline. Georgia's middle school students were no different. It is expected that these test scores will begin to rise.

Seven PRISM districts posted a greater percent meeting or exceeding rate than the state in 2006.



Middle school students using a team approach for learning

CHANGES IN THE CRITERION-REFERENCED COMPETENCY TEST AT THE ELEMENTARY LEVEL IN MATH



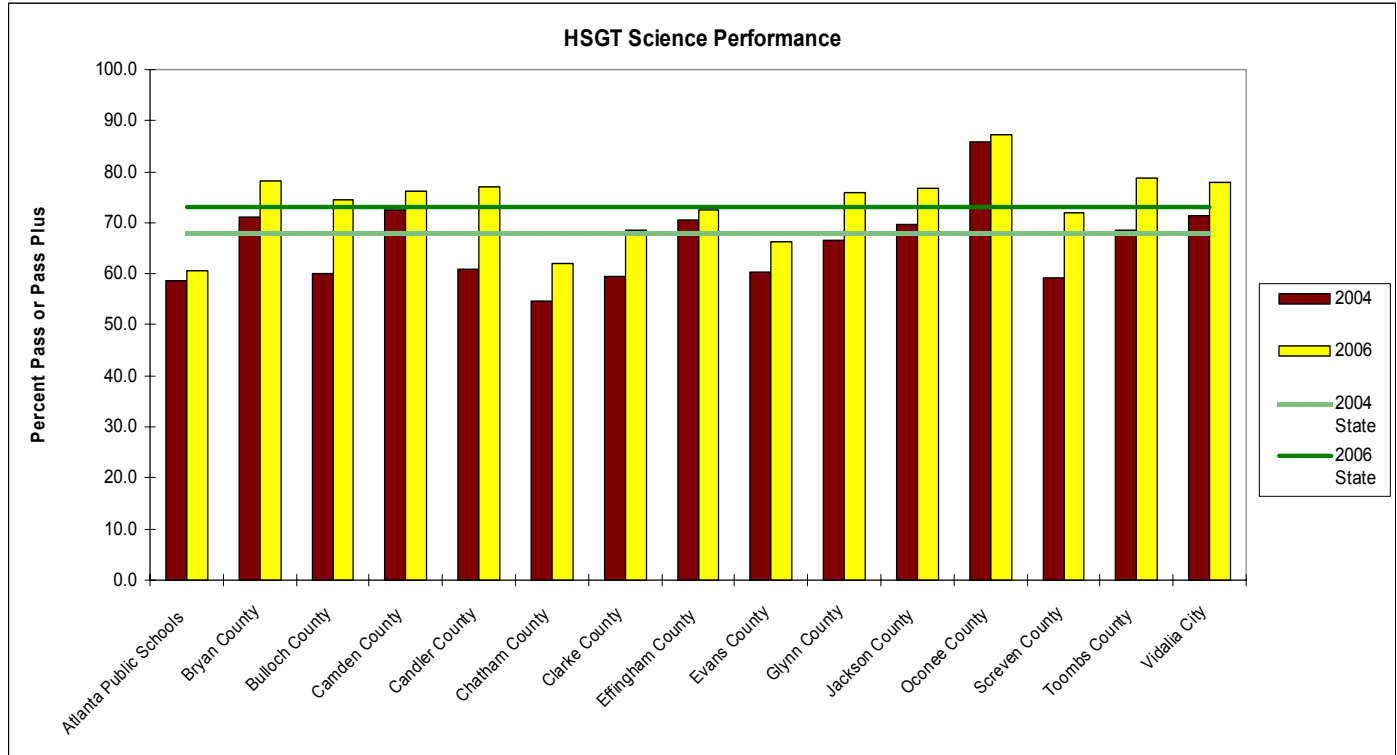
2006 Math Results

*The new GPS curriculum was implemented in grade 6 during the 2005-06 school year so the mathematics CRCT in grade 6 was a new test. The results are not comparable. The new GPS in mathematics is substantially more rigorous than the previous Quality Core Curriculum (QCC).

The number of PRISM districts exceeding the state pass rate remained the same (10) as the number in 2004.

Six PRISM districts increased their percentage of students meeting or exceeding proficiency in mathematics in 2006.

CHANGES IN THE HIGH SCHOOL GRADUATION TEST IN SCIENCE



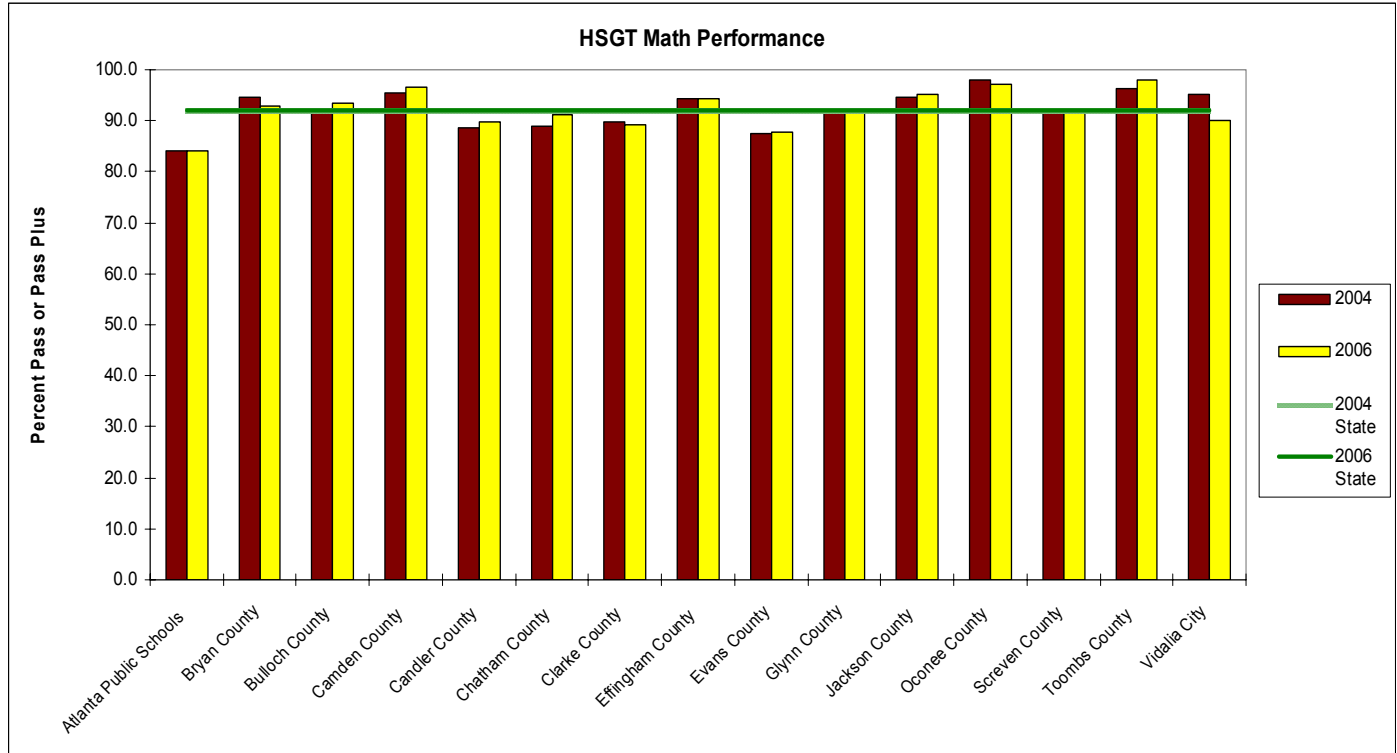
2006 Science Results

The new GPS was implemented in Science at the high school level during the 2005-06 school year. Tests were revised accordingly so results from the 2004 baseline year are not comparable to 2006 results.

100% of PRISM districts increased their percentage of students meeting or exceeding proficiency in science when compared with the 2004 results. This occurred even though scores typically decline after implementation of a new curriculum and test.

The number of PRISM districts exceeding the state pass rate increased from seven to nine.

CHANGES IN THE HIGH SCHOOL GRADUATION TEST IN MATH

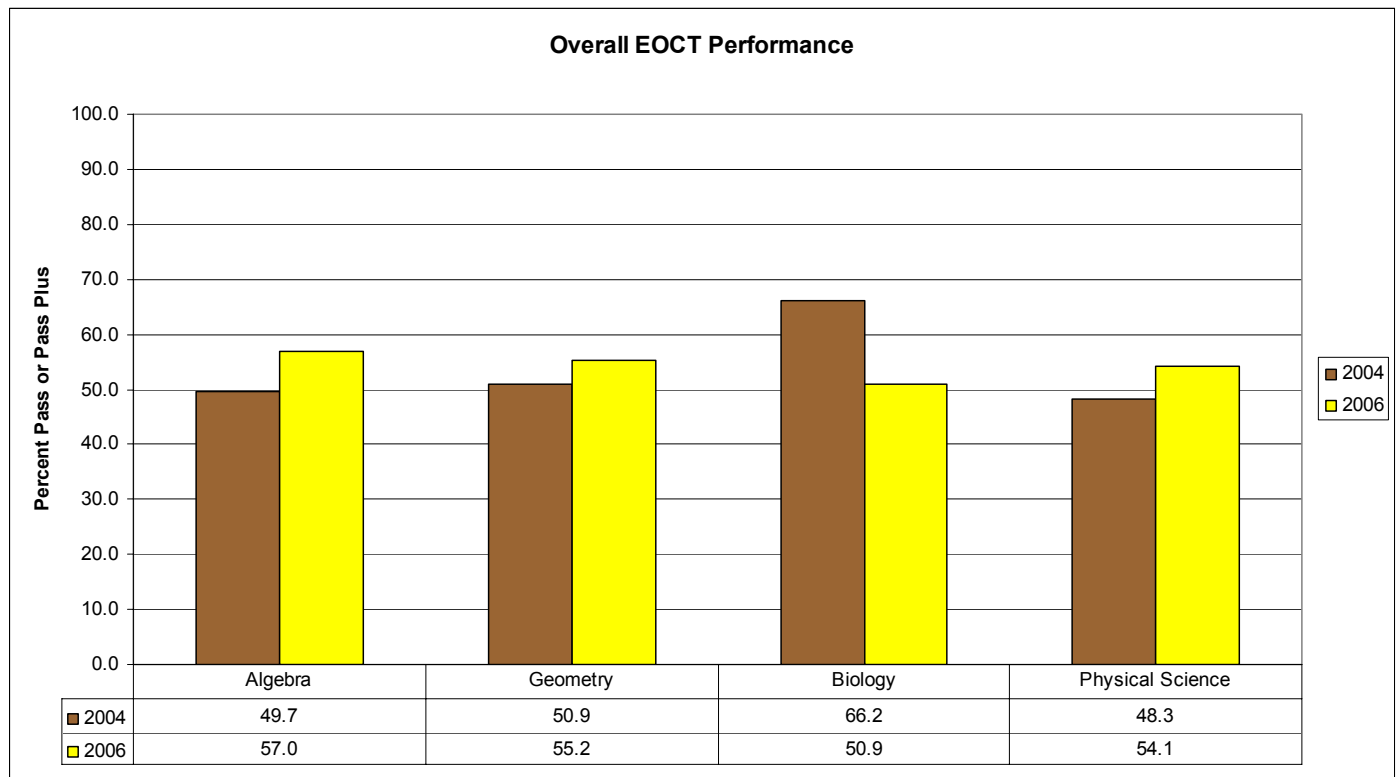


2006 Math Results

12 of 15 PRISM districts increased their percentage of students meeting or exceeding proficiency in mathematics when compared with the 2004 results.

The number of PRISM districts exceeding the state pass rate remained the same.

CHANGES IN THE END OF COURSE TESTS IN SCIENCE AND MATH FOR PRISM DISTRICTS



PRISM districts improved their percentage passing End of Course Tests in Algebra, Geometry and Physical Science.

CHANGES IN THE QUANTITATIVE SCHOLASTIC APPTITUDE TEST (SAT)

2006 Results
11 of 15 PRISM Districts showed improvement in their Math SAT score from the 2003 baseline year.

The number of PRISM Districts exceeding the state score increased to 6 from 3.

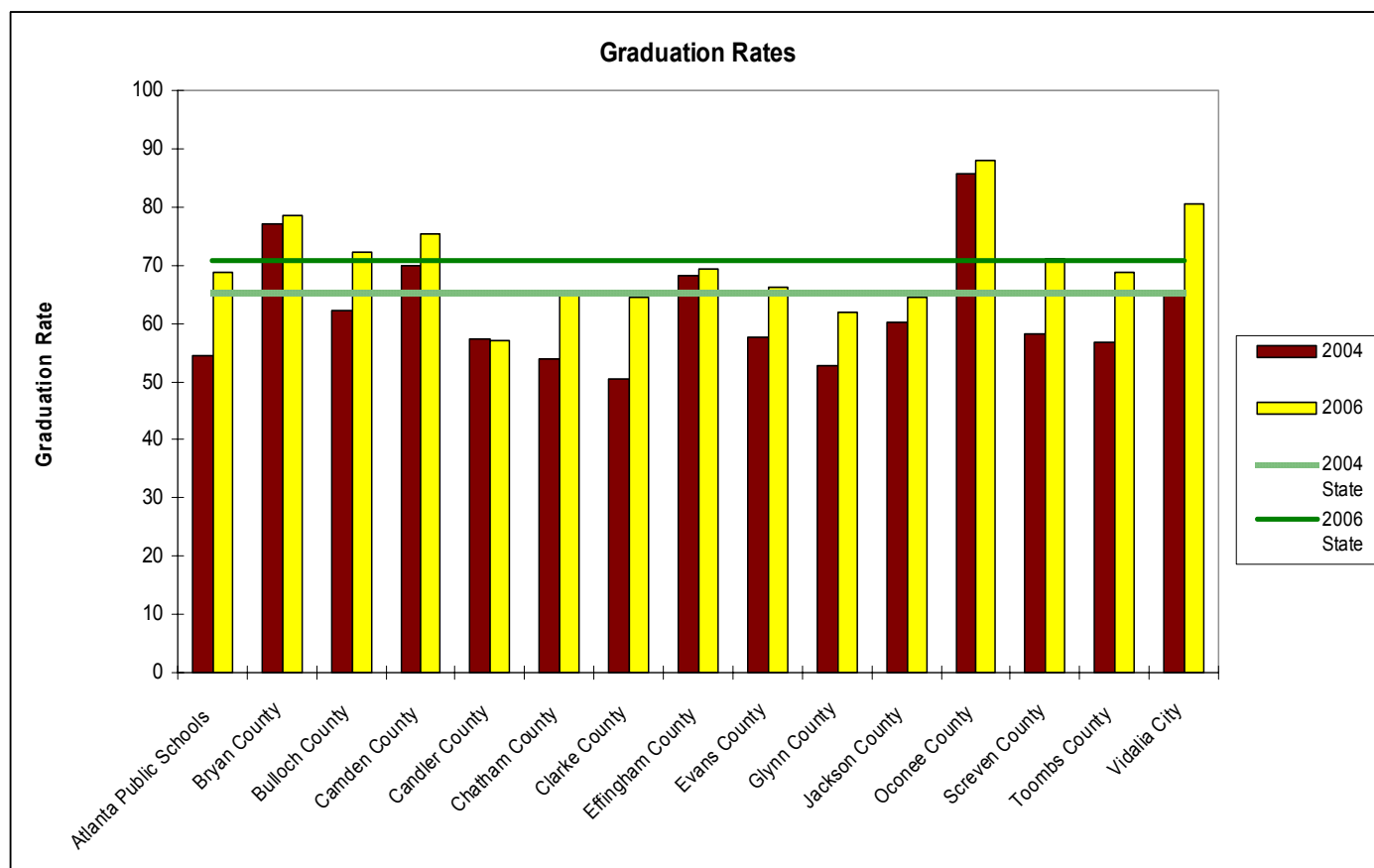
PRISM REGION	PRISM DISTRICT	SAT Math 02-03	SAT Math 03-04	SAT Math 04-05	SAT Math 05-06
State		498	500	504	503
Atlanta Metro	Atlanta Public Schools	437	430	444	435
East Central	Bulloch	491	501	508	504
	Candler	471	444	487	432
	Effingham	493	484	493	515
	Evans	458	441	478	478
	Screven	483	498	459	472
	Toombs	471	454	484	484
	Vidalia	513	498	504	469
Northeast	Clarke	489	489	504	502
	Jackson	489	497	503	511
	Oconee	534	557	550	537
Southeast	Bryan	512	513	507	520
	Camden	487	479	491	490
	Chatham	474	463	473	476
	Glynn	511	521	521	516

CHANGES IN THE GRADUATION RATE FOR PRISM DISTRICTS

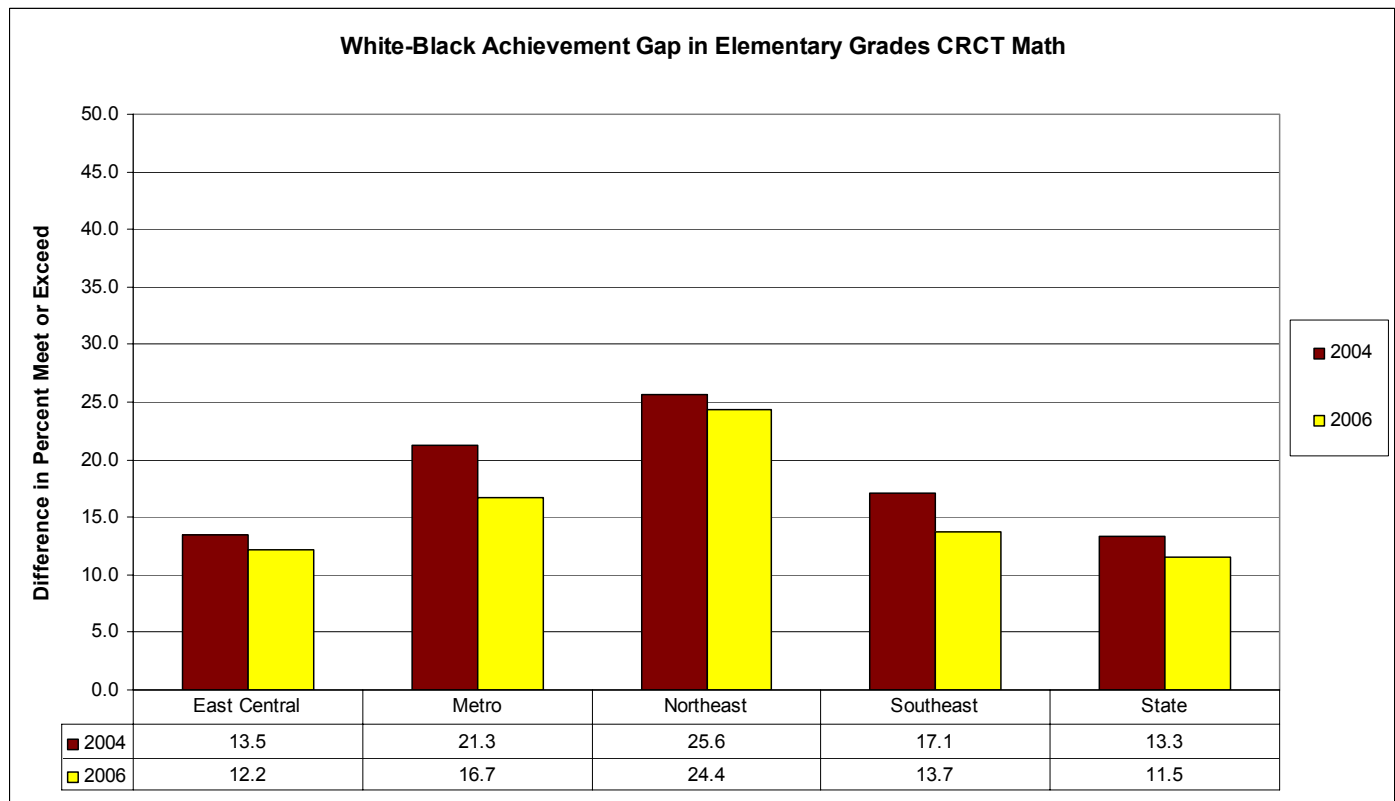
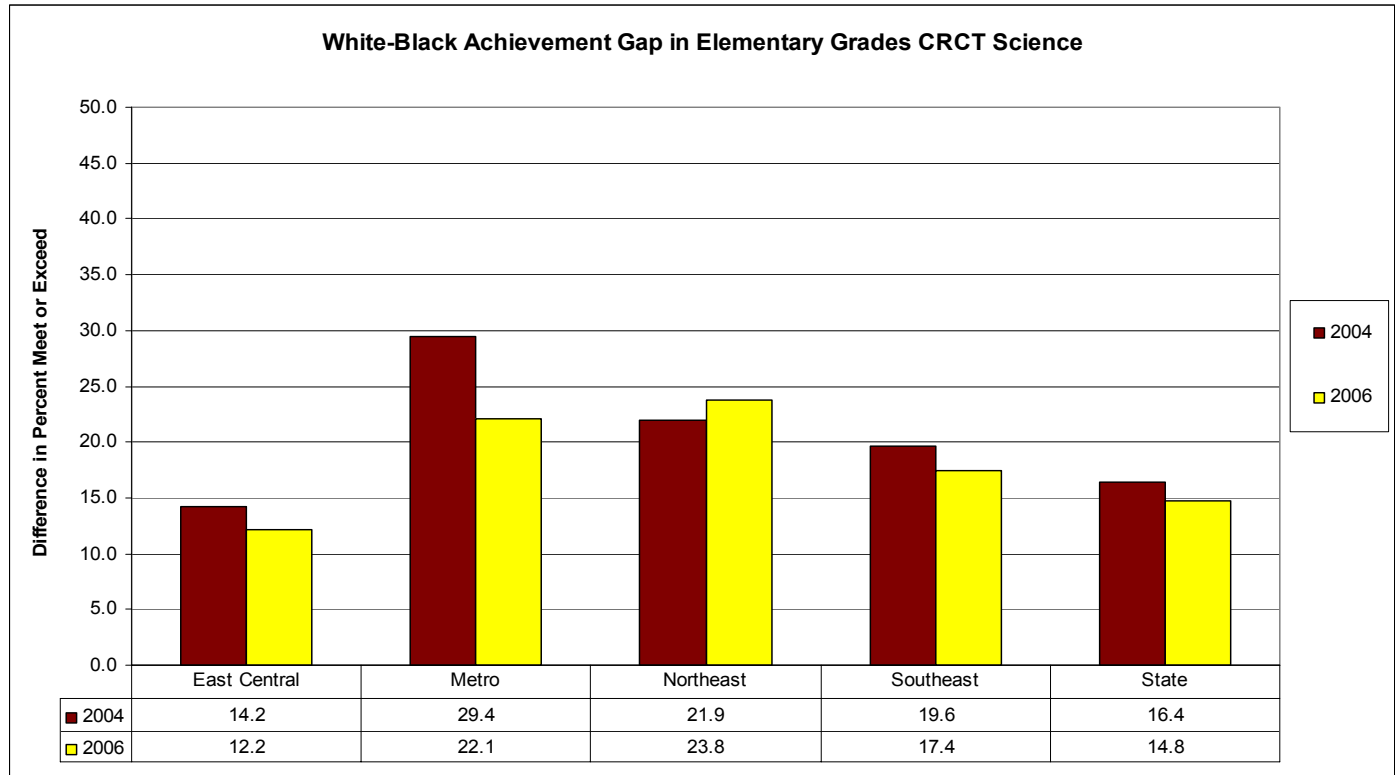


14 PRISM districts improved their graduation rate.

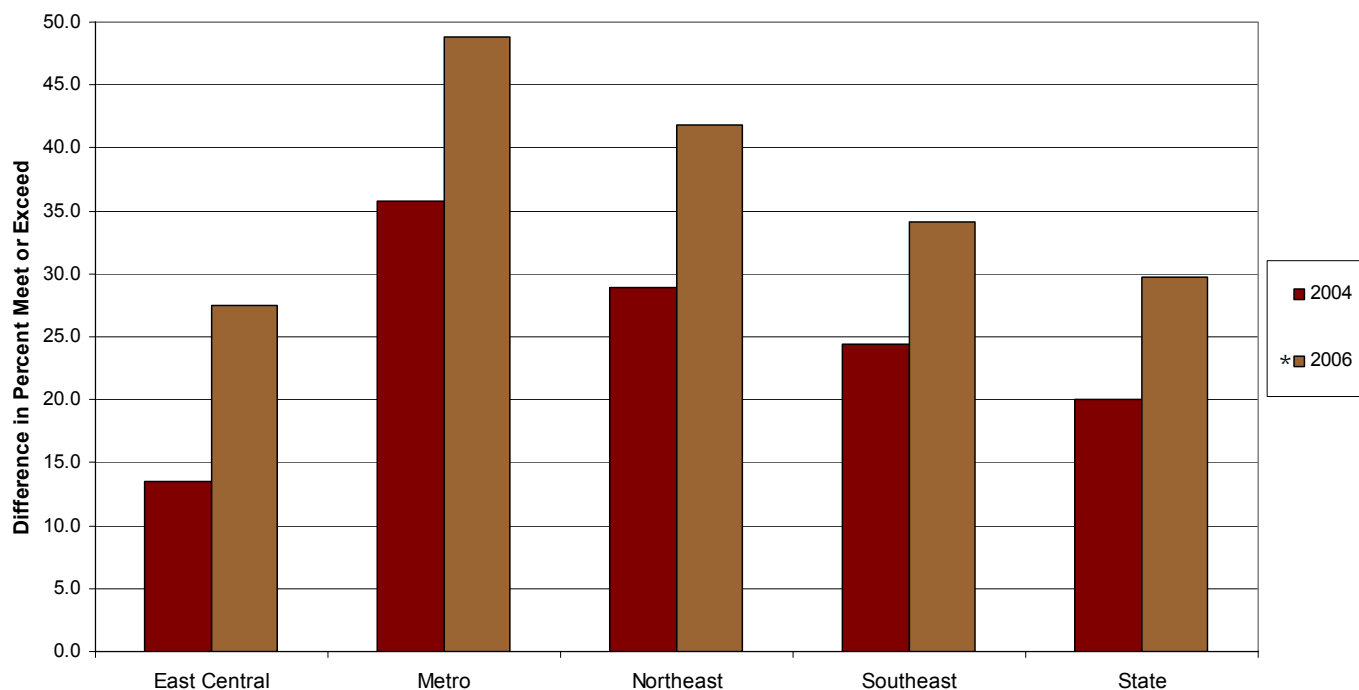
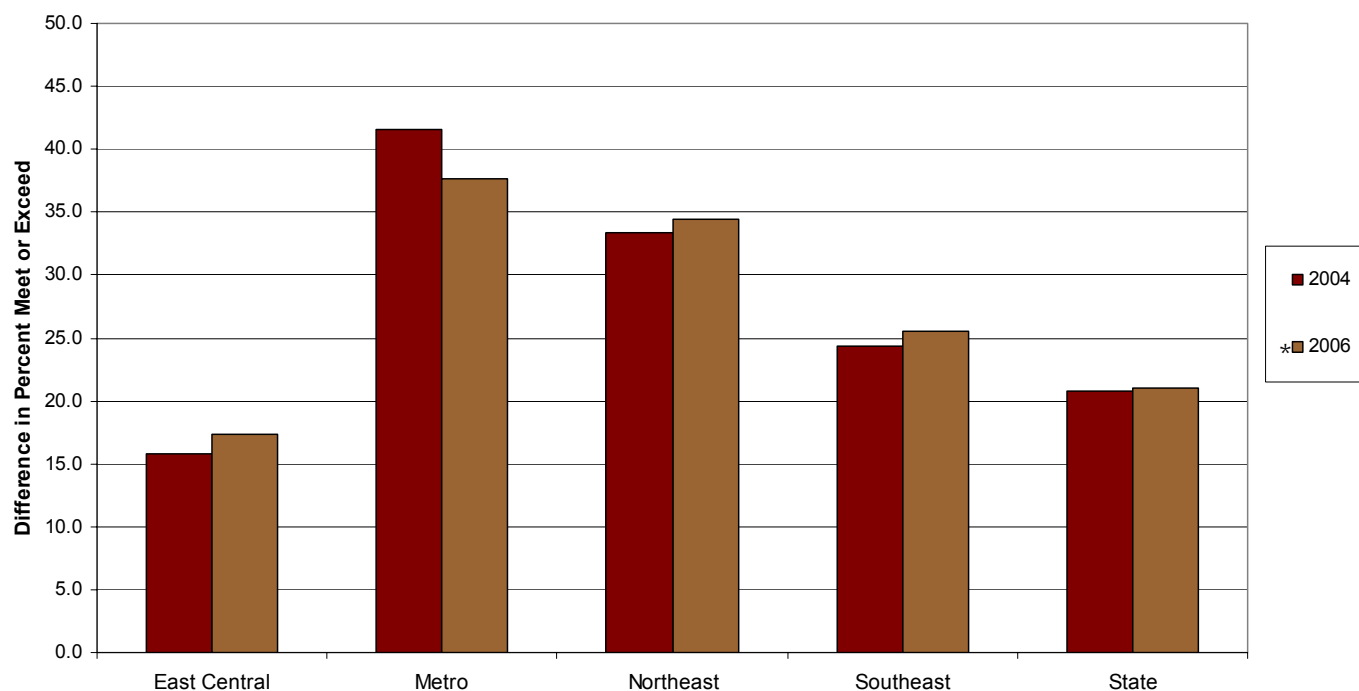
The number of PRISM districts exceeding the state graduation rate increased from 4 to 6.



A LOOK AT THE ACHIEVEMENT GAP BETWEEN WHITE AND BLACK STUDENTS IN SCIENCE AND MATHEMATICS IN THE PRISM REGIONS

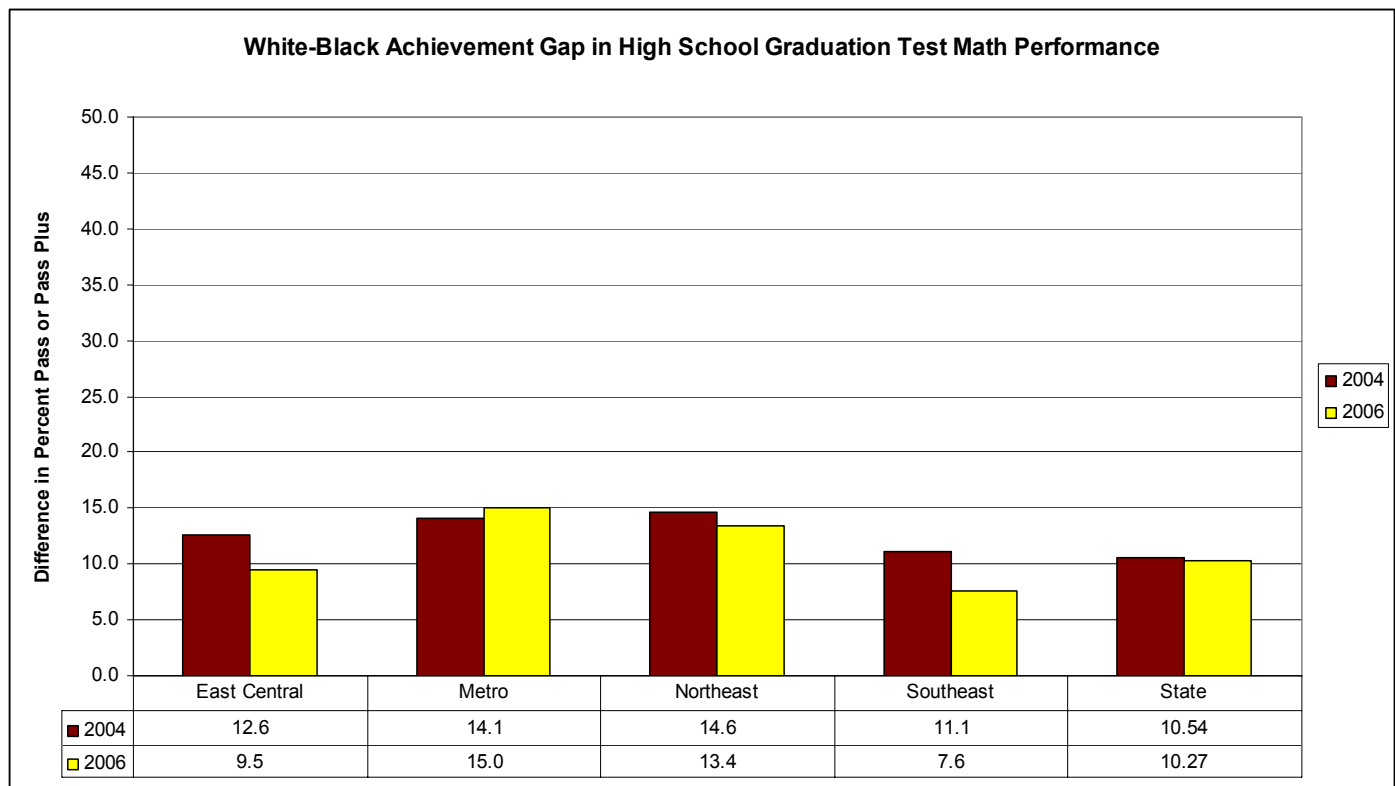
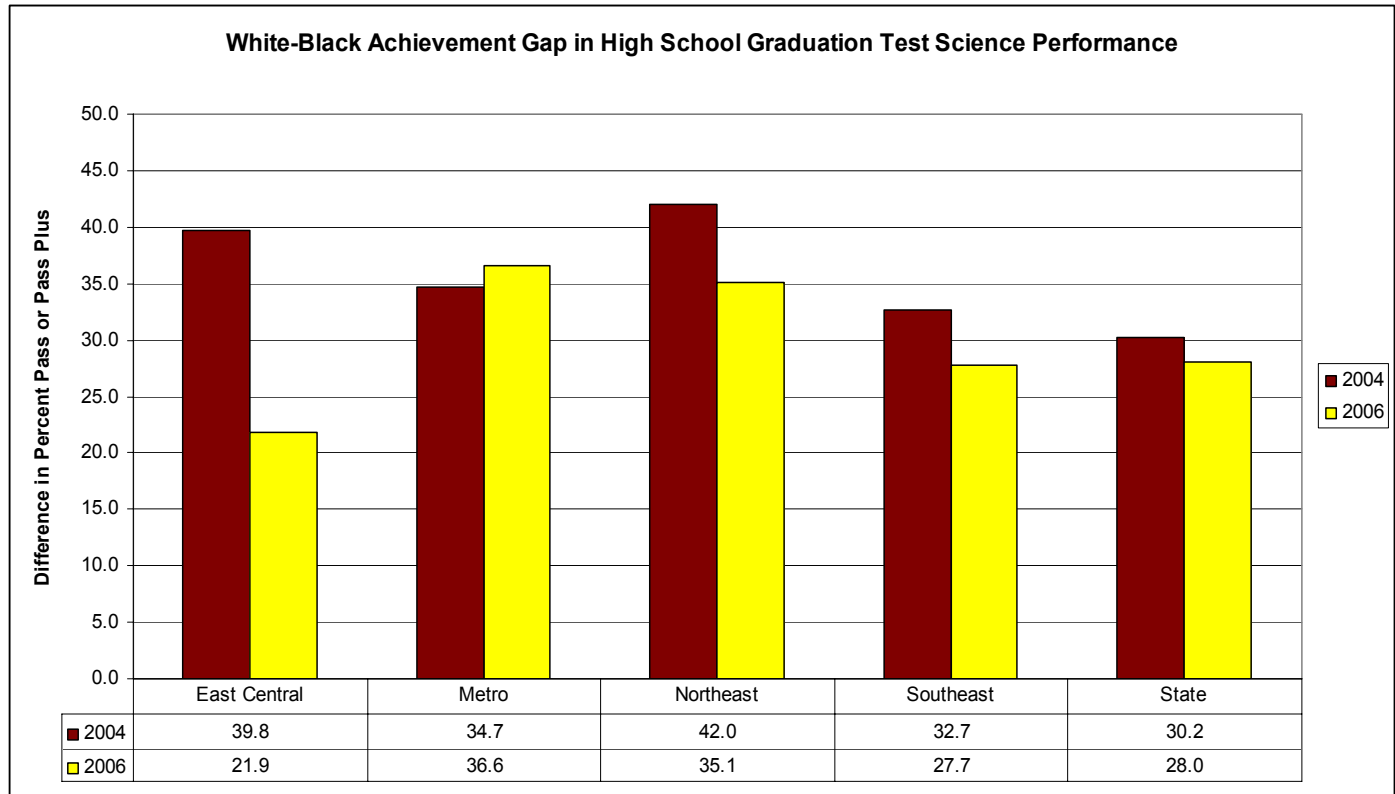


Gaps are closing in 3 of 4 PRISM regions at the elementary level in science and in all 4 PRISM regions in math at the elementary level on the aggregated CRCTs. Gaps are also closing for the state.

White-Black Achievement Gap in Middle Grades CRCT Science**White-Black Achievement Gap in Middle Grades CRCT Math**

*2006 test data for grade 6 math and grades 6 and 7 science are not comparable to that from 2004 because new tests were administered to reflect the new GPS.

A LOOK AT THE ACHIEVEMENT GAP BETWEEN WHITE AND BLACK STUDENTS IN SCIENCE AND MATHEMATICS IN THE PRISM REGIONS



Gaps are closing in 3 of 4 PRISM regions and the state in both science and math.

TRANSFORMING COLLEGE AND UNIVERSITY SCIENCE AND MATHEMATICS FACULTY

Through PRISM, The Institute on the Teaching & Learning of Science & Mathematics was established to provide a forum for faculty to learn, share, research, and document best practices of cognitive sciences and practitioners in teaching and learning of science and mathematics. The statewide Institute provides plenary speakers who model inquiry instruction and /or engage students in various types of assessment both in science and mathematics. Part of the program includes faculty in breakout sessions sharing insights from active-learning strategies they are trying in college courses. Regional institutes complement the statewide Institute and provide a forum to showcase and share progress that results from their mini-grant activities. Progress emanating from some mini-grant projects was the central feature of the four regional institutes in Spring 2006. Regions have used mini-grants to provide the impetus that busy faculty need to work on issues related to implementing new teaching strategies and improving student learning. Through Year 3 of PRISM, 336 college and university faculty members from PRISM higher education institutions have participated in the state and/or regional Institutes.

A regional mini-grant program invites proposals from faculty to experiment with strategies and share knowledge of evidence-based research on the teaching and student learning of science and mathematics, especially in introductory classes and /or investigation of some aspect of science or mathematics teaching in K-12 schools. To date, 162 mini-grants have been funded in the four regions to further the goals of PRISM.

Students participating in a redesigned college physics course that combines lecture and labs



PREPARING THE NEXT GENERATION OF TEACHERS

- 27 higher education institutions sent teams to the PRISM-sponsored Academy for Learning through Performance Standards and Assessment – Higher Education during Year 3. Teams were responsible for course redesign to ensure Georgia's teachers are prepared to teach to the new GPS curriculum. 120 USG faculty participated.
- Since 2004, 259 Atlanta Public School juniors and seniors have participated in the Advanced Academy for Future Teachers held at Georgia State University during the summer. This academy was developed as a recruitment tool for students interested in science and/or mathematics teaching as a career. Minorities represent 99% of the Academy's participants.
- Project FOCUS (Fostering Our Community's Understanding of Science) is a major project based in the College of Agriculture and Environmental Science at the University of Georgia. In this special topics course carrying three hours credit, undergraduate students spend three hours per week working with teachers to conduct inquiry science lessons with their students in elementary schools. There were 219 science majors enrolled in the FOCUS program in Years 1-3. In a study conducted with 54 of the participants, 24% indicated that they would consider teaching as a career.

- In February 2005, The Board of Regents approved two new courses in science, with laboratory experience, for pre-service teachers, grades P-5. These courses are taken during the first two years of college.
- In February 2005, The Board of Regents approved one new course in mathematics for pre-service teachers P-5. These courses are taken during the first two years of college.
- In January 2006, The University System of Georgia Vice Presidents for Academic Affairs Committee approved three new Area F professional education courses for all pre-service teachers.
- In 2004, 15 PRISM Satellites were created at University System institutions with teacher preparation programs to prepare pre-service teachers of science and mathematics to teach the new GPS, to increase the production and diversity of K-12 teachers of science and mathematics with sufficient content and pedagogical knowledge and skills to teach all students to high standards, and to begin the scale-up of PRISM lessons learned across the state.

Science and Mathematics Teacher Production Rates: 2006 compared to 2002

Institution	Middle School Mathematics		Middle School Science		Math		Broad Field Science		Biology		Chemistry		Physics	
	2002	2006	2002	2006	2002	2006	2002	2006	2002	2006	2002	2006	2002	2006
Armstrong State University	13	37	22	28	1	8	1	7	2	0	0	1	0	0
Georgia Southern University	7	29	7	13	6	14	11	1	0	6	0	2	0	0
Georgia State University	12	47	15	47	31	19	33	22	0	0	0	0	0	0
University of Georgia	14	21	15	17	29	51	20	8	10	13	1	1	0	1
TOTAL	46	134	59	105	67	73	65	48	12	19	1	4	0	1

PRISM universities produced 384 teachers of science and or mathematics in 2006—an increase of 132 teachers. USG institutions that prepare educators are participating in a companion project, Double the Number, Double the Diversity.

CHANGING POLICY

A statewide PRISM committee developed a policy that specifically advocates rewarding higher education faculty for work in K-12 schools through decisions in promotion and tenure, pre-tenure and post-tenure review, annual and merit pay, workload, recognition, allocation of resources, and other rewards. This policy recently was adopted by the University System Board of Regents, thereby making Georgia one of the first states to recognize at the system level the importance of this work.

The University System's policy provides the avenue for interested higher education faculty who wish to work with K-12 schools and teachers to continue and be supported.

PRESS RELEASE: <http://www.gaprism.org/press/releases.phtml>

POLICY: http://www.gaprism.org/information/pub/regents_policy.pdf



We're on the Web

www.gaprism.org

www.mathsciencesuccess.org



Coming Soon in this Series of PRISM Impact Reports

- Comparison data between PRISM districts and districts with similar demographics
- Data on the number of students enrolled in more challenging science and mathematics courses K-12
- Data on the percentage of students taking core level science and mathematics courses at the college level who make A's, B's, or C's
- Teacher production rates in the PRISM Satellite Institutions



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