

## Mathematics and Science Partnership Program (MSP): Helping Teachers and Students Succeed

**F**all 2006 begins the third year of the Mathematics and Science Partnership (MSP) grant program funded by the US Department of Education (Title II, Part B of the No Child Left Behind NCLB Act of 2001) and managed by the New Jersey Department of Education. Going into year three, MSP programs at Montclair, Rowan and Rutgers are making great strides in achieving the state goals for the NCLB federal definition of Highly Qualified Teachers (HQT) and Subject Matter Specialization.

"It is essential that teachers continue to develop their content knowledge and pedagogy. Teachers are a key factor in student achievement and we are pleased to help support their life long learning," said Michael Heinz, Science Coordinator and Program Officer for the Mathematics Science Partnerships at the New Jersey Department of Education. While it may be too soon for student achievement data, looking at preliminary pre- and post- teacher assessments and through numerous classroom observations, Heinz notes that the programs are making an impact in the classroom and he is hopeful that an increase in student achievement will follow.

MSP programs are designed to provide math and science teachers in grades 5-8 the opportunity to enhance their content knowledge as well as:

- improve the academic achievement of students in math and science;
- provide follow-up activities, such as curriculum alignment, distance learning and activities that train teachers to utilize technology in the classroom;
- increase the number of Highly Qualified Teachers in math and science; and
- include learning opportunities that are aligned to Professional Standards for Teachers.

While driven by the same mandate, programs at Montclair, Rowan and Rutgers differ in their format and delivery – each designed to meet the needs of their educational community.



### Montclair: CUSP - Creative University-Schools Partnership

Administered through PRISM, a center at Montclair State University, and in partnership with 26 school districts and 13 non-public schools, CUSP delivers professional development summer institutes in

math and science. Over 10 days, teachers receive intense content in science (Earth, Physical and Life Science) or mathematics (Geometry). Both institutes integrate content and strategies for teaching middle grade classes. A group of 80 teachers participated in a 10-day July institute to learn strategies to use with students in the fall. Collaboration and networking with colleagues were important aspects of the institute, just as communication is an integral part of inquiry learning in the classroom.

### Rowan: SJMP - South Jersey Math Partnership

An intensive professional development project (200 hours per teacher in two cohorts, over 18 months), Rowan University has united 21 school districts to provide training for 100 middle school teachers. Professional development activities focus on improving content knowledge; understanding of how adolescents develop; instructional planning and designs that promote critical thinking; assessment strategies; accommodations for special learners; communication and technological skills. The end result is to help students achieve state standards in fractions, algebra, geometry and probability and statistics. To date, results show highly significant teacher content gains on all modules, positive increases in teacher instructional practices, and significant increase in student achievement on a project developed NAEP assessment.



### Rutgers: ESTEEMS - Establishing Excellence in Education for Mathematics and Science

Administered through Rutgers University, ESTEEMS unites Rutgers, Middlesex County College, Salem Community College, 15 school districts and 3 non-public schools. Structured around two content institutes, in summer 2006, 30 teachers participated in the Earth Science Institute and 32 teachers participated in the Algebra Institute.

These programs include project-based learning, self-reflection, and collaborative science investigations and mathematics problem-solving activities. Other components of ESTEEMS professional development includes pre- and post-institute content knowledge assessment, on-site classroom visitations and coaching and graduate course credits.

# Math Achievement in Woodbridge Township

**T**he Woodbridge Township School District is committed to making systemic reforms in the teaching of mathematics, science and technology in grades K-12. To help the district meet this goal, the NJ SSI Regional Center at Rutgers has offered its teachers and administrators continual professional development support.

"We are quite excited about the progress that the district has made with the proceeds of Standards Implementation grants for improving elementary school mathematics," said Dr. Emily Dann, Associate Director, NJ SSI Regional Center at Rutgers University.

Over the course of its partnership with NJ SSI, Woodbridge Township has received four Standards Implementation grants. The grants awarded in 2003 and 2004 helped the district bring standards-based mathematics programs - Investigation in Number, Data and Space and Everyday Math - into their elementary schools. During the SSI grant years, Nancy Paugh served as the K-12 Math Supervisor. Nancy currently serves as the Secondary Math Supervisor (6-12) with Kimberly Hahn serving as the Elementary Math Supervisor (K-5). Due to the large size of the district (16 elementary schools), Woodbridge leveraged the Standards Implementation grant funds by using the 24 elementary Academic Support Instruction (ASI) teachers as the team of teachers to take part in intense professional development. The ASI teachers became the turnkey helpers to regular classroom teachers and special education teachers in spreading the innovations into additional classrooms.

The NJ SSI Regional Center at Rutgers provided the professional development, and during the first year, utilized the Investigations materials. This was designed to help give teachers insight into the advanced mathematical processes used by children. The professional development was organized around five full days of instruction for the involved teachers followed by several days where one of the professional development providers modeled classroom activities in classrooms with students. These sessions were attended by ASI teachers who were part of the grant team, classroom teachers, and special education teachers (resource center and self-contained) from the given schools. All of these teachers later discussed and critiqued the classroom activity and mathematics learning that took place.

"The Standards Implementation grants have helped our district improve the implementation of new, standards-based mathematics curricula. I'm grateful that NJ SSI encourages districts to examine current issues in mathematics education and to share test data and statistics, which ultimately improve classroom instruction," said Ms. Paugh.

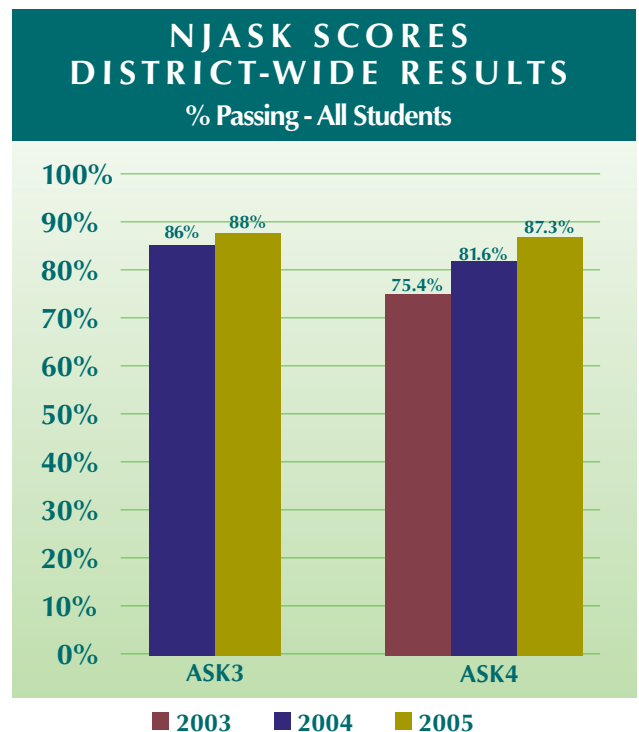
In 2005, NJ ASK math scores showed impressive gains for all students, compared to the two previous years. (see the chart on right).

In addition to developments in its mathematics curriculum, Woodbridge Township has collaborated with the Environmental and Occupational Health Sciences Institute (EOHSI) at Rutgers University, to develop integrated curriculum units having environmental health themes. These units have the goal of improving student academic performance and workplace readiness life skills. The ongoing project, entitled "Students Understanding Critical Connections between the Environment, Society, and Self" (SUC-CESS), creates and pilots innovative curriculum units in elementary

and middle schools in Woodbridge. The three units have been piloted and all teachers trained at the second, fifth and seventh grade levels are ultimately made part of the district's science curriculum. Dr. Dann has taken part in this activity as the mathematics education specialist responsible for working with the team to develop integrated mathematics activities for the environmental units, along with Frank Darytichen, Woodbridge Science Supervisor.

The Woodbridge administrators, including Superintendent Vincent Smith and Assistant Superintendent for Curriculum and Instruction Lois Rotella, the Woodbridge Board of Education, parents and community members have been supportive of NJ SSI grant efforts, by approving the annual submission of grant requests, serving on the district's NJ SSI Task Force, encouraging initiatives to implement standards- and research-based programs, and improving instructional strategies to help teachers raise students' achievement in mathematics and science.

"NJ SSI grants have allowed Woodbridge Township to provide additional teacher training, workshops, special guest speakers and presenters, which we would otherwise not have been able to afford. We look forward to a continuous and productive partnership with NJ SSI in the years ahead," added Ms. Paugh.



# Dynamic Classroom Assessment

**D**ynamic Classroom Assessment (DCA) is a 30-hour professional development program designated to help middle and high school mathematics teachers learn how to gather information about students' mathematical thinking, make inferences about what students know and can do, and then make instructional decisions that are better aligned with students' mathematical understanding. DCA is designed to enrich teachers' knowledge about classroom assessment so they can implement better instruction using knowledge of what students know and can do.

"Planning instruction without clear knowledge of how students think about the mathematics content may result in instruction that misses the mark. Understanding student thinking without knowing how to use this knowledge in planning instruction may simply use up class time and planning time without any payoff for learning" say George W. Bright (University of North Carolina at Greensboro) and Jeane M. Joyner (Meredith College), developers of DCA.

What differentiates this program from traditional mathematics assessment – which focuses on the effectiveness of the program, ranking students, and assigning grades – are three underlying principles:

- Exploring an assessment for learning model
- Distinguishing between the substance (meaning) and the presentation (how to communicate the meaning) of a mathematical idea, and
- Questioning students effectively through clarifying or probing questions

The DCA program includes a combination of formal learning sessions and implementation sessions. The DCA sessions will help teachers move between learning to see what kind of information to gather from students, and incorporating that knowledge into their instructional planning.

"When teachers understand what students know and can do, and then use that knowledge to make more effective instructional decisions, the net result is greater learning for students and a greater sense of satisfaction for teachers," the co-developers added.

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## SESSIONS 1-5:

Thursday, October 12, 2006  
Friday, November 3, 2006  
Friday, December 14, 2006  
Wednesday, January 10, 2007  
Tuesday, February 6, 2007

**Location:** Rutgers University, Busch Campus

**Program cost:** Individual: \$500.00

Team of 3 or more get one additional participant registration for free

## NEWS FROM THE NJ DOE

New Jersey is currently one of 23 states committed to participating in the American Diploma Project. This initiative is largely a response to studies which indicate that only half of the U.S. students who graduate from high school are prepared for college-level reading, and only 40 percent are prepared for college-level mathematics. In other words, for many high school graduates, there are gaps between the education they received in high school and the overall skills, abilities, and work habits that are expected of them in college and in the work force. The American Diploma Project (ADP) was launched by Achieve, Inc., in partnership with The Education Trust and the Thomas B. Fordham Foundation, to restore value to the high school diploma.

In each ADP state, the governor, the state superintendent or commissioner of education, business leaders, and college and university leaders have committed to making the necessary changes in policy and practice to address these challenges. In the coming months, New Jersey mathematics educators should expect to have an opportunity to review and comment on some slight revisions to the Core Curriculum Content Standards in mathematics, proposed to increase the alignment of those standards with the American Diploma Project benchmarks.

The NJ High School Redesign Steering committee plans a statewide conversation on high school improvement through two series of meetings across New Jersey. The first set of meetings will take place in early October for teachers and educational administrators. A second set of open-to-the-public meetings for parents, students, community members, and other educational stakeholders will take place in early December. To register to attend a meeting, visit the Committee's official website at [www.njhighschoolsummit.org](http://www.njhighschoolsummit.org).

**OCTOBER**

10/3, 11/2, 1/10, 4/26  
**CMP 2 New Users Support Series (6-7)**

College of Morris

10/5, 11/15

**Refining 6-12 Math Curriculum and Instruction Based on What We Have Learned from Student Performance on the HSPA (6-12)**  
CMSCE, Rutgers University

10/10-10/11

**New Jersey Science Convention**  
Somerset, NJ

10/16, 12/6

**Engineering is Elementary: Engineering and Technology Lessons for Children (3-5)**  
CIESE, Stevens Institute of Technology

10/16, 10/17, 10/24, 10/25

**Rutgers Family Science (K-8)**  
CMSCE, Rutgers University

10/19

**Introduction to Rocks and Minerals (3-4)**  
CMSCE, Rutgers University

10/19-10/21

**National Council of Teachers of Mathematics Eastern Regional Conference**  
Atlantic City, NJ

10/23

**Multidisciplinary Projects in Science and Literacy: Internet-Based Lessons Using Telecollaboration and Real-Time Data for Elementary Students**  
CIESE, Stevens Institute of Technology

10/23-10/24, 11/1-11/2

**Family Tools and Technology (3-7)**  
The College of New Jersey

10/25

**Introduction to Hands-on Astronomy 2: Stars & Galaxies (5-12)**  
Raritan Valley Community College

10/26

**GEPA Algebra Graphing Calculator Workshop Using TI-83 Plus/TI-84**  
County College of Morris

10/26, 11/14, 11/30

**Math NJ ASK Assessment Workshop (3-7)**  
Rowan University

10/27

**9th Annual Symposium for Math, Science, and Technology (K-12)**  
Rowan University Education Institute

**NOVEMBER**

11/2, 11/17, 12/7, 12/13

**Lenses on Learning Part 2**  
NJ SSI, Rutgers University

11/3

**SMARTBoard: Beyond the Basics (K-12)**  
CMSCE, Rutgers University

11/6-11/7

**Science NJ ASK Assessment Workshop (2-4)**  
Rowan University

11/9, 11/10

**Science GEPA Assessment Workshop (5-8)**  
Rowan University

11/15

**Pre-K Workshop in Math and Science II**  
County College of Morris

11/16

**Engineering is Elementary (EiE) - Balance & Forces (K-5)**  
CMSCE, Rutgers University

11/16

**Unique and Compelling Ways to Use Technology in Middle School Mathematics (5-8)**  
CIESE, Stevens Institute of Technology

11/17

**Strategies to Prepare Special Education Students for the HSPA (9-12)**  
CMSCE, Rutgers University

11/17, 12/13

**Engineering the Future: Overview of a Full-Year Pre-Engineering/ Technology Education (9-10)**  
CIESE, Stevens Institute of Technology

11/28

**Explore the Solar System (K-4)**  
Raritan Valley Community College

11/28

**Refining 6-12 Mathematics Curriculum and Instruction: What We Have Learned from Students' Performance on HSPA (6-12)**  
County College of Morris

11/29

**Introduction to Hands-on Astronomy 1: Moon & Solar System (5-12)**  
Raritan Valley Community College

11/29, 11/30

**Science HSPA Assessment Workshop (9-12)**  
Rowan University

**DECEMBER**

12/4

**Preparing for ASK 5 and 6: Solving Problems with Discrete Math and Statistics (5-6)**  
CMSCE, Rutgers University

12/5

**Introduction to Hands-on Astronomy 2: Stars & Galaxies (5-12)**  
Raritan Valley Community College

12/5

**Algebra, Graphing Calculators and Middle School Students: Explore the Possibilities (6-8)**  
CIESE, Stevens Institute of Technology

12/6

**The Big Ideas in Probability and Data Analysis on the HSPA (9-12)**  
CMSCE, Rutgers University

12/7

**Math in the Special Education Classroom -Exciting Lessons and Other Resources Outside of the Traditional Textbook to Get Your Students Motivated! (7-12)**  
CMSCE, Rutgers University

12/8

**Higher Order Thinking Through Mathematics (3-8)**  
CMSCE, Rutgers University

12/11

**Everyday Mathematics: a Focus on Special Education (1-2) and (3-6)**  
County College of Morris

12/12

**Kinesthetic Astronomy1 (K-4)**  
Raritan Valley Community College

12/13

**Our Solar Connection (5-12)**  
Raritan Valley Community College

12/13

**Preparing Special Students for the ASK 5, 6 & 7 and GEPA (5-8)**  
CMSCE, Rutgers University

12/19

**Engineering is Elementary (EiE) - Water (K-5)**  
CMSCE, Rutgers University

For additional information about these events and other professional development opportunities, please visit the News and Events section of the NJ SSI web site at: <http://njssi.rutgers.edu>



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