

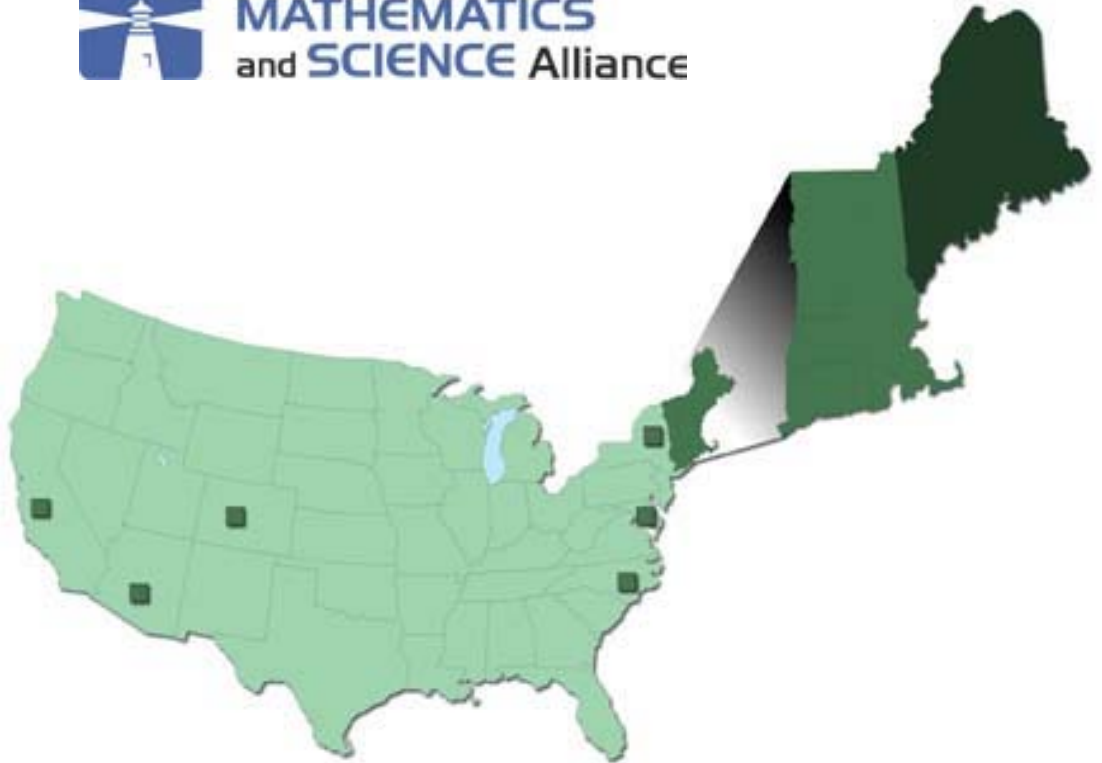
Working to improve
science and mathematics
education for all
students since 1992.



BI-ANNUAL REPORT 2002 - 2004



Maine
MATHEMATICS
and **SCIENCE** Alliance



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These linkages help us better understand the classroom while at the same time expand our horizons by working outside of Maine.”

- Francis Eberle

LINKING AND LEARNING

Executive Director's Perspective



It is with great pleasure that I am able to present this biannual report about the Maine Mathematics and Science Alliance. The Maine Mathematics and Science Alliance (MMSA) has grown and strengthened its relationships in many areas over the last two years.

The relationships I refer to are the linkages to schools and students in Maine, as well as connections with regional and national organizations. These linkages help us better understand the classroom while at the same time expand our horizons by working outside of Maine. These linkages include university partnerships such as one with the University of Maine at Farmington in the MATHS project, the Eisenhower Regional Alliance for Mathematics and Science with the Governor's Academy, or Project 2061 with the newly awarded PRISMS project.

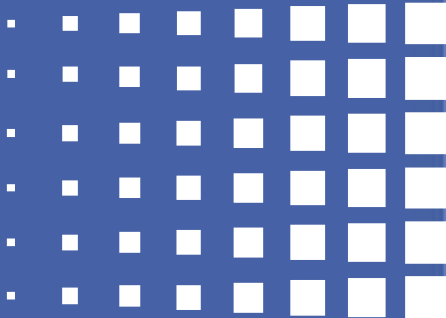
To manage these new relationships the MMSA has developed content and operations teams to better work with you. The mathematics team focuses its programs, consulting services, and products supporting Maine schools and districts. These include focused school efforts such as in the MATHS-Maine program and other efforts designed to support individual teachers and administrators. The science team has a broad portfolio of targeted projects such as the NASA activities and more comprehensive programs such as the new Curriculum Topic Study effort that will reach educators nationwide. The assessment and evaluation team is primarily responsible for assessment development and implementation. Program evaluation activities have evolved to include the MATHS, the TSLC, and a DOE mathematics initiative. The operations team manages the increasingly complex financial accountability and reporting of the MMSA. You will be able to read about these teams in much more detail in this report.

We are continuing our commitment to Maine and to all our partners. I encourage you to learn more about us in this report or visit us at www.mmsa.org.

A handwritten signature in black ink that reads "Francis Eberle".

Francis Eberle
Executive Director

MATHEMATICS PROJECTS



MATHS-Maine Districts

Augusta School Department

Deer Isle-Stonington CSD

Jay School Department

MSAD 9 (Farmington)

MSAD 11 (Gardiner)

MSAD 34 (Belfast)

MSAD 41 (Milo)

MSAD 56 (Searsport)

Old Town School Department

TSLC Districts

Brewer School Department

So. Portland School Department

Westbrook School Department

Maranacook CSD (Readfield)

MSAD 59 (Madison)

NEW! Mathematics: Access and Teaching in High Schools (MATHS) - Maine

The Maine Mathematics and Science Alliance in partnership with the University of Maine at Farmington and nine Maine school districts (see sidebar) has been awarded a three-year grant by the Maine Department of Education. MATHS - Maine is designed to support secondary educators who are committed to improving mathematics achievement for all students to improve their knowledge and skills in mathematics. The strategies for accomplishing this include: professional development during the school year in mathematics content, creating a network of mathematics educators, and accessing resources for building a sustainable model for improvement at the secondary level that incorporates best practices in the learning and teaching of mathematics.

Cheryl Rose: Project Director

Dr. Margaret Wyckoff: University of Maine at Farmington - Project Partner

Carolyn Arline: Mathematics Associate

NEW! Teacher Student Learning Continuum (TSLC)

The TSLC program encourages districts to develop models for learning for a range of teachers and students. Historically weak implementation of homogenous professional development efforts has often resulted in new teachers still learning to teach on the job, experienced teachers avoiding long term curricular coherence, and teacher leaders not seriously challenged. All students as they move from grade to grade should have the same opportunities for learning, and this has implications for the instruction, curriculum and assessments used. The continuum idea is used to emphasize that the experience and expertise of teachers, administrators and students vary widely. New models of professional development are required. The TSLC program provides financial and technical assistance to support 5 districts (see sidebar) with data usage, professional development planning and delivery, and content, instruction and assessment implementation. This project is funded in part by an award from the Maine Department of Education.

Leslie Minton and Henrietta List: Co-Directors

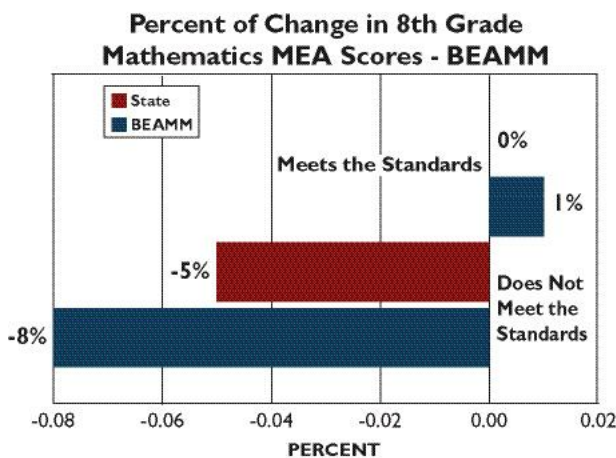
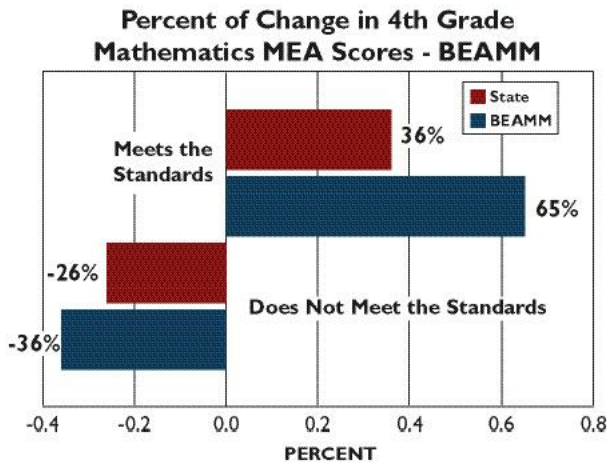
Broadening Educational Access to Mathematics in Maine (BEAMM)

The BEAMM project was a five-year partnership of seven Maine school districts (see sidebar), faculty at Colby College, the Maine Department of Education and the MMSA funded by the National Science Foundation. The districts were identified in 1998 by the Maine DOE as low performing. There were 37 schools with approximately 500 teachers geographically distributed across the state. The goals of BEAMM were to increase student aspirations and performance in mathematics by providing professional development and high quality curriculum for all K-8 teachers of mathematics. After five years these districts have shown capacity for growth in student achievement and sustained progress (see charts below). As well as extensive professional development for teachers, the project supported administrators and teacher leaders. A final report is being prepared for submission to the National Science Foundation that will document the impact of this project that brought roughly \$1.1 million in federal money to Maine.

Cheryl Rose: Principal Investigator/Project Director
Francis Eberle: co-Principal Investigator
Tom Berger: co-Principal Investigator, Colby College

BEAMM Districts

- MSAD 34 (Belfast)
- MSAD 60 (Berwick)
- MSAD 63 (Holden)
- Sanford School Department
- School Union 90 (Milford)
- School Union 96 (Gouldsboro)
- School Union 106 (Calais)



NEW! Early Numeracy Project

The Early Numeracy Project is a collaboration of the MMSA and the Riverton Elementary School in Portland, the Longfellow Elementary School in Portland and the Laura E. Richards School in Gardiner and is funded by the Maine Department of Education. The purpose of the project is to explore the strategies of the Early Years Numeracy Program in order to better understand the mathematical development of K-2 students, determine current levels of performance of students, and to use the information to guide instructional decisions.

Leslie Minton: Project Director

NEW! Advanced Placement Curriculum Analysis (AP)

The AP project is designed to review and analyze to determine what the curricular basis needed for more students to be able to take AP classes. An in-depth analysis of some of the common mathematics and science curriculum used by Maine teachers will provide additional information for Maine teachers to be able to make informed decisions about their students and their access to rigorous curriculum. The analysis protocol was developed at the Maine Mathematics and Science Alliance.

Cheryl Rose: Project Director

Carolyn Arline: Mathematics Associate

Henrietta List: Science Project Director

School Learning Laboratory (SLL)

The School Learning Laboratory is a collaborative project among 12 educational non profit organizations (see sidebar) that work statewide in the SuperED group. The purpose



of this project is to provide support to 6 schools to assist in their school improvement goals and then document the process. The various non profits pool their thinking to assist in improving the issues and concerns at the target schools. One result is for more effective schools, and another is a description of the process, so other schools will be able to learn how to better interact with out-

side agencies. The MMSA coordinates the privately-sourced funding and is one of the participating non profit organizations.

Francis Eberle: Project Coordinator

Doris Ray: Ray Consulting

Diane Ray: Ray Consulting

SLL Partners:

The Center for Educational Services
Institute for Global Ethics
KIDS Consortium
Kieve Affective Education
Maine Alliance For Arts Education
Maine ASCD
Maine Council on Economic Education
Maine Humanities Council
Maine Mathematics and Science Alliance
Maine Support Network
Spurwink Institute
Technology Integrators and Collaborators

SCIENCE PROJECTS

Quest

MMSA has developed 6 middle and 6 high school lesson plans to accompany the PBS series *Quest: Investigating Our World*. Complete lesson plans are posted on-line, making them easily accessible and are ready to use by teachers. Each Quest episode explores how a variety of "natural" topics relates to Maine, New Hampshire, and Vermont. The educational materials posted on-line, <http://www.mainepbs.org/education/lessonplans.html>, support state and national science standards. In 2002 almost 20,000 downloads were recorded. The 2004 series included *Climate Change*, *Biomechanics of Sports*, *Spring*, *Gulf of Maine*, *Bioinvasion*, and *Inventors of New England*. The 2005 series, airing in January, includes *Survive*, *Epidemic*, *Summer*, *Aquaculture*, *Scientists*, and *Archaeology*.

Henrietta List and Lynn Farrin: Co-Directors



GLOBE

Students and Scientists: Together Acquiring Science Knowledge is a National Science Foundation project funded for the development of materials for the GLOBE program, http://www.globe.gov/globe_flash.html. Four teams of teachers from across the country are piloting four units that develop middle school and high school student research skills in **Atmospheric Science** and **Coastal Biodiversity**. Units implement GLOBE research protocols allowing students to contribute to the international on-line database utilized by NASA and associated scientists around the world. A second on-line tool is under development in this three year project. For **Assemble an Inquiry**, a database has been created that identifies the alignment of all existing GLOBE protocols, instructional activities and assessments to national standards allowing teachers to create their own customized lessons.



Henrietta List: Principal Investigator/Project Director



www.globe.org

Maine NASA Activities

The Maine NASA Program utilizes the context of the cutting edge missions of NASA and NASA educational materials and programs to enhance grades 6-8 science programs and improve content knowledge of earth systems and space sciences. Eighteen middle and high school teachers spent a week in August, 2004 at NASA Goddard Space Flight Center in Greenbelt, Maryland learning science content and making curricular connections across life, earth, physical, and space science concepts in Maine's Learning Results. This was the eighth year for this week long onsite institute supported with funding from the Maine Department



of Education. Through daily presentations with NASA scientists, participants deepen their understanding of the importance of earth and space science in the curriculum and as an exciting context to learn all sciences. Participants receive 3 graduate credits from the University of Maine.

With the professional development grant from the Maine Space Grant Consortium, the Sunspotter Program was provided for middle school teachers. Two days of profes-

sional development in the content of the Sun-Earth System were provided by Tufts University's Wright Center and NASA Goddard Specialists with Maine's Learning Results linkages provided by MMSA. Twenty middle school teachers received a Sunspotter on loan to conduct inquiry investigations on sunspots. The Sunspotter is a telescope that allows safe observations of sun phenomena. Teachers reconvened in the spring to share student project work and ideas for using the Sunspotters.

Page Keeley: Project Director

Lynn Farrin: Project Associate



NEW! PRISMS (www.nsd.org)

Phenomena and Representations for Instruction of Science in Middle Schools (PRISMS) is a NSF-funded project for the National Science Digital Library www.nsd.org that will begin in 2005.

In partnership with AAAS/Project 2061, the MMSA will work with Maine middle school lap top science teachers to identify, annotate, and test out web-based phenomena and representations aligned with standards and selected for their potential to enhance instruction and assessment.

Over three years, a collection of 1,000+ items will be metatagged and added to the National Science Digital Library. AAAS/Project 2061 will be training Maine teachers over two summers to use the Project 2061 analysis procedure to evaluate high quality items that will comprise the collection.

Page Keeley: Principal Investigator/Project Director

Francis Eberle: Co-Principal Investigator

Francis Molina: AAAS/Project 2061

Sophia Kesidou: AAAS/Project 2061



www.nsd.org

MATH AND SCIENCE PROJECTS

Northern New England Co-Mentoring Network (NNECN)

NNECN is a four year, tri-state Teacher Enhancement Project funded by the National Science Foundation. Leadership in the context of mentoring is the primary focus of the project. Two cohort groups of 100 middle and high school science and mathematics mentor teachers in Maine, New Hampshire, and Vermont participate in a rigorous three-year professional development program to build leadership skills in mentoring, coaching, professional development design, the change process, state and national standards, instructional strategies, formative assessment, and research on learning. Participants can receive up to 6 graduate credits. Each mentor teacher mentors up to three teachers. Mentors and mentees are provided with an extensive set of professional resources, tools, and opportunities for ongoing professional development. Building a content-focused co-mentoring network of colleagues within a school is a unique aspect of NNECN that distinguishes it from general induction programs.

Page Keeley: Principal Investigator/Project Director

Francis Eberle: Co-Principal Investigator

Lynn Farrin: State Coordinator

Susan Mundry: Project Partner - Learning Innovations/WestEd



www.nnecn.org

NEW! Curriculum Topic Study- *Bridging the Gap Between Standards and Practice (CTS)*

CTS is a National Science Foundation funded Teacher Professional Continuum Project that will develop materials to help science and mathematics educators at all levels of the professional continuum improve their content and pedagogical understanding of science and mathematics topics. There will be four products: a science CTS book, a mathematics CTS book, a facilitator's guide to using CTS, and a CTS web site. The first book in the series, *Science Curriculum Topic Study- Bridging the Gap between Standards and Practice*, is being published by Corwin Press and co-published by NSTA. The release date is March 2005. Professional development will be offered throughout the U.S.. Twelve national collaborators will work with the project team on the design of materials and processes that utilize CTS for preservice and inservice teacher learning.

Page Keeley: Principal Investigator/Project Director, Lead Author

Cheryl Rose: Mathematics Guide Lead Developer

Lynn Farrin: Project Associate

Susan Mundry: Facilitator's Guide Lead Developer - Learning Innovations/WestEd



www.curriculumtopicstudy.org

Governor's Academy for Science and Mathematics Education Leadership

The Governor's Academy program is designed to elevate the skills and knowledge of teacher leaders engaged in science and mathematics reform efforts in their schools. With funding support from the Regional Alliance at TERC, twenty K-12 teachers from throughout the state make up the second cohort group to go through the rigorous Academy program. Fellows receive over 150 hours of professional development in eight connected components and are expected to design and implement a plan for improving science or mathematics teaching and learning at their school, district, region, or state level.

Page Keeley: Project Director

Cheryl Rose: Co-Director

Lynn Farrin and Carolyn Arline: Project Associates



Maine Mathematics and Science Teaching Excellence Collaborative (MMSTEC)

MMSTEC, www.educateME.info, in its final year of its five-year funding period, has made significant impact and progress on its goals. Some of the results include: three tenured track faculty appointments in mathematics and/or science and education, summer academies, in 2003 attendance reached 104 science and/or mathematics instructors, 71 students have received scholarships as they pursue being a science or mathematics teacher

in Maine, and a 75% increase in prospective mathematics and science teachers in the pipeline in the University of Maine System. Additionally, faculty have incorporated new strategies for teaching students such as Peer Led Team Learning, formative assessment, group work in large lectures, and using technology. Also faculty have been involved in MMSTEC



from University of Maine at Presque Isle, Machias and Fort Kent campuses and 4 Community Colleges.

Richard Stebbins: University of Southern Maine

Principal Investigator/Project Director

Francis Eberle: Co-Principal Investigator

Robert Franzoza: Co-Principal Investigator - UMaine

Mary Schwanke: Co-Principal Investigator - UMaine



www.EducateMe.info

MMSTEC Collaborators:

University of Southern Maine

University of Maine at Farmington

University of Maine

Maine Mathematics and Science Alliance

ASSESSMENT & EVALUATION PROJECTS

Local Assessment Development (LAD)

The Local Assessment Development Project is a multi-year project of the Maine Department of Education and the Maine Mathematics and Science Alliance. MMSA has worked with hundreds of Maine teachers developing, piloting and field testing assessments

aligned with Maine's Learning Results for mathematics and science. Each assessment is accompanied by a task-specific rubric and scoring guide, references to relevant national standards and suggestions for prior instruction, annotated benchmark samples of student work, and field test data on task reliability and student performance.

The variety of LAD assessments available reflects the array of concepts and skills encompassed by the Maine standards, the assortment of instructional strategies, and the range in grade spans K-12.



Jill Rosenblum: Project Director

Elizabeth Byers-Small: Assessment and Evaluation Associate

Chad Dorsey: Assessment and Evaluation Associate

Debra McIntyre: Assessment and Evaluation Associate

NEW! Program Evaluation

The Maine Mathematics and Science Alliance's Assessment and Evaluation team provides formative and summative program evaluation. Approaches include document and data analysis, interviewing, focus groups, surveys, and classroom observations to collect data about teacher practice, attitudes, content knowledge and student performance. Evaluation projects have included the Gulf of Maine Research Institute's online Earth System Science course, the Maine Department of Education's Teacher Enhancement Project, Advancing the Agenda for Results Based Educator Certification (AARBEC), and MMSA initiatives such as Mathematics Access and Teaching in High Schools (MATHS) and Teacher Student Learning Continuum (TSLC).

Jill Rosenblum: Project Director

Elizabeth Byers-Small: Assessment & Evaluation Associate

Chad Dorsey: Assessment & Evaluation Associate

Debra McIntyre: Assessment & Evaluation Associate

NEW! Surveys of Enacted Curriculum (SEC)

Surveys of Enacted Curriculum (SEC) is a set of surveys intended to collect and report data on the classroom level enacted curriculum. The survey tools are designed to provide school districts with reliable, comprehensive data to assist teachers, administrators and policy makers with planning for instructional improvement. A sample report below shows the reported algebra taught in middle school and tested in the 8th grade Maine Educational Assessment. The Maine Department of Education and the Maine Mathematics and Science Alliance are partnering with the Council of Chief State School Officers (CCSSO) and several other nationwide educational institutions to offer the Maine SEC to Maine schools. Over 900 K-12 teachers of mathematics and science participated in the first year.

Francis Eberle: Co-Director

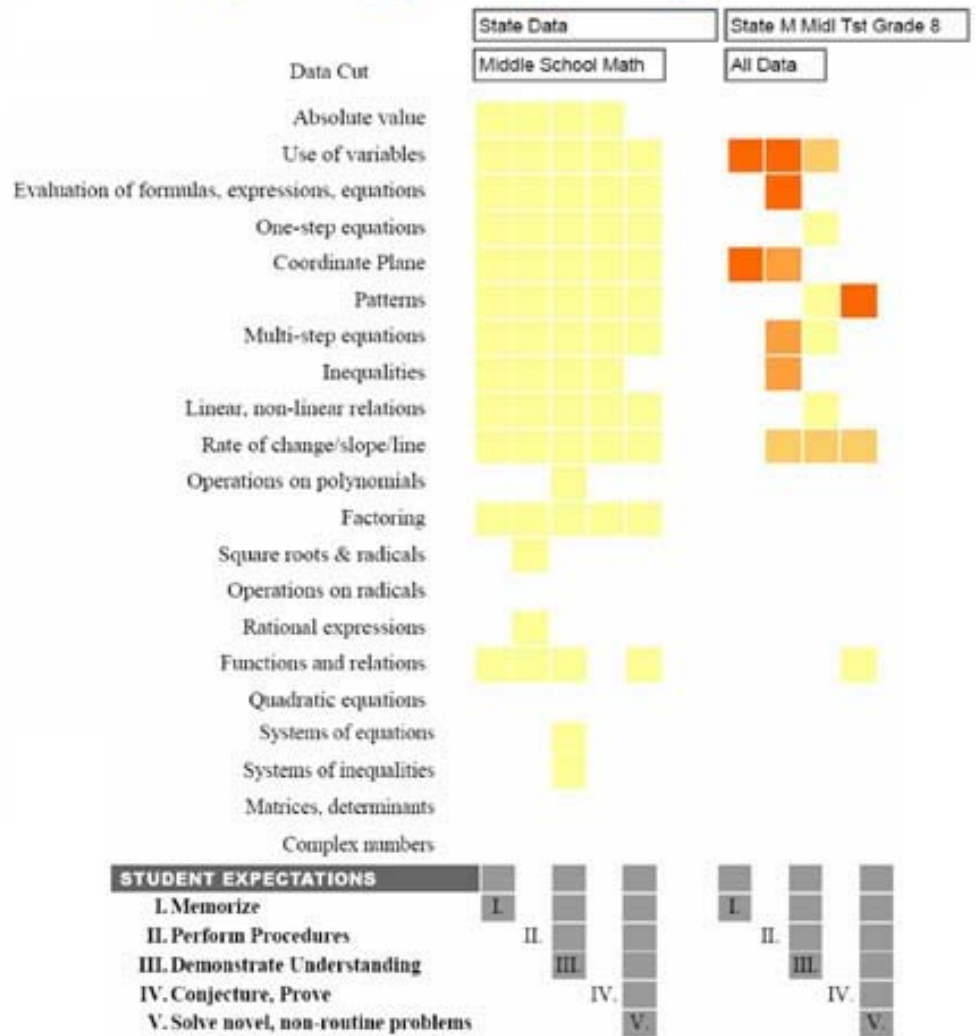
Debra McIntyre: Co-Director

Elizabeth Byers-Small: Co-Director

Mathematics Content: Algebraic Concepts

Percentage of Overall Mathematics Instructional Time

= Not Covered = < 0.5% = < 1.0% = < 1.5% = > 1.5%

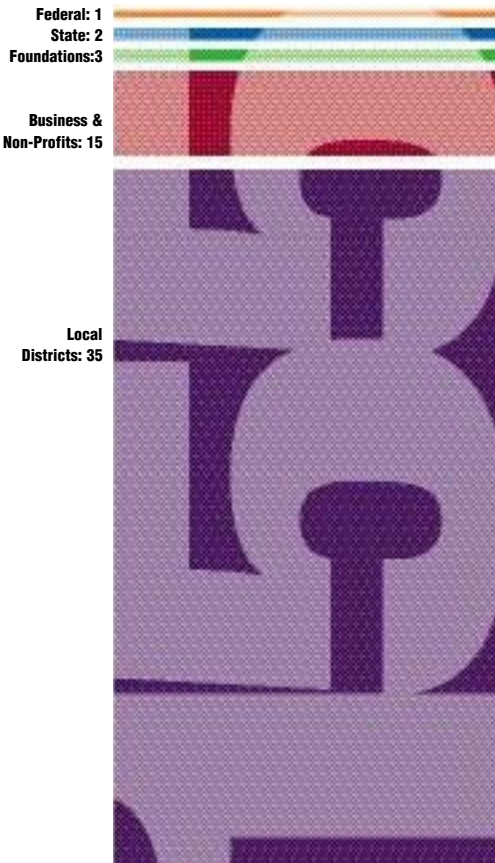


FINANCIAL INFORMATION

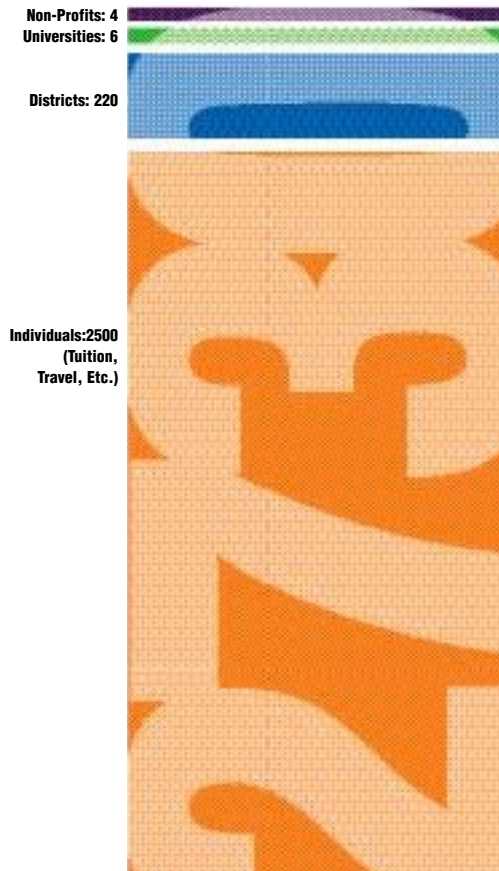
Revenue Sources	2004 \$4.5 million	2003 \$4.8 million
Federal	67%	67%
State	24%	24%
Private	2%	3%
Professional Services	6%	5%

Expense Allocations	2004 \$4.5 million	2003 \$4.7 million
K-12 Professional Development	39%	37%
K-16 Professional Development	30%	26%
School Based Programs	6%	5%
Other Educational Programs/Contracts	19%	28%
Management and General	7%	4%

Funders by Type



Recipients by Type



MMSA ADVISORY BOARD

Ann Adjutant

Measured Progress

Kate Arno

Small Business Development Ctr.

Tom Berger

Colby College

William Berlinghoff

Colby College

Karl Braithwaite

Muskie School of Public Service

Philip Brookhouse

Lewiston Middle School

James Carignan

State Board of Education

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Ricia Hyde

Waterville Junior High School

Gloria Jenkins

MSAD 43

Tad Johnston

Maine Department of Education

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Wes Marble

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Linda McCullough

University of Southern Maine

Peter Mills

Wright and Mills

Margo Murphy

Georges Valley High School

Richard Stebbins

University of Southern Maine

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LL Bean

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MMSA MISSION STATEMENT



The MMSA endeavors to create, sustain, and extend an effective learning environment that supports increased aspirations and improved student performance in mathematics and science so that all students will meet or exceed state and national standards.

www.mmsa.org

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