

# Michigan Mathematics and Science Centers Network

Building a 21st century workforce by inspiring and nurturing excellence in mathematics and science for all Michigan schools, students, teachers and communities.

## 2006-2007 Annual Report

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# MICHIGAN MATHEMATICS AND SCIENCE CENTERS NETWORK

*Building a 21st Century workforce by inspiring and nurturing excellence in mathematics and science for all Michigan schools, students, teachers, and communities.*

The Michigan Mathematics and Science Centers' Network is a primary infrastructure supporting the improvement of mathematics, science, and technology education in Michigan. Programs and services of the thirty-three Mathematics and Science Centers (M/S Centers) are made available to all Michigan public and private schools in their service areas. ***This report summarizes the work across the Network during the 2006-07 school year. Individual Centers produce an annual report of accomplishments available from each Center.***

## What's Inside?

Highlights of 2006-07 .....	2
Overview of Statewide Projects.....	3
Professional Development.....	9
Student Services .....	11
Leadership .....	14
Curriculum Support .....	16
Community Involvement .....	18
Resource Clearinghouse.....	20
Leveraged Resources .....	22
Focus on High Priority Schools.....	23
Appendix .....	24
Meeting State and National Goals .....	24
Supporting Michigan Department of Education Priorities.....	25
Table 1: Professional Development Participants.....	26
Table 2: Professional Development Activities .....	27
Table 3: Student Services Activities .....	28
Table 4: Ten Year Summary Data .....	29
Network Committee Activities.....	30
Directory of M/S Centers .....	32

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### FUNDING CHANGES

The Mathematics and Science Centers Program was created by legislation in 1988, providing grant funds to establish Centers in cooperation with school districts, higher education institutions, science museums, and professional associations. Since that time, the program has undergone significant changes, including development of a Master Plan for funding and operating Centers and implementation of several important statewide programs. Today, all school districts across the state have access in their region to one of 33 Mathematics and Science Centers in Michigan.

Base funding for M/S centers is now part of the annual State Aid Act-Section 99 and totaled \$2.5 million for the 2006-2007 school year. This is the fourth year of **75% reduced** state funding. **Future mathematics and science programming for schools is in jeopardy as Centers search for the financial resources to support schools, teachers, and students. In 2006-2007, state funding cuts resulted in 18% fewer professional development hours for teachers and 84% fewer program hours for students as compared to 2002-2003 school year.**

# IMPACTS AND OPPORTUNITIES

## Highlights from the 2006-07 Annual Report



Again in 2006-07, the Michigan Mathematics and Science Centers Network offered programs and services to thousands of teachers and their students, all designed to improve the teaching and learning of mathematics and science. Although a fourth year of significantly reduced funding from the Michigan Legislature necessitated reductions in programming, the 33 Centers continued to provide public and private schools in their regions various student services, teacher professional development, curriculum, leadership, community partnership, and resource sharing programs. Below are highlights from the annual report of the Michigan Mathematics and Science Centers Network. Readers are encouraged to review the entire report. Information about the Network is available from David Krebs, President ([dkrebs@muskegonisd.org](mailto:dkrebs@muskegonisd.org); Phone: 231-767-7217) or [www.mscenters.org](http://www.mscenters.org).

- In addition to the many regular local and regional activities, the Network facilitated five major state-wide projects serving Michigan teachers and their students:
  - Michigan Mathematics Leadership Academy
  - Michigan Science Leadership Academy
  - High School Math and Science Success
  - Michigan Mathematics and Science Leadership Collaborative
  - Michigan Environmental Education Curriculum Support Program
- 13,215 different teachers and other educators participated in programs, including: 4,271 teaching elementary, 2,686 teaching middle/jr. high, 3,166 teaching high school, 223 teaching pre-K, and 2,869 identified as others (administrators, paraprofessionals, etc.)
- 2,036 professional development programs were offered: 926 in math, 802 in science, 96 in technology, 25 integrated math/science/technology, and 187 in other topics
- A total of 11,933 hours of PD were provided; 30,271 total PD enrollments
- 160,220 students participated directly in Center programs: 28,021 elementary, 45,414 elementary and middle/jr. high, 16,739 middle/jr. high, 37,756 middle/jr. high and high school, 22,267 high school, 157 pre-K, and 9,866 from mixed grade levels (some students may have attended multiple programs)
- Over the past 10 years, 23,965 PD programs have been offered; total enrollment in 10 years was 371,056 (many teachers participated multiple years in multiple programs)
- In the past 10 years, 2,500,995 students have been served directly by centers (some students served multiple years in more than one program)
- In collaboration with the Michigan Department of Education, Centers offered PD to aid teachers in implementation of the new Michigan Mathematics and Science Grade Level Content Expectations
- Mathematics and science teachers participated in school year workshops that built their knowledge of the Michigan High School Content Expectations and strategies to engage all students in learning
- Teachers were trained to use classroom and state mandated assessment materials to improve student learning
- MEAP scores are improving in schools where Centers have been able to work intensively over a sustained period of years
- Michigan Virtual High School courses are available through the Network to students across Michigan
- Students have had a variety of opportunities to gain real-world experiences with community businesses, agencies, and organizations
- High priority schools (high need, high minority, low achievement) were targeted by Centers for intensive professional development and other customized interventions
- Centers collaborated on activities with 31 different Michigan colleges and universities, engaging science, math, engineering, and technology faculty
- Centers have provided direct and customized services to schools and school districts to help them align their curricula to state-level standards and benchmarks, including the new Content Expectations



**Michigan  
Mathematics and  
Science Centers Network**

Building a 21st century workforce by inspiring and nurturing excellence in mathematics and science for all Michigan schools, students, teachers and communities.

## **Michigan Mathematics and Science Center Network**

*Building a 21<sup>st</sup> century workforce by inspiring and nurturing excellence in mathematics and science for all Michigan schools, students, teachers and communities*

# **STATEWIDE PROJECTS**

**2006-07**

The Michigan Mathematics and Science Centers Network is a collaboration of 33 regional centers throughout the state created by the Michigan Legislature to elevate mathematics and science education for all students in Michigan. Centers provide public and private schools in their regions with a variety of student services, teacher professional development, curriculum, leadership, community partnership, and resource sharing programs.

Each year, Centers offer local programming to thousands of teachers and their students, designed to improve the teaching and learning of mathematics and science. Additionally statewide projects are conducted across Centers, partnering with state agencies, professional organizations, higher education, non-profit programs, and businesses. In the 2006-07 school year, there were five major statewide efforts, the results of which are highlighted here.

They include:

- MICHIGAN MATHEMATICS LEADERSHIP ACADEMY
- MICHIGAN SCIENCE LEADERSHIP ACADEMY
- HIGH SCHOOL MATH AND SCIENCE SUCCESS
- MICHIGAN MATHEMATICS AND SCIENCE LEADERSHIP COLLABORATIVE
- MICHIGAN ENVIRONMENTAL EDUCATION CURRICULUM SUPPORT PROGRAM

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This report was prepared by Science and Mathematics Program Improvement (SAMPI)  
Western Michigan University  
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# **HS-MASS**

## **High School Math and Science Success**



Michigan  
Mathematics and  
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**STATEWIDE PROJECT**

**HS-MASS** was a statewide collaborative effort of the Michigan Mathematics and Science Centers Network during the 2006-07 school year to provide high school teachers with professional development opportunities for help in understanding the new science and mathematics components of the High School Merit Curriculum and associated testing and implications for teaching and learning in their classrooms. Below is a summary of results based on an analysis of data collected as part of the external evaluation. Reports based on other evaluation data, as well as detailed information supporting this report, are available.

At the direction of the Michigan Department of Education, during a brief 3-month period from December 2006 through February 2007, the Network prepared professional development materials, planned and implemented workshops, and conducted a results-oriented external evaluation at Centers across Michigan. The program was designed to provide teachers with assistance in implementing the Michigan Merit Curriculum statewide for the first time in March 2007.

- The Network conducted over 90 workshops, serving 832 high school mathematics teachers and 848 high school science teachers.
- Results of a pre/post test of students of participating teachers shows a statistically significant increase in scores pre to post for both mathematics and science data interpretation across the Network. Approximately 25,000 students completed math and/or science tests.
- Center Director interview data indicate there was significant interest from schools and teachers in learning about how they could effectively prepare their students for the new Michigan Merit Curriculum. This is reflected in the more than 1,600 teachers who were recruited and participated in the workshops conducted by the Network in the brief three-month period.

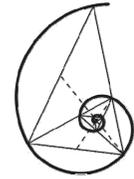
### **Results of a pre/post survey of participating teachers show a significant increase in mean ratings pre to post on all items related to workshop topics and activities.**

- Most teachers indicated very little familiarity with the new High School Content Expectations or the new ACT test at the beginning of HS-MASS. By the end of the workshop series, they indicated significantly improved familiarity and understanding.
- Likewise in the post survey, teachers said they were much more familiar with both what students need to know to demonstrate understanding of the High School Content Expectations and the strategies needed by students to be successful on the new Michigan Merit Exam.
- At the end of the workshops, teachers indicated they were much better prepared to develop action plans and design lessons/units consistent with the new content expectations.

***Results of HS-MASS confirm that the Network is an effective statewide infrastructure for improving mathematics and science education. With adequate funding, it is able to respond to changing needs of schools and teachers at the grassroots level, providing effective, high quality-programs and services.***



# Michigan Mathematics and Science Teacher Leadership Collaborative



Michigan  
Mathematics and  
Science Centers Network

## PHASE I ACCOMPLISHMENTS

July 1, 2006-December 31, 2007

**STATEWIDE PROJECT**

The Michigan Mathematics and Science Teacher Leadership Collaborative (MMSTLC) is a statewide partnership among the Michigan Mathematics and Science Center Network, Grand Valley State University, Saginaw Valley State University, The University of Michigan—Dearborn, The University of Michigan—Ann Arbor, and the Michigan Department of Education. The purpose of the collaborative is to develop a cadre of teacher leaders, establish collaborative working relationships among teacher leaders, administrators, math/science centers, and science, technology, engineering, and mathematics faculty, to improve mathematics and science learning of students in targeted high priority schools, and to increase capacities of math/science centers to sustain support for teacher leaders and high priority schools.

- 
- Creation of a partnership and a plan to provide programs, services, and materials to build regional and local leadership
  - Establishment of a state level infrastructure to build capacities of:
    - regional mathematics and science centers to serve high priority schools
    - selected middle grade teachers to serve as teacher leaders in their schools and regions
    - administrators from at-risk schools to support teacher leaders
    - STEM faculty partnering with mathematics and science centers and high priority schools
  - Recruitment of the first cadre of eight Centers (Escanaba area, northern lower Michigan, Saginaw, Flint, Big Rapids area, Kalamazoo, Detroit, Oakland County). Each Center recruited a Core Team to support teacher leaders in one or more high priority schools. A total of 13 Center staff, 15 STEM faculty, 17 local school administrators, and 30 teacher leaders across all sites were recruited. Teacher leaders will be working with more than 100 mathematics and science teacher colleagues. More than 10,000 students in 17 schools will be served by teacher leaders and their colleagues
  - Provided 58 hours of state-level training for the Cadre I Core Teams in school-year workshops and summer institutes
  - Assignment of state-level coordinators to support core teams and provide customized technical assistance; more than 350 hours already provided
  - Creation of local plan by each Core Team to improve mathematics and/or science in participating at-risk, high priority schools
  - Distribution of \$1.6 million to the eight Centers in Cadre I for the Core Teams work to build local capacities and support teacher leaders; plans for distributing \$2 million to the eleven Centers in Cadre II
  - Development and distribution of customized materials for use by Core Team members
  - Development of an evaluation plan to assess the effects of the program on Centers, Core Team members, teacher leaders, and teachers and students in participating schools
  - Recruitment of the Phase II cadre of eleven additional Centers; three days of state-level training already provided for the Core Team; customized technical assistance underway; plans underway for recruiting and training a cadre of teacher leaders.

For more information about MMSTLC, contact Walter Rathkamp at SVSU ([rathkamp@SVSU.edu](mailto:rathkamp@SVSU.edu) or 989-964-4117) or go to [MMSTLC.org](http://MMSTLC.org).

# Michigan Science Leadership Academy (MSLA)

The Michigan Science Leadership Academy (MSLA) is a Michigan Mathematics and Science Center Initiative focused on providing statewide professional development and other services to support and improve the teaching and learning of science. MSLA coordinates statewide science materials development projects, teacher workshops, and dissemination efforts for the Network.



In the 2006-07 school year:

- MSLA coordinated a major eight-month statewide effort in the 2006-07 school year to develop the Companion Documents for the Michigan High School Content Expectations in science (Michigan Merit Curriculum standards)
- The development of the Companion Documents was a collaboration among the Mathematics and Science Centers Network (via MSLA), the Michigan Science Teachers Association (MSTA), and the Michigan Department of Education
- Four 90-page Companion Documents—Biology, Chemistry, Earth Science, and Physics—were produced, designed to clarify and support the content expectations so teachers can more effectively use them to assist students in mastering the science content
- Fifteen writers from across Michigan worked in four subject-matter teams to prepare the Companion Documents
- For each of the 410 subject matter expectations, the teams wrote clarification statements (specific intent, clarification, or key ideas about the expectation) and provided reference to an instructional example (exemplars of the type of instruction that can be effectively used to address the expectation)
- Hundreds of reviewers were recruited by MSLA through various Michigan science and science education professional organizations to provide feedback for improvement of draft Companion Documents. The documents were then made more widely available on-line so more classroom teachers and others could offer their ideas about how to improve the material.
- The Mathematics and Science Center Network is working with the Michigan Department of Education to facilitate dissemination of and training on the Companion Documents
- The Network is a valuable resource for the Michigan Department of Education for developing and effectively disseminating materials to schools and teachers across Michigan
- MSLA is working with the Michigan Department of Education to develop similar companion documents for the grades K-7 content expectations

**For more information about MSLA, contact  
Dr. LaMoine Motz at the Oakland Schools Science/Math/Technology Center  
(248-209-2378 or [LaMoine.Motz@oakland.k12.mi.us](mailto:LaMoine.Motz@oakland.k12.mi.us))  
For more information about the Companion Documents and content expectations,  
go to [Michigan.gov/mde](http://Michigan.gov/mde)  
or contact Kevin Richard at the Michigan Department of Education  
(517-540-6805 or [RichardK1@michigan.gov](mailto:RichardK1@michigan.gov))**

# MICHIGAN MATHEMATICS LEADERSHIP ACADEMY



Michigan  
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STATEWIDE PROJECT

The Michigan Mathematics Leadership Academy (MMLA) was organized in 2000-01 as a joint effort of the Michigan Mathematics and Science Center Network, the Michigan Council of Teachers of Mathematics (MCTM), and the Michigan Department of Education (MDE). The purpose of MMLA is to provide professional development in mathematics in a trainer-of-trainer format to teams from each of the 33 Centers across the state.

MMLA arose in response to changes being made to the Michigan Mathematics Curriculum Framework and increasing focus on statewide testing with the MEAP. That initial need has increased with the advent of No Child Left Behind in 2002 and the subsequent Grade Level Content Expectations and High School Content Expectations which impacted the mathematics curriculum and MEAP.

Since 2001-02, MMLA has offered two or more training sessions each year for Center teams. Each training session is hosted by a Center and offered at four Centers strategically distributed across the state to minimize costs for participants and Centers.

A sample of MMLA accomplishments include:

- ◆ Creation of 4-8-person teams at each of the 33 Mathematics and Science Centers made up of K-12 educators to provide training to improve the teaching and learning of mathematics among their colleagues. This represents a cadre of more than 200 trained teachers and supervisors available to help Michigan schools
- ◆ These teams are important regional/local expert resources helping schools improve their mathematics programs
- ◆ Fifty or more hours of training was provided to the Center-based teams each year since 2001, a total of more than 300 hours
- ◆ Thousands of teachers (many for multiple sessions) across the state have been served by the MMLA teams since the program began. In 2006-07 alone, about 1450 Michigan teachers and other educators participated in 116 different sessions facilitated by team members, representing hours of training—a total of 672,800 contact hours for all participants.
- ◆ MMLA has been a partner in the development of a variety of curriculum, instructional, and assessment tools for schools, principals, and teachers to support their mathematics programming
- ◆ MMLA has addressed the following topics and issues:
  - ◆ Problem-solving K-12
  - ◆ MEAP item analysis interpretation K-8
  - ◆ Using MI-CLiMB
  - ◆ Algebra through a functions approach
  - ◆ Formative assessment
  - ◆ Mathematics content K-12 based on needs
  - ◆ Interpretation and clarification of K-8 GLCE
  - ◆ Assessment item writing for K-8 GLCE
  - ◆ Interpretation/clarification of the 9-12 HSCE
  - ◆ Training in M-GLaNCE instructional module
- ◆ MMLA has been an important and effective partner in disseminating information and providing training in a variety of curriculum and assessment tools for the Michigan Department of Education

Funding for MMLA was initially provided by the Mathematics and Science Center Network and MCTM. In 2002, the president of MCTM approached the Dow Foundation on behalf of MMLA, and MCTM was awarded a grant of \$ 125,000, a major resource for the program's continuation.



# Dissemination of MEECS

## Michigan Environmental Education Curriculum Support Materials

In collaboration with the Michigan Department of Environmental Quality (MDEQ) and the Michigan Geographic Alliance, the Michigan Mathematics and Science Center Network conducted workshops to prepare Michigan teachers to use the MEECS curriculum support materials in their classrooms. MEECS is a set of five standards-based, inquiry-based, and Michigan-oriented environmental curriculum units for students in grades 4 through 9. Material, notebooks and support materials were developed in five areas—Air Quality, Ecosystems and Biodiversity, Energy and Resources, Land Use, and Water Quality. Centers conducted workshop series across the state focusing on each of the units.

Highlights of the collaboration:

- Center teams participated in 5-day institutes to prepare to facilitate MEECS workshops in their regions
- Between January and June 2006, Centers conducted 40 workshops, serving 462 teachers from 117 different school districts
- Between July 2006 and January 2007, 63 workshops were conducted, serving 711 teachers from 163 different school districts
- In end-of-session evaluations, teacher participants responded very favorably to the workshops, indicating their effectiveness in preparing them to use the MEECS materials in their classrooms
- This collaboration shows the effectiveness of the Mathematics and Science Center Network in widely disseminating an important curriculum resource to teachers across Michigan
- The MDEQ was able to provide a large number of teachers with substantive workshops through this collaboration with the Network that would not otherwise have been possible

For more information about the MDEQ-MEECS/  
Network collaboration, contact  
David Krebs at 231-767-7317 or  
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For more information about MEECS go to  
<http://www.Michigan.gov/deq> or contact  
Tom Occhipinti at 517-373-2379 or  
occhipit@michigan.gov

# PROFESSIONAL DEVELOPMENT

**State Board of Education Major Activity:**  
 "Improve professional development for current teachers"

**NCLB goal:** "Preparing high quality teachers"

**Mathematics and Science Centers Network Goal:**  
 "Provide professional development opportunities that enable and sustain effective teaching in mathematics and science by keeping teachers current in the field and able to develop positive learning environments for all students."

**13,215** teachers and administrators enrolled in one or more professional development sessions facilitated by M/S Centers. These participating teachers and administrators averaged 13.7 hours of professional development offered by M/S Centers in 2006-2007.\* This 2% decrease from the previous year is the result of reduced funding.

\*Detailed numbers of hours, enrollments, and content of professional development sessions can be found on pages 26-27.

## How are M/S Centers supporting teachers in meeting NCLB challenges?

- Centers implemented "Trainer of Trainer" professional development models that engage highly qualified teachers in planning and delivering PD at local schools
- Center directors provide support to administrators and teachers through phone, email, and direct contact in regards to "highly qualified issues."
- Centers facilitate and support teachers in developing teacher portfolios with records and certificates of completed professional development.

2,036 professional development sessions were offered by M/S Centers in 2006-2007.

11,933 hours of professional development programming were offered by M/S Centers in 2006-2007.

## Examples of Professional Development Targeted at High Priority Schools

- Teachers from a high priority school in Jackson County participated in the Texas Instruments-Teachers Teaching with Technology (T<sup>3</sup>) and learned how to use graphing calculators to enhance student learning in algebra. These teachers became teacher leaders and presented professional development sessions to their colleagues.
- Teachers at an under-achieving district in the Mason-Lake-Oceana service area participated in science curriculum mapping, scope and sequence courses, and unit development.
- Several of the Math-Science Partnership (MSP) Grants provide support for "Lesson Study" in high priority schools. This process engages communities of teachers in studying their own instruction through team observations and reflection.
- Teachers are trained to analyze MEAP data to identify gaps in student knowledge and problem solving abilities.

## TYPES of PROFESSIONAL DEVELOPMENT OFFERED THROUGH CENTERS' PROGRAMMING

- Content knowledge workshops
- Professional development series
- Graduate courses
- Courses leading to certification in mathematics and science
- Distance-learning series
- Sponsorship of teachers to attend educational conferences
- New teacher induction programs
- Mentoring programs
- Summer institutes
- Video-conferencing
- In-class coaching
- Technology training and integration
- Lesson study
- Learning communities
- Online webinars and classes

## **IMPACTS AND OPPORTUNITIES: PROFESSIONAL DEVELOPMENT SERVICES**

**Teachers are supported in developing an understanding of Michigan’s new Grade Level Content Expectations (GLCEs) and High School Content Expectations (HSCEs) through the M/S Centers.**

- Teachers work to align district curriculum to the new GLCEs.
- M/S Centers offer in-person and distance learning workshops to aid teachers in the implementation of the mathematics and science GLCEs.
- Teachers learn research-based instructional strategies and meaningful problem-solving activities aligned to the GLCEs.
- M/S Centers across the state offered teachers opportunities to review and discuss the draft K-7 science GLCEs. Participants were able to provide the MDE with feedback.
- During the “roll out” of the science HSCE, teachers studied the HSCEs, explored course configurations to meet the MMC graduation requirements, compared instructional materials, and continued alignment of current science curricula (example from Grand Traverse).
- Teachers participated in school year workshops that build knowledge of the HSCEs and strategies to engage *all* students in learning. During the summer, teachers participated in an intensive two-week institute to strengthen their mathematical content knowledge (example from Western U.P.).
- K-8 math teachers were trained on M-GLAnCE (Michigan Grade Level Assessments and Content Expectations) (examples from Seaborg, Macomb, Kalamazoo).

**Teachers gain knowledge about the new Michigan Merit Curriculum graduation requirements and the Michigan Merit Exam.**

- Teachers throughout the state participated in High School-Math and Science Success (HS-MASS), a program to assist secondary math and science teachers understand and prepare students to take the first Michigan Merit Exam (MME).
- Teachers explored course configurations to meet the MMC graduation requirements.
- Teachers became familiar with the structure and effective techniques for teaching the mathematics and science content of the MME through professional development sessions
- Teachers have received TI-81+ graphing calculator training on how to teach students to use the calculators on the Michigan Merit Exam (example from Grand Valley Regional).

**Teachers who participate in Center programming learn research-based, best instructional practice for all students in their classrooms.**

- Teachers use Testwiz to analyze student data to pinpoint weak areas in curriculum alignment, assessment, and teaching practices. Workshops were offered that covered assessment strategies, problem solving and the GLCE’s (example from Dickinson-Iron-Menominee).
- Teachers are trained to use classroom and state mandated assessment materials to improve student learning (example from Eastern U.P.).

**Teachers are becoming mathematics and science leaders in their schools and districts.**

- Through MMLA (Michigan Mathematics Leadership Academy) teachers, coordinators, and administrators participate in trainings and then bring back materials and information to share with their schools and districts.
- As part of the Michigan Mathematics and Science Teacher Leadership Collaborative (MMSTLC), teachers work with STEM professors to address different aspects of instructional leadership and education in math and science.
- Teachers in Jackson County, participating in the Texas Instruments Teachers Teaching with Technology (T<sup>3</sup>), learned how to use graphing calculators to enhance student learning in algebra. These teachers became teacher leaders, presenting professional development sessions to their colleagues (example from Jackson).

# STUDENT SERVICES

**Dept. of Education Strategic Goal:**  
*“Attain improvement in academic achievement for all students with primary emphasis on high priority schools and students”*

**NCLB goal:**  
*“Improving the academic achievement of the disadvantaged”*

**NCLB goal:**  
*“Promoting innovative programs”*

**Programs for Under-represented Students**

- Active recruitment of under-represented students for accelerated and special programs, including summer camps.
- M/S Centers provide strategies for teachers to work with special needs students such as differentiated instruction, lessons for multiple intelligences, and methods for teaching writing and literacy.
- Conferences for middle school girls focused on math, science and/or engineering.

**Support for Students Attending High Priority Schools**

- M/S Centers annually identify high priority schools for targeted programming such as summer courses and special mathematics and science opportunities that support and enhance classroom work.
- Whenever possible, programs are offered to students at no (or low) cost.

**Accelerated High School Programs**

- Eight Centers provide advanced mathematics and science courses through half-day high school pull-out programs in collaboration with local districts. Recruitment of minorities is a priority. See page 13 for reported outcomes of these programs.
- Centers save Michigan families money by providing Advanced Placement Courses and Dual Enrollment opportunities with local colleges.

**CUTS TO STUDENT PROGRAMMING**

Due to the fourth year 75% cut in funding to M/S Centers, student programming hours have been drastically reduced. In the past year, there were 84% fewer programming hours than five years ago. In addition, one accelerated high school program closed and others are in jeopardy.

**What types of outreach services are provided to students by M/S Centers?**

- Weekend, evening, and after-school programs
- Research and professional programs
- Classroom instructional programs
- Outdoor education programs
- Mathematics, science, and engineering fairs
- Summer camps and academies
- Internships in industry and medical fields
- Mentoring
- Academic competitions/Lego Leagues
- Advanced technology training
- On-line learning through MVU

# IMPACTS AND OPPORTUNITIES: PROGRAMMING FOR STUDENTS

## Test Scores

- Common on-line mathematics assessments are being used region-wide. Analysis of this on-line testing (made possible by Centers) has allowed teachers to improve instruction and identify needed resources (examples from five Upper Peninsula Centers, AMA, COOR, and Manistee/Wexford Center).
- Schools that have worked most intensively with a Center are showing increases in MEAP scores (examples from Allegan, BCAMSC, Lapeer, Macomb, Manistee-Wexford, Muskegon, Northwoods, Oakland, St. Clair, and Wayne).

## Increased Interest in Mathematics and Science

- Results from a comprehensive longitudinal study (encompassing more than five cohort years of intermediate outcomes and four years of long-term outcomes) indicate the STEPS Camp for Girls does influence college major choices. It has increased the number of women interested in studying SME-related fields (example from GVSU Regional).
- Reef Keepers program brings Technical and Education Center students to the Center on a regular basis to learn about the care and maintenance of the aquaria and to conduct experiments, collect and record daily data, and propagate corals (example from Allegan).

## Increased student access to quality mathematics and science programming

- Michigan Virtual High School Courses are available through the M/S Centers.
- Students across the state have access to Star Lab and Science Olympiad programs.
- Students have opportunities to attend and present at events such as "Ecology Day," regional "Mathematics, Engineering, and Science Symposiums," and other academic competitive events.

## Students gain work experience through local companies in their communities

- In Allegan, partnering with the Technical Education Center's Environmental Sciences and Electro-Mechanical programs allowed students to gain real-world experiences.
- BCAMSC Distribution Center provided first-entry work study for special education students, getting them ready to be placed in area businesses upon completion of BCAMSC program. Ninety-five percent (95%) of students were able to be placed in community programs after first-entry positions at the BCAMSC.
- In Berrien County, Accelerated Program students serve as interns in local businesses.
- Students in the Upper Peninsula work with the DNR and local industries.
- Students in Kalamazoo have access to labs and mentoring from professionals in the community for science research.

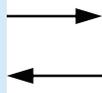
### Design Partnership a First in Michigan

The Convergence Education Foundation (CEF) selected Huron Math/Science Center schools as a recipient of Innovative Vehicle Design project partnership and provided \$10,000 for vehicle design and construction. CEF supports work of Embracing Our Earth with the physical presence of Segway and staff to demonstrate. In Spring 2007, Convergence invited Huron M/S Center to investigate a partnership with Purdue University. Through this CEF/Purdue support agreement, students in Huron Math/Science Center schools will participate in EPICS (Engineering Projects in Community Service)—a first in Michigan.



# LEADERSHIP

**Michigan Department of Education  
School Improvement Framework  
Standard:** “Create a shared environment where everyone contributes to a cumulative, purposeful, and positive effect on student learning.”



**Mathematics and Science Centers Network Goal:**  
“Articulate a shared vision of improved teaching and learning of mathematics and science, facilitate collaboration among Centers, and develop professional development programs to meet the needs of Network members.”

## STATEWIDE INITIATIVES

The Michigan M/S Center Network has a leadership role in five major statewide initiatives to improve mathematics and science:

- Michigan Mathematics Leadership Academy (MMLA)
- Michigan Science Leadership Academy (MSLA)
- Michigan Environmental Education Curriculum Support (MEECS)
- Michigan Mathematics and Science Teacher Leadership Collaboration (MMSTLC)
- High School-Math and Science Success (HS-MASS)

See pages 3-8 for details about these programs.

## NETWORK LEADERSHIP ACTIVITIES

At each quarterly meeting, Center directors are involved in activities and presentations that enhance their abilities to support schools in understanding assessment strategies, new resources and educational programs, grant opportunities, and MDE initiatives.

In addition, Center Directors receive MDE and MEAP updates that they pass on to local school districts.

## LEADERSHIP Focus on High Priority Schools

- Centers work with local districts to develop math and science initiatives to improve instruction based on student assessments
- Centers identify, train, and place science and mathematics coaches in high priority schools. Teachers in targeted schools reported an increase in understanding the application of science in real world contexts and were more interested in hands-on involvement in science and mathematics.
- Many of the Centers facilitate Trainer of Trainer programs to build leadership capacity at the district and building level.
- High priority schools were targeted by Centers for intensive professional development. Activities performed by coordinators and consultants included:
  - Aiding teachers in the curriculum mapping process
  - Assisting teachers with unit writing
  - Facilitating discussions on cross-grade connections
  - Developing the scope and sequence of courses
  - Supporting teachers as they used assessment data for improvement
  - Demonstrating effective classroom strategies
  - Implementation of a test-taking/study skills course in tested grades
  - Identification, training, and use of a school data manager to support decision making

# IMPACTS AND OPPORTUNITIES: LEADERSHIP

## Teacher Leader Networks are Developed

- Received a \$2.3 million Math and Science Partnership Grant (Michigan Mathematics and Science Teacher Leadership Collaborative – MMSTLC) to deliver a statewide program aimed at developing science and mathematics teacher leaders in high priority schools. The project will develop the leadership skills and practices among all stakeholders to support quality instruction in mathematics and science.
- The Huron M/S Center embarked on a comprehensive, continuous improvement model which is designed to build capacity in local districts. The model involves intensive training for Teacher Leaders from three Centers (15 districts). Participants engage in 14 days of training and research related to mathematics content and effective learning strategies. The model also includes ongoing training for school administrators.
- The M/S Center Network has become a primary partner in the statewide Building a Presence in Science. Through this program, there are “Points of Contact” at most school buildings across the state to disseminate information about science assessments, programs, and grade-level content expectations.

## Centers Support Quality Teaching Experiences and Professional Development for Pre-Service Teachers

By collaborating with colleges and universities, Centers take a leadership role in ensuring that new teachers entering the field have relevant experiences and are well-prepared to meet Michigan’s standards for teaching as well as the Grade Level Content Expectations and High School Course Expectations.

- 10 SVSU undergraduates had opportunities to act as mentors to area students and, in return, be mentored by Master teachers in the area of mathematics and science.
- Northern Michigan University students partnered with The Seaborg Center and conducted weekend College for Kids programs under the supervision of Center staff.
- SVSU, Seaborg, and GVSU Centers are involved in content knowledge courses for pre-service teachers.
- Baker College students earned credits by helping elementary students conduct experiments at the Michigan Aerospace Challenge and Muskegon Mayfest Celebration.

### Special Education and Classroom Teachers Support MEAP Achievement

Teams of general and special education middle school mathematics teachers from seven Muskegon County school districts partnered with the Muskegon Regional M/S Center to improve student achievement on the mathematics portion of the MEAP.

### Centers have been collaborating with Michigan universities and colleges to develop professional development workshops, seminars, and courses for teachers, developing instructional units, and providing summer institutes for both students and teachers.

Universities and Colleges involved have included: Adrian College, Alpena Community College, Andrews University, Baker College, Central Michigan University, Eastern Michigan University, Ferris State University, Finlandia University, Grand Valley State University, Jackson Community College, Kalamazoo College, Kettering University, Lake Superior State University, Marygrove College, Michigan State University, Michigan Technological University, Muskegon Community College, Northern Michigan Community College, Northern Michigan University, Northwestern Michigan College, Oakland University, Saginaw Valley State University, Sienna Heights College, Spring Arbor University, University of Detroit-Mercy, University of Michigan, University of Michigan-Dearborn, University of Michigan-Flint, Wayne State University, West Shore Community College, and Western Michigan University.

# CURRICULUM SUPPORT

**Michigan Dept. of Education  
Priority:**  
*"Helping low performing schools"*

**Mathematics and Science Centers  
Network Goal:**

*"Support principals in identifying the professional development needs of teachers, analyze MEAP data to identify instructional needs of students, and work with school improvement and curriculum development teams to align programming and instruction with state and national standards."*

**SUPPORT OF MICHIGAN'S GRADE LEVEL CONTENT EXPECTATIONS (GLCEs) and HIGH SCHOOL COURSE EXPECTATIONS**

- Multiple sessions were provided to assist teachers in their understanding and knowledge of Michigan's GLCEs.
- HS-MASS, a statewide initiative, provided professional development to help 8th-12th grade teachers understand the new science and mathematics components of the MMC and MME.

**K-7 Science GLCE Public Review Sessions**

- Centers across the state offered public review of the draft K-7 science GLCE. Participants received explanations and review of the documents and were guided through the on-line survey.

**PROFESSIONAL DEVELOPMENT SUPPORTING CURRICULUM ALIGNMENT WITH STATE STANDARDS**

- M/S Centers collaborate with Michigan Environmental Education Curriculum Support (MEECS), a Michigan Department of Environmental Quality program to develop and disseminate environmental curriculum units through the Clean Michigan Initiative. The Network conducted professional development to train teachers to use the curriculum units.
- The Macomb County Math/Science Center developed the M-GLAnCE modules (Michigan Grade Level Assessment and Content Expectations). This program provides professional development for K-8 teachers focused on grade-level assessment and the Content Expectations. The Macomb County Mathematics Curriculum Guide was also completed. The guide supports the M-GLAnCe project. These modules are distributed statewide.

**USING ASSESSMENT TO IMPROVE INSTRUCTION AND CURRICULUM**

Centers continued to work with districts on data analysis. At the Eastern Upper Peninsula Math/Science Center, regional, district, and classroom level data, analyzed by the Center, is provided annually for use by School Improvement Teams, administrators, and teachers throughout the region. These materials have been particularly useful for high priority schools to target interventions.

At the Detroit Math/Science Center, data-driven strategies were pervasive in professional development, instructional practice, and assessment including the collection, disaggregation, and analysis of student data.

**CURRICULUM SUPPORT FOR HIGH PRIORITY SCHOOLS**

Almost half of the Centers in the Network have been key partners in Michigan's Math/Science Partnership Grants. These grants focus on preparing teachers from high priority districts (underachieving, disadvantaged, or extreme rural) to teach curricula aligned with the GLCEs and High School Course Expectations.

## **IMPACTS AND OPPORTUNITIES: CURRICULUM SUPPORT TO LOCAL SCHOOL DISTRICTS**

### **Support science and math achievement in identified high priority schools**

- Due to the expanded partnership between Allegan Math and Science Center and the Van Buren ISD, which included financial VBISD contributions of \$50,000, the M/S Center has been able to impact the 11 districts in Van Buren ISD.
- In the Battle Creek region, BCAMSC outreach staff have coordinated a community effort that identifies programs impacting students in Battle Creek middle schools. This coordination has allowed for all support groups to collaborate to increase achievement scores.

### **Assist districts with statewide math and science test alignment and analysis**

- All school districts and buildings within Manistee Regional Math/Science Center received the math and science MEAP data analysis for both content and strand.
- In the U.P., an increasing number of schools engage in the analysis of assessment data, goal setting, instructional improvement, and alignment of curriculum to state and national standards.
- The Macomb Math/Science Center has continued to expand the implementation of the “Dynamic Classroom Assessment” (DCA) program. Using assessment data, the five lowest performing districts have been identified. Working with MMLA trainers, these districts are exposed to methods and strategies for working with data to develop meaningful lessons and interventions to help improve mathematics understanding.
- Centers around the state are supporting districts in aligning curriculum, instruction, and assessment to state standards.

### **Help districts align local curriculum to implement the standards and benchmarks in the MMC, GLCE, and HSCE**

- In the Dickinson-Iron-Menominee region, all districts participated in curriculum mapping activities to better align their curriculum. Because of this, all districts have curricula aligned with state standards. As an outcome, all MEAP science and math scores were above the state average in all districts.
- In the Manistee-Wexford service area, math pacing guides were developed and shared across the region.

### **Facilitate the integration of technology into the math and science curriculum**

- All Centers are supporting the integration of technology into lessons.
- Sherwood Park K-8 School in the Grand Rapids Public School District will make better educational and instructional use of their computers because teachers learned how to use computers to support learning and to find resources on-line through PD sessions sponsored by the Grand Valley Regional Center.
- The Macomb County M/S/T Center’s equipment loan program has provided direct material support to schools. Schools can borrow Star Labs, Lego robotics kits, classroom GPS sets, data collection probes, and numerous other types of equipment to support classroom instruction.

### **Assist MDE with math and science initiatives**

- Schools are aware of state mathematics and science initiatives, assessment changes, and policy updates.
- High School-Math and Science Success (HS-MASS) is a statewide project providing professional development and other services to teachers and schools in order to improve the teaching and learning of mathematics and science. Over 1,600 8th-12th grade teachers and 25,000 students participated in the project in the 2006-07 school year.

# COMMUNITY AND PARENT ENGAGEMENT

**NCLB goal:**  
 “Partnering with parents and communities”

**Michigan Mathematics and Science Center Network Goal:**  
 “Engage businesses, universities, museums, governmental agencies, and parents in supporting and providing quality mathematics and science education and experiences.”

**Business and Industry have collaborated with Centers to provide:**

- Used office furniture, scientific equipment, and supplies for schools
- “Teacher in Industry” internship experiences
- Student internships in technical fields such as medicine, information technology, website design, engineering, architecture, aviation, pharmacy, dentistry, veterinary medicine, and forensic science
- Career talks
- “Real-World” application of research projects such as stream science
- Mentoring and job shadowing experiences for students

**Partnerships With Other Institutions and Organizations**

- Centers have collaborated with over 30 Michigan universities and colleges to plan teacher and student programming, write grants, and share resources.
- Over 14 museums and planetariums have shared programming with Centers.
- Centers have provided programming and consultation to environmental/outdoor education centers across the state.
- Centers have involved the public libraries, National Park Service, Pictured Rocks National Lakeshore, the Department of Natural Resources, the U.S. Fish and Wildlife Agency, the U.S. Forest Service, Conservation Districts, and Watershed Councils in M/S Center programs to benefit Michigan families and schools.

**Examples of Partnerships with Foundations**

- One Center was able to connect a local high school science teacher with the Convergence Education Foundation. As a result, the teacher received a \$31,000 grant to fund the implementation of a new biology technology research-based class.
- Centers are partnering with the DTE Foundation to support innovative teaching through the issuance of mini-grants for teachers.
- The Dart Foundation has supported environmental education programs, GLOBE training, professional development supporting integration of technology into lessons, and equipment for Center Resource Centers.

**Through Centers’ efforts, professionals in the community are assisting with student research projects, Science Olympiads and science fairs, career presentations, and mentoring.**

**EXAMPLES OF ENGAGING PARENTS AND OTHER COMMUNITY MEMBERS**

Many Centers organize Family Math and Science Nights and community education classes designed to engage parents and students in hands-on, inquiry-based activities. These programs build parents’ awareness of and familiarity with inquiry-based teaching and learning that students are participating in at school.

## **IMPACTS AND OPPORTUNITIES: ENGAGING PARENTS AND COMMUNITIES**

### **M/S Centers collaborate with community groups to co-sponsor math and science programs**

- New Level Sports co-sponsored an after-school program for inner-city students in high priority schools in Battle Creek. Survey data revealed increased interest in math and science careers.
- The Symposium for Middle School Girls, robotics programs, and partnerships with industry have had a positive impact on the community in the Macomb County service area. Students, parents, and community volunteers came together with over 1,000 participants. Students come from public, private, charter, and home schools.
- The Regional Math and Science Center at GVSU directed a week-long Science, Technology, and Engineering Preview Summer (STEPS) Camp for 7<sup>th</sup> grade girls. The camp was sponsored in conjunction with Padnos College of Engineering and Computing. The camp's goal was to foster interest in the sciences, to motivate students to take all the basic science and math in high school, and to encourage students to consider science/engineering careers. This free, week-long experience was supported by donations of \$30,000 from area businesses and attracted 14% minority participation.

### **Community groups are involved in planning and implementing programs**

- The Western U.P. Center brought together community organizations, businesses, higher education institutions, and schools to secure funding for stewardship projects pertaining to the Lake Superior Watershed.
- Advisory boards of Centers bring human and financial resources to Centers as well as many opportunities for collaboration. Members come from higher education, informal science institutions, K-12 schools, businesses, civic organizations, medical institutions, and industry. Members share messages about mathematics and science education with their organizations and they brainstorm ideas, network, and exchange resources.

### **Financial and human resources are acquired to provide the six basic services**

- Greater awareness of the importance of math and science education, resulting in significant financial and in-kind support.
- Allegan M/S Center and US 131 Motor Sports Park partnered together to provide an authentic venue for the Center's Eco-Races.
- Community and business support of BCAMSC science kit program: \$110,000 raised in 2006-07.
- Businesses in the U.P. contributed over \$5,000 to the Science Olympiad Tournament, which allowed students to attend the event at no cost.
- Thanks to charitable donations from local donors (\$28,000 to construct two handicapped-accessible bathrooms and \$40,000 to erect a yurt/classroom), SEE-North's Center for Outdoor Studies opened in Summer 2007.

### **Public understanding of the goals and issues of math and science education is promoted**

- Community science festival is held twice a year for the community (example from AMA-Iosco).
- In the Lansing area, the Girls Math/Science Conference is held for sixth grade girls and their parents. The conference gives them resources to make informed choices regarding math and science careers and classes.
- Newspaper articles describe M/S Center programs and presentations and keep the public aware of the Centers.

### **Parents are more engaged in school activities**

- Parents are actively involved in summer programs.
- Increased parent involvement at science and math fairs.
- Increased number of parent volunteers.
- Parents are engaged as essential partners in the learning process and benefit from the parent workshop in mathematics and science provided by the Detroit M/S Center.

# RESOURCE CLEARINGHOUSE

***In what ways are Center resources being used to support best practices in mathematics, science, and technology education?***

## **M/S Centers support schools in the use of technology by:**

- Providing training and strategies for integration of technologies.\*
- Developing partnerships with industries to secure equipment such as graphing calculators, scientific probes, and other lab equipment that would otherwise be cost-restrictive.
- Allowing teachers to copy materials and borrow printed resources, videos, kits, and manipulatives required for hands-on activities in particular science and/or mathematics curricula.

\*Detailed numbers of hours, enrollments, and technology-focused sessions can be found in the Appendix, pages 26-29.

## **Maintenance and expansion of resources for local school districts**

- M/S Centers are a dissemination point for several organizations including MCTM, MSTA, and MDSTA.
- Resource libraries are maintained by Centers, many of which are accessible through M/S Center websites.
- M/S Centers play an active role in the development, distribution, and maintenance of inquiry-based mathematics and science kits statewide. In addition, M/S Centers provide training and in-classroom support for using the kits or other equipment and instructional materials available on-loan from the Centers.

## **Centers create and sustain an Internet presence to support mathematics and science education**

Building a Presence - This national network connects teachers throughout the State of Michigan, both in communication and leadership. The mission of Building a Presence for Science is to provide science teachers with information about professional development opportunities and science teaching resources.

Mason Lake Oceana MSC upgraded their website to provide resources at the grade or subject level. Now teachers can access multiple documents at one location. The recently-created mathematics documents shared by the Northern Michigan Learning Consortium can all be accessed at one location on the website. Furthermore, listservs of middle and high school mathematics teachers were created to provide relevant and up-to-date information directly to teachers quickly and effectively .

At the Wayne RESA M/S Center, the science test question generator for developing common assessments is available online for teachers in the service area. "Live365," an internet-based science music station that plays science songs and can be accessed by students or teachers at any time, was also supported.

**Centers actively recruit businesses and industries to support mathematics, science, and technology education through donation of equipment, facilities, and supplies. Some of these are used in Center programming but a major focus is the loaning and distribution of these materials and equipment to area schools. Financial resources are often used to support special events such as science fairs, academic competitions, and mathematics and science camps. Some examples of the businesses and industries that have supported Centers in the past year include:\*** Abitibi, Blue Granite, DOW, HARSCO, Judd LLP, Nordlund & Associates, New Page Corporation, Perrigo Company, Pfizer, PVS Nolwood, Smiths Aerospace, Warner Norcross, Marquette General Hospital and US 131 Motor Sports Park.

\* Not a complete list.

## IMPACTS AND OPPORTUNITIES: RESOURCE CLEARINGHOUSES MAINTAINED AND COORDINATED BY M/S CENTERS

**M/S Centers provide access to quality materials and equipment for the classroom that otherwise would not be available.**

### Technology

- Centers provide technology resources (along with training) and other materials to supplement and enhance lessons. On-line access to resource inventories is available on many Centers' websites. Teachers are making greater use of technology to support curriculum and instruction.
- In Detroit, the Accelerating Learning through Technology (ALTT) program continues to give middle school students at the middle school level continuous access to wireless technology tools, such as handheld computers and laptops, to support instruction.

### Science Kits

- 125 school districts across the state use the K-6 Science Curriculum/Kit program developed by the Battle Creek Area Mathematics and Science Center.
- Science kit use is facilitated and supported by M/S Centers (examples from Battle Creek, GVSU, Lapeer, Mason-Lake-Oceana, Sanilac, SEE-North). The Battle Creek Center has facilitated 130 science kit trainings across the state.

### Other Resources

- NASA resources and workshops provide in-service and pre-service teachers access to resources and strategies for integrating math, technology, and social studies with science are available through several Centers (e.g. CMU, DIISD, Genesee, Seaborg, SVSU).
- Centers have facilitated the donation (and dissemination) of lab equipment and supplies to districts from other agencies and industry.

**Communities have access to resources provided for and developed by Centers.**

- Families have access to high-quality accelerated mathematics and science programs for students that often are only available in wealthy areas. There are eight accelerated high school programs facilitated by Centers across the state (Battle Creek, Berrien County, Detroit, Kalamazoo, Macomb, Mecosta, Oakland, and Sanilac).
- Communities have access to outdoor education Centers (e.g. SEE-North Center for Outdoor Studies, Sprinkler Lake, Huron Nature Center, Clear Lake Education Center, Ligon Outdoor Education Center) as well as M/S Centers' Resource Centers.

### REAL Science in Muskegon County

High school science labs in Muskegon County are getting a bonanza of new equipment thanks to the **REsources for Authentic Learning in Science** (REAL Science) project. The project is meant to provide high schools throughout the county with access to current, real-world lab equipment. This equipment, selected by teachers collaborating with local industry experts, reflects the industrial and commercial labs of today. The cost for these instruments is beyond the reach of strained school budgets.

During the summer of 2007, local high school science teachers were introduced to the initial purchase of chemistry and biology equipment through hands-on training sessions. The MAISD Regional Mathematics and Science Center, in collaboration with a local community-based board of advisors, directs and manages the program including the logistics of transporting the equipment on a rotating basis to each of the area high schools. This will not only achieve an economy of scale for the equipment, but also for the associated ongoing professional development and curriculum support provided by the Math and Science Center.

## LEVERAGED RESOURCES

***Funding Crisis: For the fourth year in a row, the Michigan Mathematics and Science Centers have experienced a major funding set-back. The foundation grant from the State of Michigan has been cut 75% by the Legislature. Never before has the leverage of funds from other sources been so important. To compound the problems, grant acquisition has become more challenging with reduced staff and lack of available matching funds required by many funding agencies. In addition, local school districts have fewer funds available to support teachers to attend professional development or support other services of the Centers.***

### Examples of Resources Leveraged Through Collaborations with Universities and Colleges

- Collaborations with state universities to sponsor full-day regional mathematics and science conferences
- Teacher Quality Grants (Title II, Part A) are developing science leaders in underachieving schools and building teachers' science content knowledge
- Partnership with universities and school districts in writing proposals for the Mathematics and Science Partnership Grant program (Title II, Part B)
- Inclusion of pre-service teachers in science, mathematics and technology content professional development courses offered to districts

**In the past year, Michigan Mathematics and Science Centers have leveraged an additional \$7,909,955 from grants and community contributions.**

***Intermediate School Districts and Universities have contributed \$2,759,127 toward salaries and \$435,851 toward Centers' general funds, a drop of \$22,638 from the previous year. A large portion of these contributed funds represent Title II, Part B funds or payment for general education***

### EXAMPLES OF LEVERAGED SUPPORT

- Community donations to support the new SEE-North Center for Outdoor Studies totaled over \$68,000.
- Northwoods MST Center has engaged the New Page Corporation in improving mathematics and science education by providing funds for teachers' professional development.
- The DTE Foundation provides \$3,000 mini-grants to teachers for projects that enhance students awareness of energy conservation strategies (examples from Oakland).
- Battle Creek Area M/S Center collaborated with the Kellogg Foundation to begin a two-year fundraiser for science kit sponsorship. Over \$110,000 was raised through local businesses and industry.
- The Convergence Education Foundation selected Huron Math/Science Center schools as recipient of Innovative Vehicle Design project partnership which provided \$10,000 for vehicle design and construction.
- The REAL Science program in the Muskegon Area received \$107,500 in donations from local foundations
- Corporate, community, and foundation support for the Grand Valley Regional Center engineering camp for girls has provided funds totaling approximately \$400,000 over the past six years, including \$30,000 in 2006-07.

## FOCUS ON "HIGH PRIORITY" SCHOOLS

Providing services to high priority schools continues to be a major focus of Michigan's M/S Centers. As high priority schools are identified by the Michigan Department of Education, Centers make a variety of programs and services available to help improve teaching and learning of mathematics and science at identified schools. Needs assessments are conducted to target services to the specific needs of underachieving school buildings and districts. Examples of the types of services offered are described below.

### Examples of Services to High Priority Schools

- Centers target high priority schools each year for intensive assistance that includes building-wide professional development. Much of the PD occurs at the classroom level and includes (1) classroom observations to determine areas of need, (2) modeling science lessons, (3) small group PD designed to meet the identified needs, (4) content integration assistance, (5) assessment assistance, (6) gap analysis, and (7) resource acquisition.
- The Alpena-Montmorency-Alcona Center is using MEAP analysis with schools not meeting AYP with the purpose of targeting specific professional development needs.
- BCAMSC has targeted a group of underachieving schools for intensive interventions for the past five years. Prior to the interventions, the percent of students reaching proficiency levels was 51% of the state average. Percent proficient is now 91% of the state average. BCAMSC received a grant to provide assistance to high priority middle schools.
- In the Central Michigan area, the relationship between the Saginaw Chippewa Tribe and the Central Michigan SMTC has been strengthened. SMTC collaborated with the tribal school to become a NASA Explorer School.
- The Berrien M/S Center continued to work with area schools to improve student achievement in mathematics; this effort was expanded to include an additional school. This work included professional development for mathematics teachers in content and pedagogy through intensive summer institutes, school year curriculum professional development, and lesson study. The Center was awarded a Title II Mathematics and Science Partnership grant in collaboration with Andrews University to specifically raise student achievement through increasing the skill of middle school mathematics teachers.
- Among districts failing to make AYP, Dickinson-Iron-Menominee M/S/T Center facilitated middle school math workshops, AIMs (Activities Integrating Math and Science) workshops, and math and science curriculum alignment workshops. A Summer Math Camp was run for middle school students using the MVU on-line Math Camp program combined with one hour of math related games. Initial findings show a significant improvement from the pre/post student test scores.

### Project: Making Mathematics Matter (PM<sup>3</sup>) Improving Student Achievement Scores in Mathematics

This Wayne County initiative between the Wayne County M/S Center at Wayne RESA, the University of Michigan-Dearborn, and the Hamtramck and Highland Park school districts was funded through MSP funds to increase the body of research about what kind of professional development makes a positive difference, specifically for mathematics teachers. Mathematics Institute classes were developed for fifty teachers of mathematics in grades 4 through 8 from Hamtramck and Highland Park. Overall, the Institutes resulted in substantive improvement in mathematics content, pedagogy, and instructional practice.

## APPENDIX

### MEETING STATE AND NATIONAL GOALS

The M/S Centers Network serves as a catalyst and resource for improvement of the teaching and learning of mathematics and science. Centers provide services within their region that enhance and extend beyond those available to local districts. A major focus of their work is supporting schools in meeting the strategic goals of the State Board of Education, the priorities of the Michigan Department of Education, and the goals of No Child Left Behind (NCLB).

The table below illustrates the correlation of the Michigan Mathematics and Science Center Network goals with state and national goals.

<b>Michigan Department of Education School Improvement Framework Performance Indicators</b>	<b>No Child Left Behind (major goals)</b>	<b>Michigan Mathematics and Science Center Network Goals</b>
Highly qualified personnel who continually acquire and use skills, knowledge, attitudes, and beliefs necessary to create a culture with high levels of learning for all.	Preparing high quality teachers	Provide professional development opportunities that enable and sustain effective teaching in mathematics and science, by keeping teachers current in the field and able to develop positive learning environments for all students.
Staff participates in learning teams; professional learning is conducted with colleagues across the school/district on improving staff practices and student achievement.	Preparing high quality principals	Provide Teacher Leader programs to develop expertise at a building level in content, pedagogy, assessment and other essential components to teaching high standards. Support principals in their efforts to improve math and science in their schools.
Staff has the professional technology skills to be effective in their positions.		Facilitate and model the integration of technology into the mathematics and science curriculum.
Best practice instructional methods are used to facilitate student learning.	Requiring schools to use research-based instructional programs	Facilitate the integration of research-based instruction and best practices into the content areas of mathematics and science.
The school and community work collaboratively and share resources in order to strengthen student, family, and community learning.	Partnering with parents and communities	Engage businesses, universities, museums, governmental agencies, and parents in supporting and providing quality mathematics and science education and experiences.

## SUPPORTING MICHIGAN DEPARTMENT OF EDUCATION PRIORITIES

A major focus of the M/S Centers Network in 2006-2007 has been to support the development and dissemination of Michigan's new Grade Level Content Expectations (GLCEs) in both mathematics and science as well as supporting high school reform efforts. Support has ranged from serving on advisory teams, reviewing GLCEs, and providing workshops for teachers and administrators to become familiar with the GLCEs. Work with teachers has begun in developing mathematics lessons and assessments that are aligned with the GLCEs. Centers focused on familiarizing teachers and then students with the ACT and MME student assessments through a series of teacher professional development sessions in Winter 2007.

The Network also supports the Michigan Department of Education's priorities in the following ways:

<b>Michigan Department of Education Priorities and Activities</b>	<b>No Child Left Behind (major goals)</b>	<b>Michigan Mathematics and Science Center Network Goals</b>
Enhance teacher effectiveness and quality	Improving accountability Providing evidence of effectiveness Planning evaluation	Support principals in identifying the professional development needs of teachers, analyzing MEAP data to identify instructional needs of students, and working with school improvement and curriculum development teams to align programming and instruction with state and national standards.
Attain meaningful improvement for all students with primary emphasis on high needs schools and students	Improving the academic achievement of the disadvantaged	Provide opportunities to under-represented students to improve achievement in mathematics and science.
Share promising practices among high schools with a focus on instructional practice; relevance in curriculum and establishing student-centered learning environments	Promoting innovative programs	Provide accelerated mathematics and science programming to motivated math and science students (with a focus on recruiting under-represented students); Provide teacher professional development using research-based instructional strategies.

**Michigan Mathematics and Science Center Network  
Data Tables 2006-2007**

**PROFESSIONAL DEVELOPMENT**

**Table 1: Professional Development Participants**

			Reported Gender**		Position					
Parti- cipants	Differ- ent No. of Indiv.	Total Hours	Males	Females	Admin.	Math Tchrs.	Science Tchrs.	Tech Tchrs.	Com- bined Subject	Other or Un- known*
Pre-K	223	3,088.5	12	211	7	4	2	1	142	67
Elemen- tary	4,271	44,557.91	518	3,690	127	78	134	16	3,539	377
Middle/Jr. High	2,686	53,806.32	724	1,858	91	921	1,065	25	213	371
High School	3,166	44,675.41	1,397	1,684	146	973	1,170	64	146	667
Others*	2,869	34,681.91	787	1,901	306	252	386	31	400	1,494
<b>Total</b>	<b>13,215</b>	<b>180,810.1</b>	<b>3,438</b>	<b>9,344</b>	<b>677</b>	<b>2,228</b>	<b>2,757</b>	<b>137</b>	<b>4,440</b>	<b>2,976</b>

\*Other includes persons who work across levels, are not teachers or administrators, or did not indicate position.

\*\* 3.3% of individuals did not indicate Gender.

Teachers averaged 13.7 hours of participation in Center programming during the 2006-2007 academic year.

## WHAT WERE THE NATURE AND EXTENT OF THE PROFESSIONAL DEVELOPMENT ACTIVITIES?

Professional development was delivered in many ways, depending on the identified needs in the service area. Two primary formats included: (1) single events, lasting from a portion of one day to several consecutive days, and focused on a particular topic, skill, or issue, or (2) series—a series of sessions with a single focus, conducted periodically over a several week/month period.

**Table 2: Professional Development Activities**

		Math	Science	Technology	Integrated M/S/T	Other	Total
<b>Pre-K</b>	Events	3	3	0	0	0	6
	Hours	12.5	12	0	0	0	24.5
	Participants*	55	98	0	0	0	153
<b>Elementary</b>	Events	256	247	17	1	34	555
	Hours	1,214.5	1,135	128	2	149	2,628.5
	Participants*	3,563	2,225	154	136	437	6,515
<b>Elementary &amp; Mid/Jr. High</b>	Events	104	131	14	1	20	270
	Hours	622	632.75	59.5	3	164	1,481.25
	Participants*	1,969	1,752	229	27	249	4,226
<b>Mid/Jr. High</b>	Events	180	109	11	0	16	316
	Hours	1,126.25	1,208.5	67.5	0	68.5	2,470.75
	Participants*	2,852	1,696	209	0	235	4,992
<b>Mid/Jr. High &amp; High School</b>	Events	139	111	3	0	12	265
	Hours	799.75	880	41	0	82	1,802.75
	Participants*	1,439	1,781	24	0	236	3,480
<b>High School</b>	Events	145	135	15	20	30	345
	Hours	937.5	759.83	107.5	89	84	1,977.83
	Participants*	2,071	2,401	235	233	372	5,312
<b>K-12 Mixed Levels</b>	Events	99	66	36	3	75	279
	Hours	655.5	258.5	202	10	421.5	1,547.5
	Participants*	2,253	825	926	147	1,442	5,593
<b>Total</b>	Events	926	802	96	25	187	2,036
	Hours	5,368	4,886.58	605.5	104	969	11,933.08
	Participants*	14,202	10,778	1,777	543	2,971	30,271

\*Includes duplicate counts-Individual participants enrolled in more than one program.

**Table 3: Student Services Activities**

		Math	Science	Technology	Integrated M/S/T	Other	Total
<b>Pre-K</b>	Events	4	6	0	0	0	10
	Hours	23	22	0	0	0	45
	Participants	70	87	0	0	0	157
<b>Elementary</b>	Events	23	507	25	0	1	556
	Hours	142.5	2,141.35	258.75	0	12	2,554.6
	Participants	1,477	26,079	434	0	31	28,021
<b>Elementary &amp; Mid/Jr. High</b>	Events	13	88	10	2	4	117
	Hours	75	806.5	174.75	6	52	1,114.25
	Participants	32,220	12,521	172	169	332	45,414
<b>Mid/Jr. High</b>	Events	49	75	16	2	8	150
	Hours	698.65	816	1,025	6	37.5	2,583.15
	Participants	2,584	10,602	1,560	318	1,675	16,739
<b>Mid/Jr. High &amp; High School</b>	Events	11	36	9	2	7	65
	Hours	4,303	3,219	418	9	25.5	7,974.5
	Participants	8,607	28,597	212	53	287	37,756
<b>High School</b>	Events	52	129	0	6	10	197
	Hours	564.25	2,291.5	0	126	111	3,092.75
	Participants	8,082	13,434	0	212	539	22,267
<b>Other Mixed Levels</b>	Events	4	17	0	1	2	24
	Hours	83.5	215	0	8	270	576.5
	Participants	1,288	6,211	0	25	2,342	9,866
<b>Total</b>	Events	156	858	60	13	32	1119
	Hours	5,889.9	9,511.35	1,876.5	155	508	17,940.75
	Participants	54,328	97,531	2,378	777	5,206	160,220

**For more descriptive information regarding individual Center programming, see individual Center Reports. These can be obtained by contacting the Center Director (see page 32). The Network website also gives further information: [www.mscenters.org](http://www.mscenters.org).**

**Table 4: Ten Year Summary Data**

**SUMMARY OF PROFESSIONAL DEVELOPMENT ACTIVITIES 1997-2007**

School Year	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007*
<b>Total PD Programs Offered</b>	2,396	2,186	2,549	2,765	3,436	3,239	1,705	1,928	1,725	2,036
<b>Total PD Program Hours</b>	18,862	16,158	14,059	13,067	14,757	14,563	10,507	11,057	11,109	11,933
<b>Total PD Enrollments</b>	47,068	40,160	43,655	47,210	21,904	51,527	28,540	34,237	26,484	30,271
<b>Percent PD Science-Focused Programs</b>	40%	32%	42%	40%	43%	36%	41%	31%	41%	40%
<b>Percent PD Math-Focused</b>	19%	18%	17%	21%	23%	27%	30%	41%	45%	45%
<b>Percent PD Technology-Focused</b>	4%	1%	9%	11%	7%	8%	15%	7%	4%	5%
<b>Percent PD Integrated M/S/T</b>	34%	47%	19%	18%	15%	13%	1%	0%	1%	1%
<b>Percent PD Other</b>	3%	2%	13%	11%	12%	15%	14%	21%	9%	9%

\*Total PD activities were positively impacted by a special earmarked allocation from the Michigan Legislature to fund a statewide PD effort.

**SUMMARY OF STUDENT ACTIVITIES 1997-2007**

School Year	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
<b>Outreach Sessions</b>	2,825	5,110	6,763	6,514	6,990	5,024	1,252	1,579	1,112	1,119
<b>Outreach Hours</b>	41,662	49,171	46,403	52,879.3	159,952	109,815.5	37,893.5	19,151.35	15,983	17,940
<b>Outreach Participants</b>	156,949	250,817	251,251	263,292	309,716	374,813	239,984	206,906	287,047	160,220

The program data above represent a significant decline in the amount of activities offered to teachers and students, the number of programming hours offered, and the number of enrollments in programs. **This clearly suggests that the reduction in core state funding of Michigan’s Mathematics and Science Centers has significantly impacted the quantity and accessibility of mathematics and science programming for Michigan’s students and teachers.**

However, M/S Centers have focused their efforts on providing high quality professional development to ensure teachers are highly qualified and using best practices. Due to leveraged grant monies and a special allocation from the Legislature, professional development programming hours have only been reduced by 18% despite the 75% cut in core funding. **Unfortunately, the number of student programming hours have been reduced by 84% due to funding cuts.**

# MICHIGAN MATHEMATICS AND SCIENCE CENTER NETWORK COMMITTEE ACTIVITIES

The structure of the Michigan Mathematics and Science Center Network is framed by a Master Plan approved by the State Board of Education. Every five years the M/S Network develops a Strategic Plan to specify objectives and outline internal M/S Network activities to support the improvement of mathematics and science education. Network committee goals and activities completed in 2006-2007 are described below.

## EXECUTIVE COMMITTEE FIVE-YEAR GOALS:

- Support the M/S Centers in their work as the infrastructure for math/science/technology reform
- Ensure that Network meetings are designed to build a common vision for mathematics and science education excellence
- Develop leadership capacity to assist M/S Center directors to deliver the six basic services within the context of the shared vision
- Develop/implement the Master Plan in collaboration with the Michigan Department of Education
- Monitor M/S Center funding cycle and facilitate Network management and budgetary procedures and processes
- Act as the conduit through which existing and future partners collaborate with the M/S Centers
- Improve the financial status of M/S Centers

### FINANCE COMMITTEE

Goals: Maintain a consistent budget process for the M/S Network including reviewing and prioritizing the budget allocations within the spending categories.

Activities:

- Budget reports presented at each quarterly meeting (including executive board meetings).
- Reviewed past budgets, analyzed expenditures and patterns, made budget projections.
- Solicited input from Network committees about projected expenditures for 2006-2007.
- Prepared 2006-07 budget and presented for Network approval.
- Reviewed all Network contracts and approved payment for services.
- Billed Centers for annual membership and technical assistance fees.

### EVALUATION COMMITTEE

Goals: Provide reliable and valid information about activities, participation and effectiveness, recommend methods of evaluation and data collection, and provide technical assistance to Centers.

Activities:

- Communicated with technical assistance providers to facilitate the collection and reporting of Center-level activity data
- Reviewed Annual Network Report developed by technical assistance provider. One hundred copies were disseminated.
- Centers were an important mechanism for providing feedback to MDE on the draft High School Course Expectations for mathematics and science.
- Centers have been encouraged to share successful instructional and assessment strategies at M/S Center Network meetings.

### COMMUNICATION COMMITTEE

Goal: To communicate the function, leadership, and accomplishments of Michigan's M/S Centers and to access and share information within the Network of M/S Centers.

Activities:

- Represented the Network at statewide meetings (MSDC, MAISA, MASA, MCTM, MSTA, REMCAN, MSELA)
- Assisted Pace and Partners with development and dissemination of award winning brochure
- M/S Network membership roster (including contact information) updated and disseminated
- Coordinated and set-up displays regarding M/S Center Network programming at state mathematics and science conferences
- Facilitated Network website redesign and upgrades

### POLICY AND PROCEDURE COMMITTEE

Goal: Provide oversight services to assist the Network in governance and conducting business in compliance with its by-laws.

Activities:

- Annual review of by-laws
- Provided expert advice on policy issues at quarterly M/S Network meetings or executive board meetings
- Participated in the process of developing a new Master Plan proposal for the Network

### LEADERSHIP COMMITTEE

Goals: Encourage Center Directors' focus on initiatives and activities at the state and national level, facilitate collaboration among Center Directors, develop professional development programs to meet the needs of Network members in their delivery of a common set of services, and articulate a shared vision of improved teaching and learning of mathematics and science.

Activities:

- Mentors assigned to new directors
- Network listserv used to share resources
- Organized a New Director Orientation
- Designed tools and checklists for new directors
- Presented resources to use with MME and ACT professional development
- MMLA and BaPS statewide initiatives supported to build capacity of mathematics and science leaders

### LEGISLATIVE COMMITTEE

Goal: To improve Center Directors' relationships with local legislators and to establish communications between key Network representatives and key legislative/executive contacts.

Activities:

- Developed a guide for director's to learn how to work with their legislator
- Legislature contact list updated
- Current legislation pertaining to Centers is monitored and disseminated to Center Directors
- Continuing to share impact and results of M/S Centers with legislators
- Working to develop positive relationships with key policy makers

## DIRECTORY OF MICHIGAN MATHEMATICS AND SCIENCE CENTERS

Center Name	Contact Person	Telephone
Allegan County M/S Center	Amy Oliver	(269) 686-5087
AMA/IOSCO M/S Center	Tracy D'Augustino	(989) 354-3101
Battle Creek Area M/S Center	Connie Duncan	(269) 965-9440
Berrien County M/S Center	Dennis Lundgren	(269) 471-7725
Capital Area Sci/Math Center	Julie Fick	(989) 224-6831
Central Michigan SMTC	Claudia Douglass	(989) 774-3573
COOR S/M Center	Don Meeks	(989) 275-9562
Detroit M/S Centers	Nancy Varner	(313) 873-0225
Dickinson-Iron-Menominee M/S/T Center	Dee Benjamin	(906) 776-8137
EUP M/S Center	Michelle Ribant	(906) 632-3373
Genesee Area M/S/T Center	Larry Casler	(810) 591-4470
Grand Traverse Regional M/S/T Center	Tom Wessels	(231) 922-7875
Hillsdale-Lenawee-Monroe M/S Center	Pam Bunch	(517) 265-6691
Huron M/S/T Center	Scott Whipple	(989) 269-3473
Jackson County M/S Center	Jennifer Nimt	(517) 768-5151
Kalamazoo Area M/S Center	Brenda Earhart	(616) 337-0004
Lapeer County M/S Center	Laura Chambless	(810) 667-6495
Livingston/Washtenaw M/S Center	Nicole Garcia	(734) 994-8100
Macomb County M/S/T Center	Mike Klein	(586) 228-3467
MAISD Regional M/S Center	David Krebs	(231) 767-7317
Manistee, Wexford-Missaukee Regional M/S Center	Karen Mlcek	(231) 876-2263
Mason-Lake-Oceana M/S Center	Kathy Surd	(231) 757-4934
Mecosta-Osceola M/S/T Center	Mary Ann Robinson	(231) 796-3543
Northwoods M/S/T Center	Tom Abramson	(906) 786-9300
Oakland Schools S/M/T Center	LaMoine Motz	(248) 209-2378
Regional M/S Center (GVSU)	Karen Meyers	(616) 331-2265
Saginaw Valley State Univ. Regional M/S Center	Walter Rathkamp	(989) 964-4114
Sanilac County S/M Center	Deborah Wild	(810) 648-4700
The Seaborg Center- NMU	Debra Homeier	(906) 227-2002
SEE-North	Marty Samson	(231) 348-9700
St. Clair RESA M/S Center	Terry Parks	(810) 364-8990
Wayne RESA, M/S Center	Libby Trenkle	(734) 334-1375
Western U.P. M/S Center	Shawn Oppliger	(906) 482-4520