

# 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.

## 2010-2011 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 2010-11 school year. Individual Centers produce an annual report of accomplishments available from each Center.***

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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 new Master Plan in 2007 for funding and operating Centers and implementation of several important statewide programs. Today, all school districts across Michigan have access in their region to one of 33 M/S Centers.

Base funding for M/S Centers is now part of the annual State Aid Act-Section 99 and totaled \$1.875 million for the 2010-2011 school year. **Centers continue to be severely handicapped by inadequate funding. In 2009-10, the Network's legislative funding was reduced by an additional 25%; since 2002, Center funding has been cut a total of 82%. Opportunities for schools, teachers, and students to improve science, mathematics, and technology education are severely limited. In 2010-2011, state funding cuts resulted in 51% fewer professional development hours for teachers and 93% fewer program hours for students as compared to the 2002-2003 school year, when full funding was available.**

# IMPACTS AND OPPORTUNITIES



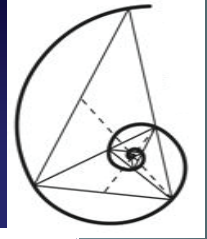
The Michigan Mathematics and Science Centers Network offered programs and services to thousands of teachers and their students, all designed to improve the teaching and learning of mathematics and science. In 2009-10, the Network's legislative funding was reduced by an additional 25%; since 2002, Center funding has been cut a total of 82%. *This was the eighth year of significantly reduced funding from the Michigan Legislature, which necessitated reductions in programming. The 33 Centers continued to provide public and private schools in their regions with 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 Megan Schrauben, President (megan.schrauben@jcisd.org or (517) 768-5281).

## Highlights from the 2010-11 Annual Report

- In addition to the many regular local and regional activities, the Network facilitated four major statewide projects serving Michigan teachers and their students:
  - Science and Mathematics Misconceptions Management (SaM<sup>3</sup>)
  - Algebra for All—Year 2
  - MSU Measurement Project
  - Assessment collaboration and database development
  - STEM Partnership
- 11,168 different teachers and other educators participated in programs, including: 174 teaching pre-K, 4,249 teaching elementary, 1,786 teaching middle/jr. high, 2,475 teaching high school, and 1,371 identified as others (administrators, paraprofessionals, etc.).
- 1,748 professional development programs were offered: 703 in math, 815 in science, 101 in technology, and 129 in other topics.
- A total of 10,825 hours of PD were provided; 25,085 total PD enrollments.
- 62,169 students participated directly in Center programs: 480 pre-K, 28,615 elementary, 5,140 elementary and middle/jr. high, 11,922 middle/jr. high, 4,281 middle/jr. high and high school, 8,750 high school, and 2,981 from mixed grade levels (some students may have attended multiple programs).
- Over the past 12 years, 27,549 PD programs were offered; total enrollment in 12 years was 404,168 (many teachers participated multiple years in multiple programs).
- In the past 12 years, 2,544,004 students were served directly by Centers (some students were served multiple years in more than one program).
- Through a special statewide teacher professional development initiative—SaM<sup>3</sup>—Centers served over 70 middle and high school mathematics and science teachers. The goals of this multi-year project are to increase 1) teacher content and pedagogical knowledge of 7th-12th grade mathematics and science subjects and 2) teacher awareness of student misconceptions of content in mathematics and science.
- Math and Science Centers, in collaboration with Michigan Virtual University, provided statewide professional development to middle and high school math teachers through Algebra for All. Fourteen Math/Science Centers across Michigan served over 520 middle and high school teachers of algebra, including special education teachers. Over 2,500 students were involved in the project.
- Centers provided innovative outreach and accelerated high school programs to meet student needs in their service areas. These highly motivating math and science programs are not otherwise available to schools.
- Centers targeted high priority schools, providing intensive assistance including: classroom-level professional development, classroom observations to identify areas of need, modeling science lessons, targeted small group PD, content integration advice, assessment assistance, achievement gap analysis, and resource acquisition.
- Centers collaborated on activities with 31 different public and private Michigan colleges and universities, engaging science, math, engineering, and technology faculty.



# Value of Statewide Projects



The 33 Michigan Mathematics and Science Centers have functioned as a collaborative Network since their inception in 1988. The past several years have been marked by an increase of statewide projects. The Network provides common professional development or student activities to target the needs of teachers, students, schools and districts across the state. The Network has become an essential means of communication between organizations, like the MDE, Michigan teachers, and students.

Network statewide projects:

- Provide research-based, ready-to-implement curriculum and professional development.
- Focus on topics and issues important to teachers and the state.
- Address the needs of students and teachers.
- Connect local teachers to a broader network of teachers.
- Allow the collection of student and teacher data.
- Lend credibility and urgency to the nature of the content presented.
- Provide financial support for substitutes and instructional materials.
- Allow teachers to remain up-to-date with the latest information.
- Give teachers the opportunity to step outside the role of teacher and experience a leadership role.
- Brings resource materials into the hands of teachers.

## Statewide Projects in 2010

- SaM<sup>3</sup> (Science and Mathematics Misconceptions Management)
- Algebra for All
- MSU Measurement Project
- Assessment collaboration and development of a database of math and science items
- Michigan STEM Partnership

Other aspects of statewide projects:

- Economy-of-scale allows Centers to share resources and planning. All Centers, regardless of size, are able to offer instructional services that may not otherwise happen. Limited resources are used more efficiently.
- Centers have opportunities to collaborate and network with each other. They look beyond themselves and focus on the needs of others across the state.
- Centers and teachers have opportunities to build and strengthen relationships with universities and ISDs.
- Increased visibility as a network and as individual Centers in the community.
- Increased communication with local principals, curriculum directors, teachers, etc.
- Teachers learn and implement new technology such as Nspire calculators.
- After participating in numerous projects, Centers have cadres of teachers “speaking the same language” and willing to share instructional strategies, successes, and failures.



## ACCOMPLISHMENTS OF SaM<sup>3</sup>—Year 1

### Science and Mathematics Misconceptions Management

The goal of the MMSCN and partners' four-year Science and Mathematics Misconceptions Management (SaM<sup>3</sup>) grant program is to increase the content and pedagogy knowledge of grades 7-12 mathematics and science teachers and to increase teacher awareness of student misconceptions of content in these two disciplines. The program focuses, in particular, on the provision of professional development to two groups of teachers: (i) a core group of teachers who are providing instruction in schools designated by the Michigan Department of Education (MDE) as "Persistently Lowest Achieving Schools" in Michigan, and (ii) other teacher teams from schools that have identified in their School Improvement Plans a need to reform mathematics and science instruction.

Over the course of the four year grant cycle, each of 33 Michigan Mathematics and Science Centers will send a teacher team of twelve to the statewide SaM<sup>3</sup> professional development program. In year 1 of the SaM<sup>3</sup> grant program, ten Michigan Math/Science Centers recruited teacher teams of 6 math and 6 science teachers in grades 7-12 from one district. These teacher teams participated in the five-day SaM<sup>3</sup> Summer Institute on July 25-29, 2011 and then in six full-day Professional Learning Community (PLC) programs at their home school district. Teacher teams from Detroit Math/Science Center, Hillsdale-Lenawee-Monroe Mathematics and Science Center, Manistee-Wexford-Missaukee Math/Science Center, Wayne RESA Math and Science Center, Berrien County Math/Science Center, Genesee Math/Science Center, Kalamazoo Area Math/Science Center, Macomb Math/Science Center, Oakland Math/Science Center, and Saginaw Valley State University Math/Science Center participated in Year 1 of the SaM<sup>3</sup> professional development program.

At the same time the Year 1 Teacher teams were being assembled, a Content Planning Team of five math and five science educators referred by MMSCN directors was recruited and began to plan for the SaM<sup>3</sup> Summer Institute. These SaM<sup>3</sup> Content Planning/Facilitation Team members designed and facilitated the Summer Institute and six days of PLC professional development meetings for ten teacher teams during Year 1 and continues through Year 2, June 2012.

Facilitators planned teacher outcomes from the Summer Institute that included:

- Increased core content knowledge in the focus areas of Fractions (math) and Energy (science) across the disciplines.
- An increased understanding of common student misconceptions in their content area.
- A set of strategies to teach for understanding.
- A set of usable lesson plans to use and examine through the year.

Teachers completed a SAMPI-designed pre and post Summer Institute survey and then administered a student pre-test to their chosen class of students during the first two weeks of school in September.

In August 2011, after the Summer Institute, the SaM<sup>3</sup> Content Facilitation Planning Team developed agendas and activities for six PLC meetings, to be held monthly at the local districts from November-April of 2011-12. At the end of these six PLC meetings, teachers will have gained:

- An understanding of how to analyze student work for understanding.
- Further understanding of content knowledge and student misconceptions.
- Consistent and timely feedback on their teaching and student understanding with the opportunity for immediate improvement.

Participation in this grant program was provided free to all teachers on the Math/Science Center's selected local district team. In addition, teachers received a stipend for their work in the Summer Institute and either a stipend or substitute teacher reimbursement for participation in six days of Professional Learning Community meetings.



**Michigan Mathematics and Science Centers Network, Michigan Virtual University,  
and the Michigan Department of Education**

## **ALGEBRA FOR ALL STATEWIDE EVALUATION AND REVIEW**

### ***Highlights of Findings from Year Two 2010-2011***

Algebra for All (AFA) is an intense professional development program that builds the algebra content and pedagogical knowledge of middle and high school teachers so that mathematics classroom instruction meets the learning needs of all students. It takes a functions-based approach to algebra instruction. Broad goals include:

- deepening teachers' understanding of the functional approach to learning algebra,
- teachers believing that all students have the capacity to learn algebra, and
- teachers experiencing new methods of engaging students that will impact the learning of all students as well as the use of technology as a teaching and learning tool.

Algebra for All was developed and implemented by a consortium of partners: the Michigan Mathematics and Science Centers Network, Michigan Virtual University, and the Michigan Department of Education. The program built upon professional development materials and processes designed and delivered by the Wayne Regional Educational Service Agency (RESA) and the University of Michigan-Dearborn's Center for Mathematics Education (CME) over the past several years.

In the first year of the project, fourteen Math/Science Centers across Michigan served over 750 middle and high school teachers of algebra including special education teachers. Each AFA session was led by the two lead facilitators from the Wayne RESA Mathematics and Science Center who were available live via the Internet. MVU provided online resources for participants including social networking with peer leaders as well as access to all project materials online.

The second year program included four face-to-face school day workshops, serving over 520 middle and high school teachers. During the professional development sessions, teachers worked primarily in groups. Classroom implementation required rethinking how algebra is taught, starting in a different framework than the earlier expression-based approach. Course content was designed to be learned incrementally, with each session's work to be tried in the teacher's classroom before the next session.

The evaluation design included continuous formative assessment with an emphasis on qualitative data collected through focus groups, surveys, and interviews. Quantitative data included pre/post algebra content tests administered to students and baseline performance of teachers on the Learning for Mathematics Teaching Scale (LMT). Randomly selected teachers provided data in the form of classroom observations, surveys, and an end-of-year interview. Interviews were also conducted with 24 of the 25 site facilitators, all of the 11 site coordinators, and seven members of the project management team.

# **ALGEBRA FOR ALL:**

## ***Highlights of Findings from Year Two***

### ***Impact on Teachers:***

- Teachers who began Algebra for All in the Fall of 2009 were asked to think back about their participation in the project. Teachers reported they were more motivated to apply what they had learned in Algebra for All in the classroom, they could better modify materials to meet the needs of particular students, and felt more competent in teaching algebra.
- As a result of Algebra for All, 84% of teachers reported using more graphing calculators and other technology in the classroom; 83% used Algebra for All activities and handouts in the classroom; and 73% were engaging their students in more discussions about the big picture and real world.
- Teachers felt the strengths of the face to face component were the collaboration with other teachers, learning new ideas for lessons, being able to participate in the activities, and learning how to use technology/graphing calculator.
- Survey responses from teachers indicated participants felt the strengths of the social network site were to share lesson plans, share ideas, and ask questions.
- Pre/post survey responses indicate a statistically significant increase in teachers' familiarity with the Michigan High School Content Expectations, familiarity with the key elements of a functions-based approach to teaching and learning algebra, and with using the graphing calculator to support the teaching and learning of algebra.
- In a pre/post survey, teachers reported higher level of technology skills, especially related to graphing calculators and document cameras.
- Results of the LMT showed a statistically significant gain ( $p < 0.0001$ ) in the pre- to post-test for all teachers. Teachers' overall confidence in their responses also increased.

### ***Impact on Students:***

- Students from a sample of participating teachers were administered a 19-item pre- and post-assessment; those results show a statistically significant gain in the pre- to post-test scores ( $p < 0.0001$ ).
- During interviews, teachers reported using more hands-on, interactive lessons for students. Teachers also used calculators more to engage students. Teachers described student responses to the instruction: "there is more class discussion," "students write more," and "student understanding is increased."

### ***Results from Interviews:***

Interviews were conducted with facilitators, site coordinators, and the project management team. Facilitators felt the best part of Algebra for All was the connections teachers made with colleagues and that teachers learn algebra content in a different way.





# MSU Measurement Project: Strengthening Measurement Curriculum, Teaching, and Research

## Project Accomplishments: 2010-2011

In Year 2 of this project, teachers worked to improve their measurement lessons, using both innovative activities and existing curricular content. The goals of this project are to: 1) expand, deepen, and report project results for length, area, and volume, and 2) use the knowledge gained through the project to improve educational practices (curriculum and teaching). Dr. Jack Smith, at Michigan State University, is the lead researcher for the project. The Michigan Mathematics/Science Centers Network have collaborated with Dr. Smith to coordinate professional development sessions for the teachers. Approximately 160 elementary teachers participated in Spring 2011.

Substantial attention and project resources (staff time and money) were given to the professional development (PD) component in Year 2. Where many interested regions could not participate in the Year 1 PD work due to late notification, nearly all regions that indicated interest participated in Year 2. Twenty regions or districts around the state participated in the PD training sessions, carried out PD work with elementary teachers in their PD work (Battle Creek, Capital Area, Detroit, Dickinson/Iron Mountain/Menominee, Eastern Upper Peninsula, Grand Rapids, Hillsdale/Lenawee/Monroe, Huron, Jackson, Lapeer, Livingston/Washtenaw, Macomb, Mason/Lake-Oceana, Montcalm/Ionia, Muskegon, Sanilac, St. Clair, Traverse Bay, Wayne, Wexford/Missaukee) and with the Michigan Department of Education. (Two regions, Oakland and Kalamazoo, participated in Spring 2010 but could not in 2010-11 because the facilitator could not make room in her schedule.)

The project hosted two two-day meetings to orient regional partners—the facilitators who would deliver the PD—to the evidence of poor learning of measurement (nationally and statewide), to promising tasks that surface important conceptual knowledge, and to the tools for lesson enrichment in measurement. Partners were encouraged to plan to engage their teachers around the specific instructional task of enriching one measurement lesson to teach in Spring 2011, rather than designing “replacement” lessons. One meeting took place in October 2010 for regions on the east side of the state; another in November 2010 for regions on the west side of the state; and a third in April 2011 for regions in the Upper Peninsula. In most all regions, the classroom teaching took place in April and May (2011) when measurement topics are typically covered (if they are covered at all).

The project supported release time and materials/food for five elementary teachers to engage in this work for three full days of PD. In the first two days, work focused on understanding the problem, doing measurement work, and working on a select lesson. Day 3 was devoted to presenting and discussing the results of the lesson, with a focus on student work (written and video). In June, the project hosted two follow-up meetings, one on the MSU campus and another on the west side of the state. At the meetings the facilitators reported their results and made tentative plans to build on their success in Year 3 (2011-12).

For more information about the MSU Measurement project, please contact Valerie Masuga, Director of the EUP M/S Center, [vmasuga@eup.k12.mi.us](mailto:vmasuga@eup.k12.mi.us).



## M/S Centers Network Assessment Committee: *Providing math and science assessment items to districts*



The purpose of the Assessment Committee (MMSCN and partners) is to collectively assist and support Michigan educators in assessing students' proficiency with the Michigan mathematics and science High School Content Expectations (HSCEs) to ultimately improve instruction and positively impact student achievement.

Building on work started in 2008, the Assessment Committee continued to support Michigan mathematics and science teachers.

### **Outcomes and Activities of the Assessment Committee in 2010-2011:**

The Assessment Committee **coordinated a work session** that developed a bank of math and science assessment items aligned to the HSCEs that went through a substantial jurying process to ensure quality. The items were subsequently entered into four different databases/platforms for flexibility in use (Access, ExamView, Data Director and ELAR). **The item bank was made available for free to any educator who wanted to use them.**

The Assessment Committee also **provided professional development on balanced assessment** to MMSCN staff using a Train-the-Trainer format. MMSCN staff was provided strategies and resources for conducting their own professional development on assessment but with an emphasis on guidelines for writing and jurying quality multiple choice and constructed response assessment items. **The Committee also created a Blackboard site which serves as a resource clearinghouse for various assessment resources.**

The Assessment Committee also **negotiated a partnership agreement** with the Ottawa Area Intermediate School District (OAISD). The partnership was a collaborative effort that focused on the strengths of both organizations. The MMSCN contributed the juried assessment item bank which included the formatting and entry of items into OAISD's assessment tool called ELAR (Electronic Learning Assessment Resource). In addition to access into ELAR, OAISD contributed the technical support which included professional development for trainers, the creation of accounts for users and the software/technical assistance to support those accounts. **The MMSCN then provided training to educators on how to create assessments using the item bank and ELAR tool.**

2010-2011 Outcomes	2010-2011 Activities
Supporting Michigan educators with assessing students' understanding of the Michigan mathematics and science HSCEs.	<ul style="list-style-type: none"> <li>• Developed a graduate course with measurable outcomes – <i>Implementing the Keys to Quality Assessment</i></li> <li>• In conjunction with the Evaluation Committee and SAMPI, developed an evaluation that assesses the graduate course outcomes and meets the pre- and post-evaluation requirements from MDE.</li> </ul>
Impacting instruction and encouraging both formative and summative assessment practices.	<ul style="list-style-type: none"> <li>• Added math and science selected response items into the ELAR platform.</li> </ul>
Maintaining a partnership between the MMSCN and Ottawa Area ISD (Year 2) focusing on the strengths of both organizations for true collaboration.	<ul style="list-style-type: none"> <li>• Conducted an ELAR (Electronic Learning Assessment Resource) training for Network Directors and Center staff. Training focus was on how to create assessments using the item bank and ELAR tool.</li> <li>• Expanded the number of ELAR accounts.</li> </ul>
Avoiding duplication of assessment services within and across the MMSCN service area and leverage resources for assessment work via a collaborative effort.	<ul style="list-style-type: none"> <li>• Continued to stay abreast of efforts by other state organizations such as MDE's Formative Assessment Initiative and the Michigan Assessment Consortium (MAC) so as not to duplicate their work. While planning the graduate course, embedded the MAC Assessment Modules.</li> </ul>

For more information about the Network Assessment Committee contact Amy Oliver, Director, Allegan/Van Buren M/S Center (aoliver@alleganaesa.org or 269-686-5087).

# Math Leadership Team (MLT) and Science Leadership Team (SLT)

The Math and Science Leadership Teams consists of MMSCN directors. Each of the 33 Center directors is on either the MLT or the SLT, depending on their area of expertise. The MLT and SLT meet during the MMSCN Quarterly meetings. The meeting time is focused on discussing current issues related to science and mathematics. It provides the opportunity for the directors to discuss mathematics and science current topics and trends in a smaller setting.

## Science Leadership Team Accomplishments: 2010-2011

In the past year, the SLT divided into three smaller work groups: Technology, Science Lab Safety, and the Next Generation Science Standards.

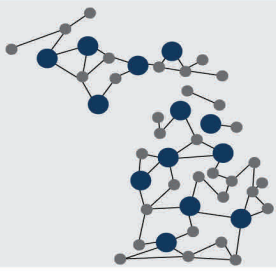
- The Technology group was charged with reaching out to various companies that provide technology support for science, and gathering feedback from the different Math/Science Centers related to current use and opinion of various technology applications. Ultimately, this team also secured a special training event for the Math/Science Center Network related to new science probeware. This training will be provided for free and each Center will be able to send a representative.
- The Science Lab Safety group reviewed several different sources related to course offerings, presentations, and consultants about Science Lab Safety. Currently, there is not a “Michigan Lab Safety Certification Program,” and due to multiple requests at various Math/Science Centers, it was determined that this would be a logical area for the SLT to explore. After much research, it has been determined that the Math/Science Center Network will offer SBCEU’s for an online Lab Safety course. Each Math/Science Center will advertise the offering, and participants will receive the SBCEU’s as well as a certificate of completion.
- The Next Generation Science Standards (NGSS) group worked with the MDE Science consultant to identify a timeline and begin discussion around the role of the Michigan Mathematics and Science Centers Network as the NGSS became a reality. The primary role of this work group is to keep current with the status and ensure that Michigan stakeholders have the opportunity to provide feedback during the public review, an opportunity to attend a rollout of the new standards, and receive information relative to how Michigan will participate in the adoption of the Next Generation Science Standards. As the NGSS move forward, the SLT will predominately focus on this area to ensure that the MMSCN continues to play a critical role in science education in the state of Michigan.

For more information about the SLT, please contact Alycia Meriweather, Director of the Detroit M/S Center, [alycia.meriweather@detroitk12.org](mailto:alycia.meriweather@detroitk12.org).

## Math Leadership Team Accomplishments – 2010-2011

- MSU Measurement – Twenty-three (23) M/S Centers participated in the MSU Measurement professional development opportunity by sending one or two facilitators to be trained in the 3-day workshop provided by Dr. Jack Smith, MSU. A few Centers are working with schools for a second year, and others are working with new schools during their second year of the program. A new training to extend the work with schools is planned for the 2011-2012 school year.
- RTI – Response to Intervention has been a common topic of conversation in the MLT and it was agreed that the Board should be brought up to date in that regard. Jenni Trusock, Huron M/S Director, agreed to, and presented RTI to the Board – what it is, as well as resources to support it.
- CCSS-M – The group has enlisted Valerie Mills, Oakland M/S/T Center Director and active member of the National Council of Supervisors of Mathematics (NCSM), to keep the Board updated on the Common Core State Standards and work of the Smarter Balanced Assessment Consortium. Valerie has provided a brief report at MLT meetings and will present the Practices to the Board at the May 2012 Quarterly Meeting of the MMSCN.
- EMATHS – In order to continue the good work that Algebra for All has begun in the state around high school mathematics, and in response to an opportunity proposed by Debbie Ferry, Macomb ISD, the MLT began discussions to scale up the successful EMATHS program statewide. Debbie has offered each Center two seats to be trained as EMATHS facilitators this August in conjunction with the MCTM conference. Twenty-eight (28) Centers have shown interest in participation.

For more information about the MLT, please contact Valerie Masuga, Director of the EUP M/S Center, [vmasuga@eup.k12.mi.us](mailto:vmasuga@eup.k12.mi.us).



**The Michigan STEM Partnership is a statewide public-private collaboration elevating STEM education in a way that increases student career or college readiness. The MMSCN leads the STEM Partnership effort.**

### **Partnership Development**

Recent successes include:

- Organizing five regional hubs to address both statewide and regional projects.
- Growing partners from education, government, philanthropy and business.
- Securing support from small business owner Chris Holman – owner of Greater Lansing Business Monthly (GLBM) and CEO of Michiganbusinessnetwork.com Internet radio station. Holman has committed to a GLBM article and a series of STEM-related interviews on the station to support the initiative. Michigan Mathematics and Science Centers Network President Megan Schrauben and Past-President Connie Duncan were interviewed in December 2011.
- Launching mistempartnership.com, developed and hosted by Michigan Virtual University (MVU). The website includes information about the Partnership and a calendar of the regional hub meetings.
- Launching a Twitter feed (@stempartnership using #michstem) that has received national recognition as one of the 50 essential Twitter feeds for STEM educators.

### **Steering Committee**

The Partnership Steering Committee members include representatives from WIN, MVU, Dow, Michigan Economic Development Corporation, Consumers Energy, The Presidents Council, State Universities of Michigan, Van Andel Institute, Michigan Mathematics and Science Centers Network, Michigan Department of Education and the U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC). Each of the five hubs also has a representative. The Steering Committee is responsible for monitoring the five regional hubs and statewide projects. The first statewide projects are the creation of a STEM education asset map and reviewing the Next Generation Science Standards. The Steering Committee divided into two subcommittees that are working on finalizing the Partnership’s messaging and assembling the asset map, which is designed to facilitate collaboration among existing STEM education efforts and identify gaps.

### **Regional Hub Development**

All but one of the five regional hubs has met twice, securing growing participation from the education and business communities. The first meetings focused on getting new partners up to speed on the initiative and providing them an opportunity to network and share ideas. Participants also were introduced to the Partnership’s statewide projects.

### **Funding**

The Partnership continues to operate with its original funding from TARDEC and the Michigan Mathematics and Science Centers Network. While the initiative continues to move forward, the lack of additional funders soon will slow down the momentum and progress.

For more information about the Michigan STEM Partnership, please contact Megan Schrauben, President Michigan Mathematics and Science Centers Network, Phone: (517) 768-5281, [megan.schrauben@jcisd.org](mailto:megan.schrauben@jcisd.org).

# Innovative Student Programs

In Centers across the Network, students have opportunities to learn and work in unusual environments; sample Science, Technology, Engineering, and Mathematics (STEM) careers; and engage in real-world research with practicing scientists and other professionals. Often partnering with business and industry, government agencies, non-profit organizations, and individuals, programs are designed to motivate ALL students to pursue STEM subjects in elementary, middle, and high school, as well as in college and adult careers. Interesting and exciting opportunities made available through M/S Centers, and not usually available in their home schools and districts, open new worlds to these students.

## Accelerated High School Programs

High school students spend half of each school day at Centers enrolled in challenging and diverse college preparatory programs in science, mathematics, and technology. Equipped with up-to-date science and computer labs, students engage in activities to learn about basic and cutting-edge STEM topics.

Many students, as part of their Math/Science Center experience, are also enrolled in college courses, where they learn college-level science and mathematics subject matter.

In the junior/senior years, students have opportunities to work with mentors, including physicians, surgeons, computer scientists, chemists, veterinarians, field and lab biologists, and other researchers.

Five Centers currently provide accelerated high school programs: Battle Creek Area, Berrien County, Kalamazoo Area, Macomb County, and Mecosta-Osceola Counties.

In the 2010-11 school year, 1,102 students were enrolled in accelerated high school programs. At least 99% entered college programs. Students graduated with ACT scores above state and national averages. For example, seniors at Battle Creek Area M/S Center graduated with an average ACT of 28. At the Kalamazoo Area M/S Center one hundred twenty six (126) juniors and seniors were enrolled in at least one Advanced Placement course during the school year; at Macomb, all seniors were enrolled in AP science classes and 2/3 were enrolled in AP Calculus. More information about Accelerated High School programs can be found on page 18.

## Other Innovative Student Services

Many Centers provide innovative outreach programming using local resources to provide opportunities and meet needs of schools, teachers, and students in their service areas. These highly motivating programs are not otherwise available to schools. Innovative instructional practices are used to engage ALL students. Below are a few examples of unique programming provided by Centers.

- Students at AMA/Iosco M/S Center participate in day and overnight trips to Sprinkler Lake Education Center. Students have the opportunity to observe, explore, and experience mathematics and science. Students interact with their environment through hands-on activities from over 100 lessons in 37 units of study.
- Mason-Lake Oceana Mathematics and Science Center developed ASM Tech Early College. This school provides students the opportunity to pursue STEM-related fields and earn up to two years of college credits for free.
- Amusement Park Physics (APP), sponsored by the MAISD Regional Mathematics and Science Center, provides students in grades 5–8 an opportunity to apply their mathematics skills and knowledge of physics principles to the real-world setting of an amusement park. There have been various levels of preparation conducted by classroom teachers. This year, student teams from a school in Spring Lake, Michigan earned top spots (first, second, and third place overall) in this statewide middle school physics competition.
- The Regional Mathematics and Science Center at Saginaw Valley State University has a long tradition of hosting Science and Mathematics Extravaganza for Kids (SMEK) camps and Saturday programs. This year forty-three (43) students attended the SMEK Jr. camp for students in grades 2-4, fifty-eight (58) students attended SMEK Sr. camp for grades 5-8, and 115 students came onto SVSU's campus in April to attend SMEK Saturday. These students explored topics such as edible cell biology, chemical reactions, and geometry.

## **FOCUS ON HIGH PRIORITY AND PERSISTENTLY LOWEST ACHIEVING SCHOOLS**

### **Providing Services to High Priority Schools Continues to be a Major Focus of the Michigan Mathematics and Science Centers Network.**

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 science and mathematics at these schools. The 33 Centers regularly invite all high priority/persistently lowest achieving, among other schools in their service areas to participate in staff professional development, student programming, curriculum support activities, and instructional resource distribution. Print, electronic, and personal invitations are extended to schools and teachers throughout each school year. As financial resources become available, Centers customize services for specific high priority schools.

### **Examples of Programs and Services for High Priority Schools**

Centers target high priority and persistently lowest achieving schools each year, providing intensive building-wide professional development. PD occurs at the classroom level and group level. PD at the classroom level may include 1) modeling math or science lessons, 2) conducting lesson observations to determine areas of need, 3) design and implement customized small group PD, 4) provide curriculum revision advice, 5) conduct achievement gap analysis, and 6) assist in accessing instructional resources.

Through the SaM<sup>3</sup> project, Centers are able to work closely with high priority schools. The Hillsdale-Lenawee-Monroe M/S Center was able to focus on the two school districts in the Tri-county region which were on the Persistently Low Achieving Schools List, Camden Frontier and Waldron Schools. Chosen to participate as a four-year Center in the Section 99.6 MDE grant called Science and Mathematics Misconceptions Management (SaM<sup>3</sup>), HLM MSC recruited math and science teachers in grades 7-12 from both school districts. These ten teachers participated in the five day Summer Institute in July 2011 and will participate in six monthly Professional Learning Community programs meeting at their school buildings during the 2011-12 school year.

St. Clair RESA Mathematics and Science Center and its partners continued to participate in the national program, KnowHow2Go (KH2G). KH2G is an initiative aimed at helping increase the number of district graduates that continue their education beyond high school. It provides parents and students with information to navigate the path to higher education using existing resources. The program is available to all district students and their families but targets those who will be first generation college students and those who are TIP (Tuition Incentive Program) eligible. High school students and their parents who participate are given further information at the "Ask an Expert" speaker series, freshmen orientation, "Parents, Kids and College" series, and with the College Survival Kits. Students are also given help preparing for the ACT. Every eighth grader in St. Clair County was able to attend an 8<sup>th</sup> Grade Decision Day at St. Clair Community College to learn more about college life.

## FOCUS ON HIGH PRIORITY AND PERSISTENTLY LOWEST ACHIEVING SCHOOLS

### Persistently Lowest Achieving Schools Served by the Network

Beginning in 2010, state law required the identification of the lowest achieving schools. Based on an analysis of participation data from across the Network, the table below shows the extent of professional development programming provided by the Network in 2010-11 to teachers in the 98 schools identified as persistently lowest achieving schools.

<b>Persistently lowest achieving schools served</b>	<b>69</b>
<b>Number of teachers from persistently lowest achieving schools served</b>	<b>156</b>
<b>Number of different activities/programs provided to teachers in persistently lowest achieving schools</b>	<b>175</b>
<b>Number of activity hours provided to teachers in persistently lowest achieving schools</b>	<b>1,606.5</b>
<b>Number of total contact hours received by teachers across all persistently lowest achieving schools</b>	<b>3,871</b>

*Teachers in 69 out of 98 (70%) persistently lowest achieving schools received professional development programming in the 2010-11 school year in addition to teachers in high priority AND non-high priority schools who were served. This has been accomplished despite an 83% decline in Network funding.*

#### Detroit Math/Science Center Serving High Priority Schools

The Detroit Center focuses on high priority schools in two different ways: focused school assistance and student services.

Focused school assistance included classroom visits, meeting with the principal, providing professional development and discussing various intervention strategies, including demonstration lessons, as well as one-on-one consulting for specific teachers. These school visits also allow for distribution of materials and information as needed. The Center also makes special contact with the high priority schools regarding materials that are available through the Resource Clearinghouse.

The Detroit Center provides multiple student services focused on high priority schools. The Center provides kits and materials aligned to the instructional sequence. The Center has also developed parent guides to assist parents at high priority schools with instruction at home. One of the most significant ways the Center impacts high priority schools is through sponsoring and facilitating district-wide events and student competitions such as You Be the Chemist, Recycling, and the Science and Engineering Fair of Metro Detroit.

#### Oakland Science, Mathematics, and Technology Center Works with High Priority Schools

Oakland Schools/OSMTech, with funding from an MSP grant, Developing Excellence in Learning and Teaching Algebra (DELTA), completed year two of a three-year commitment to develop and present a comprehensive set of resources that will support improvements in the learning and teaching of algebra across Oakland County at the secondary level. While the MSP grant includes nine high-needs high schools and their feeder middle schools, Oakland Schools provided supplementary funds to expand the project and ensure that other districts in the county would be able to take advantage of the resources and opportunities developed within the DELTA project. Included under the DELTA umbrella of professional development programs are four series focused on improving learning and teaching algebra content.

# PROFESSIONAL DEVELOPMENT

**State Board of Education Priority:**  
*“Provide effective support and professional development for teachers and administrators.”*

**U.S. Department of Education goal:**  
*“Preparing high quality teachers.”*

**Mathematics and Science Centers Network Goal:**  
*“Provide professional development opportunities to strengthen and update teaching practices based on current research and local needs.”*

## Statewide Professional Development

**1,748** professional development sessions were offered by M/S Centers in 2010-2011.

**10,825** hours of professional development programming were offered by M/S Centers in 2010-2011.

**25,085** teachers and administrators enrolled in one or more professional development sessions facilitated by M/S Centers. These participating teachers and administrators averaged 15.8 hours of professional development offered by M/S Centers in 2010-2011.\*

\*Detailed numbers of hours, enrollments, and content of professional development sessions can be found on pages 29-30.

## 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
- Professional learning communities and study groups
- Online webinars and classes
- Statewide professional development

## Examples of Professional Development

### Targeted at High Priority/Persistently Lowest Achieving Schools

- Centers throughout the state have worked intensively with high priority schools through Algebra for All, SAM<sup>3</sup>, other MSPs, and local initiatives.
- Mathematics and science consultants at Jackson County M/S Center worked intensively with a low performing school district.
- The Macomb County ISD M/S/T Center has a focused partnership with districts to provide 60 hours of mathematics and science summer school for all the students who did not score in the top two categories of the 2010 MEAP.
- The OSMTech Science team supported numerous districts with programs customized to address their challenges in science programming such as content-instructional training, strategic planning around course sequences, and resource alignment.



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

### *How are Centers impacting classroom practice?*

- Observed changes in teaching practice due to participation in the Center program include more hands-on investigations, inquiry-based teaching and learning, concept mapping, and technology integration.
- Training on the use of science kits has encouraged inquiry-based learning.
- Feedback from teachers indicates that confidence in teaching science and math basic content is increasing.

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

- Building a Presence for Science (BaPS) builds a communication network between science teachers and science leaders throughout Michigan.
- Many of the Mathematics and Science Centers, including Allegan, Northwoods, and Sanilac, held Common Core State Standards professional development sessions, which were focused on the Michigan Department of Education recommendations to share the changes and the timeline for transitioning to the Common Core State Standards with administrators and teacher leaders.
- A leadership group was developed by the Wayne RESA M/S Center for Wayne County science leaders to provide leadership development. The group met four times during the 2010-2011 school year. The meetings focused on leadership, inquiry, and science content expectations.

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

- Teachers Network-wide are engaged in best practice workshops and learn skills that are readily transferable to the classroom.
- The Allegan M/S Center finished its 12<sup>th</sup> year of providing free grade level unit training for users of the Battle Creek Science Kit Curriculum. Nearly 80% of the elementary buildings served by the Center are 100% aligned to the science content expectations and utilize an inquiry and research based curriculum.
- The Huron M/S/T Center developed and distributed to each school district two mathematics intervention kits for classrooms—one for addition/subtraction and one for multiplication/division. The kits allow any teacher or paraprofessional in the area schools to access and use low-cost research-based intervention strategies for math.

### **Opportunities to strengthening teachers' use of assessment to improve instruction.**

- At the COOR M/S Center, staff worked with local math and science committees in developing/refining common assessments, implementing new lesson designs and integrating science and math with other curricular areas in the elementary school.
- The Eastern U.P. M/S Center runs the Michigan Mathematics Program Improvement for K-8 teachers. This four-day professional development opportunity for general education and special education teachers includes diagnostic inventories, manipulatives, activities, and assessments for number and operations interventions in the mathematics classroom.
- In 13 professional development sessions run by the Lapeer M/S Center, 139 teachers and administrators were trained in the implementation of online assessment delivery and collaborative analysis of assessment data for future program improvement and teacher development.

# STUDENT SERVICES

**Michigan Department of Education Goal:**  
*“Significant improvement in the academic performance of all students with major emphasis on lowest achieving schools and students”*

- Examples of Programs for Underrepresented Students**
- Active recruitment of underrepresented students for accelerated and special programs, including summer camps.
  - Conferences for middle school girls focused on math, science and/or engineering.
  - M/S Centers provide strategies for teachers to work with special needs students such as differentiated instruction, Universal Design for Learning, and methods for teaching, writing and literacy.

**U.S. Department of Education Goal:**  
*“Improving the academic achievement of the disadvantaged”*

- Support for Students Attending High Priority Schools**
- M/S Centers 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.

**U.S. Department of Education Goal:**  
*“Promoting innovative programs”*

- Accelerated High School Programs**
- Five Centers provide advanced mathematics and science courses through half-day accelerated high school pull-out programs in collaboration with local districts. Recruitment of minorities is a high priority. See page 18 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**

In 2009-10, the Network’s base funding was reduced by an additional 25%. Since 2002, Center funding has been cut a total of 82%. Due to an eighth year of significantly reduced funding from the Michigan Legislature, student programming hours have been drastically reduced. In the past year, there were 93% fewer programming hours than nine years ago. In addition, some of the accelerated high school programs are in jeopardy.

- What types of student outreach services are provided 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
  - Online learning through Michigan Virtual University
  - Resources available for schools such as STAR Labs

# IMPACTS AND OPPORTUNITIES: PROGRAMMING FOR STUDENTS

## Students Explore STEM Careers and Opportunities

- At the Detroit M/S Center, **special guest speaker** Danny Forster from Discovery Education’s “Build It Bigger” allowed students from 5 different schools to see the application of STEM in the real-world and to be able to ask relevant questions.
- With the help of the Seaborg Center, over 4,900 students in northern Michigan participated in **Mind-Trekkers**. The events showcased STEM careers using hands-on mathematics and science activities.
- **Summer science camps** run by the Mason-Lake Oceana M/S Center provides students the opportunity to explore STEM-related activities and experiments. The camp targets middle school students and promotes inquiry-based thinking of science.
- **2011 Tri-County Science and Technology Fair sponsored by the Hillsdale-Lenawee-Monroe M/S Center:** This two-day event showcased project-based learning through the experiences and exhibits of students in grades 5-12. Student projects in water quality, alternative energy, chemical analysis, and many other topics motivated them to explore courses and careers in STEM. Judges from industry and agencies gave students feedback and constructive comments from their perspective and area of expertise.
- At the St. Clair RESA M/S Center, the **Middle School Academic Academy** is a countywide initiative that brings academically accelerated students to RESA in order to learn science, technology, engineering and math. Some of the student projects included working in groups to engineer solutions to a given problem and using rocketry to learn math/science concepts.
- **The Michigan High School Math and Science Symposium** is organized by the Regional M/S Center at GVSU to give high school students a forum to present their math and science research findings in a professional setting. The student research projects follow the scientific method and all projects are investigative in nature and are not “reports” or summaries of previously published research. Pursuing a research project from conception to public presentation offers students an opportunity to explore an area of interest, experience the excitement of discovery, and network with others who share a common interest. Experience is gained in research methods, public speaking, time management, and organization.

### Increased Interest and Ability in Science and Mathematics

The Elementary Science Olympiad Discovery Day kits developed by the Regional M/S Center at GVSU contain hands-on science activities designed for use with early elementary students. In 2010-2011, the kits were used by 5 schools to reach 681 students. Strengths of the program as noted by teacher users include: *“The students love the event and look forward to it each year. They are eager to participate and also leave energized and excited about science.”*

### Innovative Vehicle Design: Hands-on Involvement in STEM

A team of 15 high school students from districts throughout the Huron M/S Center service area designed and built a one-person electric vehicle. In addition to engineering, designing, and building the vehicle, students also created advertising and marketing materials. “Team Helios” won either first or second place in every category at the Convergence Conference in October 2010. Participation in a high school IVD team provides experiences beyond the traditional classroom that prepare students for success in college and in high-demand STEM careers.

## IMPACTS AND OPPORTUNITIES: PROGRAMMING FOR STUDENTS (continued)

**Students to Participate in Academic Competitions**

**Girls Exploring Engineering at Wayne State University through the Detroit M/S Center:**  
The one day program for girls in grades 4-6 has the students break into small groups with a mentor and they follow an interactive schedule with break-out sessions, lunch, and competition.


**Robotics Camp, Club and Class:** The Dickinson-Iron-Menominee M/S Center supported the high school after-school Robotics Club and ran two sessions of the summer Robotics Camp for middle school students. Thirty-two (32) students participated in the summer of 2011. The students design and build robots and compete in local, regional and national competitions.

**MathCounts and You Be The Chemist Competitions:** Centers continue to offer students various mathematics and science competitions. MathCounts is heavily supported by local engineers. You Be The Chemist Competition is supported by Dow Midland. These competitions have increased students' interest in mathematics and science. Furthermore, these competitions help students to "feel good" about being good at mathematics and science.

**Students Learn Environmental Stewardship**

The **Lake Superior Stewardship Initiative** (LSSI) focuses on helping students assume the role of contributing citizens in their community. Teachers, students, parents and community organizations partnered to address a stewardship need in their community. Students, with the guidance of teachers and community partners, designed and implemented projects that enhance the quality of life in their community and have a positive impact on the health of the Lake Superior watershed.

LSSI was established in 2007 with grants from the Great Lakes Fishery Trust, Wege Foundation and the Michigan Department of Environmental Quality. Since then, approximately 2,240 students and 79 teachers in 14 schools together with over 48 community partners have explored characteristics of healthy lakes, rivers, streams, and wetlands. This has motivated students to develop projects that address needs in their community.



**EXAMPLES OF OUTCOMES IN ACCELERATED HIGH SCHOOL PROGRAMS**

- More than 99% of students in Center-sponsored accelerated high school programs go on to pursue college degrees.
- All 2011 Macomb County M/S/T Center seniors were enrolled in AP level science classes and over 2/3 of the seniors were enrolled in AP Calculus, while the remaining completed traditional calculus. 100% of this year's seniors graduated and were accepted to college programs.
- Students graduating from accelerated high school programs received millions in grants: \$3.7 million in the Kalamazoo area, over \$2 million in Berrien County, \$2 million in the Mecosta area, and \$1.1 million in Battle Creek.
- The Battle Creek Area M/S Center produced three National Merit Scholars, 2 Commended Scholars, and 100% senior matriculation to college. At the school, 78 AP exams were administered with a 99% pass rate. One BCAMSC student team sent their National Space Bar winning nutritional bar on the last NASA mission for astronauts to pilot.

# 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 Centers Network has taken a lead role in several major statewide initiatives to improve mathematics and science:

- Algebra for All
- SaM<sup>3</sup> (Science and Mathematics Misconceptions Management)
- Michigan STEM Partnership
- Assessment collaboration and development of a database of math and science items
- Measurement for Elementary Teachers

See pages 3-8 for details about some of these programs.

## NETWORK LEADERSHIP ACTIVITIES

Each quarterly Network meeting includes presentations about new resources and programs, updates on MDE initiatives and grant opportunities, and focused workshops related to Center functions and organization, evaluations, and professional development.

In addition, Center Directors receive MDE, CCSS, HSCE and MEAP updates that they pass on to local school district administrators and teachers.

## DEVELOPING TEACHER LEADERS TO SERVE HIGH PRIORITY SCHOOLS

The Michigan Mathematics and Science Centers Network has continued to provide teacher leaders to high priority districts. MMSTLC (Michigan Mathematics and Science Teacher Leader Collaborative), which ran from 2006-2009, provided the building blocks to develop a teacher leader network. As a result of MMSTLC, many regions of Michigan now have Teacher Leaders available to serve as leaders in regional and statewide efforts to improve the teaching and learning of mathematics and science.

For example, the professional development program at the Livingston and Washtenaw Mathematics and Science Center focused mainly on mathematics in the 2010-2011 school year since this is an area of struggle for the Center's high priority schools. The most intensive series offered to teachers was Studying Mathematics Learning from the Student Perspective (SML). SML allowed K-12 mathematics teachers to examine mathematics teaching and learn strategies to enhance problem solving in a student-centered classroom. Additionally, facilitator training was provided so that Teacher Leaders could facilitate their building's mathematics teacher learning communities. The SML Facilitator's Network met regularly to plan collaboratively and continue to learn together. The Center director attended a number of the building meetings to help ensure program fidelity.

## IMPACTS AND OPPORTUNITIES: LEADERSHIP

### SCIENCE MATTERS



Network in Michigan

#### Teacher Leader Networks are Developed

The Michigan M/S Centers Network continues to be a partner in the statewide Building a Presence in Science. Through this program, there are “Points of Contact” at most school buildings in Michigan who disseminate up-to-date information about science assessments, student programs, Grade Level Content Expectations, and PD opportunities.

#### Teacher Leaders Using Assessment Data

Lapeer County M/S Center worked to improve its implementation of the Battle Creek science unit kits for all K-7 teachers county-wide by implementing common summative assessments via Moodle. Professional development sessions were held explaining the system and data usage. The goals of these sessions were to demonstrate the value of using common assessment data to determine **where** to improve student learning and to demonstrate the value of collaboration to determine **how** to improve student learning. Outcomes:

- In 13 professional development sessions, 139 teachers and administrators were trained in the implementation of online assessment delivery and collaborative analysis of assessment data for future program improvement and teacher development.
- Teachers whose students participated in the online delivery system received reports comparing their results to county-wide averages. After receiving their reports, teachers met to discuss their data, encouraging collaborative conversations to promote program improvement.

#### 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 Content Expectations.

- Students at Kalamazoo College and Western Michigan University served as tutors and mentors in a Kalamazoo Area M/S Center outreach program in a low-income housing project.
- Because of the Center’s work with the EMATHS project, CMU pre-service teachers learned about the Nspire graphing calculator.
- At the Seaborg Center, pre-service teachers, under the supervision of Northern Michigan University staff, taught the “College for Kids.” Over 300 K-8 students participated in the courses.

**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, Bay Community 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, North Central Michigan 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 Department of Education Reform Priorities:**  
*“Support ‘any time, any place, any way, any pace’ initiatives that help schools personalize learning for every student.”*

**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.”*

**ASSISTING THE MDE WITH MATH AND SCIENCE INITIATIVES**

- Local schools are more aware of state mathematics and science initiatives, changes in state assessment, and policy changes because Centers disseminate information to teachers and administrators.
- Algebra for All and SaM<sup>3</sup> are statewide projects, impacting hundreds of Michigan teachers and thousands of middle and high school students. The projects ensure teachers in Michigan are “speaking a common language” and have access to research-based, current professional development.

**CURRICULUM SUPPORT FOR HIGH PRIORITY SCHOOLS**

More than 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 (under-achieving, disadvantaged, or extreme rural) to teach curricula aligned with the GLCEs and High School Content Expectations.

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

- Multiple professional development sessions were provided to assist teachers in their understanding of Michigan’s GLCEs.
- The Battle Creek Area M/S Center revised K-7 science units in their kit program. The kits are used by students in their service area as well as 30% of the state and schools in Iowa, Indiana, Minnesota, and Dubai. The Science Units are completely aligned with the Michigan science and ELA standards and will be revised when the future Next Generation Science Standards are adopted in Michigan.

**PROFESSIONAL DEVELOPMENT SUPPORTING COMMON CORE STATE STANDARDS**

Centers around Michigan are helping teachers navigate the Common Core State Standards (CCSS). Centers held professional development sessions for K-12 teachers, curriculum specialists, and administrators. The primary outcomes were to:

- Investigate the CCSS at specific grade levels for deeper understanding.
- Interact with the CCSS document and support materials in order to become familiar with the standards.
- Explore the processes and proficiencies of the CCSS Mathematical and Science Practices and their implications for classroom instruction.
- Investigate the Literacy in Science Standards in order to make decisions concerning curriculum, assessment and instructional practices.
- Identify appropriate next steps at the district level.

# IMPACTS AND OPPORTUNITIES: CURRICULUM SUPPORT TO LOCAL SCHOOL DISTRICTS

## **Offering Professional Development in Formative Assessment**

More Centers offer professional development based on formative assessment in the classroom.

- In Macomb, formative assessment trainings have had a dramatic impact on teacher practice and have changed the way teachers assess students. These professional development offerings have utilized classroom video to analyze opportunities for improvement and also take advantage of available TI-Navigator technologies to gather data on student learning.
- At the Mecosta-Osceola M/S Center, formative and summative assessment workshops continue to be offered to ALL teachers and administrators through ISD outreach programs. A new leadership course has been developed for the 2011/2012 school year to teach administrators or instructional leaders how to assist teachers in creating and implementing curriculum, assessment, and improving accountability through vetted methods of continuous improvement.

## **Using Student Assessment Results to Improve Instruction and Curriculum**

- The COOR M/S Center worked with local math and science committees in developing/refining common assessments, implementing new lesson designs and integrating science and math with other curricular areas in the elementary school. Along with support for direct curriculum and assessment development, the Center also worked with teams from each of the local buildings in training staff to use data more effectively for better lesson design and differentiation.
- The Manistee, Wexford-Missaukee M/S Center assists the only high priority school in its area with curriculum, instruction, assessment and intervention ideas. The Center looks at data and helps set goals and proficiency targets with teachers, staff, and administrators.

## **Support science and mathematics achievement in identified high priority/persistently lowest achieving schools**

- Students attending Grand Rapids schools were the focus of programming and recruitment for the Regional (GVSU) M/S Center's new Summer Health Activities and Professions Exploration (sHaPe) Camp—designed to provide middle school students the opportunity to explore careers in the health sciences, participate in hands-on science activities that include laboratories and simulations.
- The Macomb M/S Center's most aggressive work with high-priority schools was again a focused partnership with districts to provide 60 hours of math and science summer school for all students that did not score in the top two categories of the 2010 MEAP. The Center provided money for materials and salaries, training, software and resources for the program.

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

- All Centers are supporting the integration of technology into math and science lessons. Berrien M/S Center hosted TechCamp 2010. This was a major professional development opportunity for educators both in and around the service area. Held over two days, TechCamp provided participants with over 20 hands-on sessions that focused on using technology effectively in instruction.
- The Detroit Mathematics and Science Center hosted a series of professional development around TI technology in an effort to increase the capacity of TI leaders in the Detroit Public Schools.

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

- Centers around the state are supporting districts in aligning curriculum, instruction, and assessment to state standards.
- The EUP Center conducted monthly district level work with high school and mathematics teachers on alignment of curriculum, balanced assessment systems, common assessments, as well as course placement for students entering high school.



# COMMUNITY AND PARENT ENGAGEMENT

**U.S. Department of Education goal:**  
*“Partnering with parents and communities.”*

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

**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.
- The Genesee Area M/S Center, for example, has partnered with:
  - ◆ Kettering University for the Young Inventors Program
  - ◆ UM-Flint for the Easy Science Lab/Grade 5
  - ◆ Mott Community College/Flint River Watershed Coalition and Michigan State University Cooperative Extension for the Flint River GREEN
  - ◆ Flint Cultural Center/Sloan Museum for the Ligon Outdoor Center

**Business/Industry/Agencies have collaborated with Centers to provide:**

- “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
- “Real-World” application of research projects such as water monitoring
- Mentoring and job shadowing experiences for students
- Used office furniture, scientific equipment, and supplies for schools
- Career talks by business professionals

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

**Examples of Partnerships with Foundations**

- Teachers in St. Clair County are still reaping the benefit of past partnerships between the Center and local organizations and businesses. Grants from DTE and the Community Foundation of St. Clair County generously funded programs that allowed for the purchase of technology for mathematics programs. In 2010-11, the Foundation also agreed to provide funding for professional development and the purchase of classroom sets of TI-Nspire calculators for 7<sup>th</sup> grade math teachers.
- In February of 2011, The Kellogg Company and W. K. Kellogg Foundation donated \$14 million to relocate the BCAMSC to downtown Battle Creek. The new facilities include a state of the art Learning Center for BCAMSC outreach services and the BCAMSC High School and Middle School Programs, and a new Distribution Center to house the Science Unit Program.

**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**

- Business and industry, foundations, and private individuals continue to support the KAMSC programs. They have provided in-kind and monetary support. Sponsoring such events as the KAMSC Olympiad, the regional Intel International Fair and others indicates a commitment to K-12 science and mathematics education.
- The Lapeer M/S Center has created partnerships with local watershed agencies to improve watershed education and awareness within the communities.
- Mason, Lake-Oceana M/S Center partners with local engineers, neighboring ISDs, the local community college, and area newspapers and radio stations. Over the course of the year, the Center donated (or loaned) supplies to the early childhood center and to Sandcastles Children's Museum to support the mathematics and science education programs that these organizations promote in the community. The Center has also provided science lessons at the Children's Museum for students who are 5 years old or younger.

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

- Twenty-five math and science professionals volunteered as judges for the Invention Convention and the Regional Science Fair at Dickinson-Iron-Menominee M/S Center.
- Muskegon and Newaygo County school-based student teams from the MAISD Regional M/S Center worked with multiple adult community partners to complete eight environmental projects in their local communities.

### **Parents are more engaged and involved in M/S Center and school activities**

- The Western UP Center conducted Family Science, Math and Engineering nights to engage elementary students and their parents in innovative activities to teach math and science concepts.
- At the Jackson M/S Center, parents attend math and science activities on their own time and ask where they can purchase tools that are used.
- The Macomb M/S Center's Symposium for Middle School Girls, robotics programs, and partnerships with industry (PVS/Nolwood Chemistry Challenge, Macomb Service Learning Project) are excellent examples of the impact the Center is having on the community. Students, parents and community volunteers have drawn together to serve over 1000 individuals.

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

- Centers across the state are receiving financial and in-kind support from area businesses, organizations, and agencies because of increased awareness of the importance of math and science. For example, at the Regional (GVSU) M/S Center, over 377 individuals volunteered for *Science Olympiad* and 120 helped during the *STEPS* camps this summer. This level of involvement increases community awareness of the importance of STEM education.
- Northwoods M/S/T Center worked with NewPage Corporation to bring the school ship *Inland Seas* to the area. Fifth grade students and various other groups of local citizens experienced half or full day sails aboard the schooner and learned about the ecology of Lake Michigan and Little Bay de Noc.

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

- Centers maintain working relationships with their area news media. Frequent newspaper articles describe M/S Center programs and keep the community aware of the Centers.
- Individual Center websites and the Michigan Mathematics Science Centers Network website ([www.mimathandscience.org](http://www.mimathandscience.org)) communicate math and science activities with a world-wide audience.
- Several thousand people in the Huron M/S Center service area participated in a day-long learning event focused on environmental science and renewable energy.

# RESOURCE CLEARINGHOUSE

## *Examples of how Center resources are used to support best practices in mathematics, science, and technology education*

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

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

\*Detailed numbers of hours, enrollments, and technology-focused sessions can be found in the Appendix, pages 30-32.

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

- Resource libraries are maintained by Centers, many of which are accessible through M/S Center websites.
- M/S Centers are a dissemination point for several organizations including MCTM, MSTTA, and MDSTA.
- 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**

Many Mathematics and Science Centers use new technology platforms such as: social networking sites, MOODLE, Learnport and other online sources for delivering professional development.

The Detroit Center facilitated online mathematics courses for the first time. For many teachers, this was a brand new experience. The Center hosted a mandatory face to face orientation, and assisted teachers as they completed the course. Teachers are requesting additional courses be offered online, and in these economic times, this method makes a lot of sense.

**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:** American Electric Power, AT&T, BACCO Construction Company, Blue Granite, Borgess Hospital, Bronson Hospital, Champion Incorporated, Coleman Engineering, Consumers Energy, CP Federal Credit Union, Dahlem Conservancy, DENSO, Detroit Edison Energy Foundation, Dow Midland, Enbridge, Flint Cultural Center, Geronimo Wind Energy, HARSCO, ITC Holdings, Jackson Area Manufacturers Association, Kalsec, Kellogg's, Martin Marietta Magnesia Specialties, New Page Corporation, Nordland and Associates, Occidental Chemical, Perrigo Company, Pfizer, PVS/Nolwood Chemicals, Sandcastles Children Museum, Skanska, Thumb Electric Cooperative, Tower Pinkster, Toy House, US 131 Motor Sports Park, Verso, We Energies.\*

\* Not a complete list.

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

**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. Five accelerated high school programs are facilitated by Centers across the state (Battle Creek, Berrien County, Kalamazoo, Macomb, and Mecosta).
- Communities have access to outdoor education centers supported by M/S Centers. Outdoor education centers include Stubnitz Environmental Education Center (Hillsdale-Lenawee-Monroe M/S Center), SEE-North Center for Outdoor Studies, AMA Sprinkler Lake Outdoor Center, Huron Nature Center, Northwoods Clear Lake Education Center, and Flint Ligon Outdoor Education Center.
- The Macomb equipment loan program has provided direct material support to schools throughout Macomb County. Schools can borrow StarLabs, Lego robotics kits, classroom GPS sets, data collection probes, as well as numerous other types of equipment to support classroom instruction.

**Battle Creek Area M/S Center kits provide access to quality materials and equipment for the classroom that otherwise would not be available**

- School districts across the state use the K-7 Science Curriculum/Kit program developed by the Battle Creek Area Mathematics and Science Center. The BCAMSC units provide instruction for ALL of the science GLCEs and provide the units to over 30% of the State’s public school districts as well as schools in Iowa, Indiana, Minnesota, and Dubai. The mandatory professional development that accompanies the program included a pilot live-stream of PD and taped PD for those districts too far away to attend a regional PD session. The Science Units are completely aligned with the Michigan science and ELA standards and will be revised when the future Next Generation Science Standards are adopted in Michigan.

**Technology and Engineering**

- At the Wayne RESA M/S Center, elementary through high school teachers were trained in the use of LEGO equipment, including LEGO robotics. The Center has a loaning library of equipment that area districts and charter schools can check out. The NXT Robotics kits, technology kits, and elementary kits were used in science classes to excite students and promote robotics.
- The Macomb M/S Center offered summer camps in robotics and programming for middle school students and support for low performing 7<sup>th</sup> and 8<sup>th</sup> grade math students. The Center also worked with the Career Education consultants to create and host the second Science Symposium for Middle School Girls. The symposium provided an opportunity for middle school girls to meet with women from careers in fields related to science, mathematics, and engineering. The symposium was again filled to capacity, and will be repeated during the 2011-2012 school year.

**StarLab throughout Michigan**

Several Centers trained teachers to use StarLab in their schools and districts. StarLab is an interactive portable planetarium that creates an ideal environment for hands-on activities. After training, teachers have free use of the StarLab for their school. Thousands of students are able to learn about the solar system through this service. Centers involved with the StarLab program include Northwoods, CMU, Lapeer, Macomb, Wayne RESA and Seaborg.

**Other Resources**

- Many Centers have an equipment loan program that has provided direct material support to schools throughout the state. Schools can borrow StarLabs, LEGO robotics kits, classroom GPS sets, data collection probes, as well as numerous other types of equipment to support classroom instruction.
- Centers have facilitated the donation (and dissemination) of lab equipment and supplies to districts from other agencies and industries.
- 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 Centers.

## LEVERAGED RESOURCES

***Severe Funding Cuts: For the eighth year in a row, the Michigan Mathematics and Science Centers have experienced a major funding set-back. The reduced foundation grant from the State of Michigan, cut 75% by the Legislature in the 2002-2003 school year, experienced an additional 25% cut in 2009-10. The Centers are now operating at 82% reduced funding. 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. Many Centers are only holding on "by a thread." Leveraged resources have prevented several Centers from closing completely.***

### **Examples of Resources Leveraged Through Collaborations with Business, Industry, Universities and Colleges**

- Students have the opportunity to visit university campuses during science Olympiads, science fairs and other activities.
- Teacher Quality Grants (Title II, Part A) are developing science leaders in under-achieving schools and building teachers' science content knowledge.
- Partnership with universities and school districts result in proposals for the Mathematics and Science Partnership Grants (Title II, Part B).
- Collaborations with state universities to sponsor full-day regional mathematics and science conferences for teachers.
- 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 \$7,413,049 from grants and community contributions.**

***Intermediate School Districts and Universities have contributed approximately \$3,627,039 toward salaries and \$491,032 toward Centers' general funds. A large portion of these contributed funds represent Title II, Part B funds or payment for general education services.***

### **EXAMPLES OF LEVERAGED SUPPORT**

- The Perrigo Company partnership makes each district in Allegan AESA eligible to receive \$2,000-\$5,000 annually in education funds and \$1,000-\$3,000 annually in scholarships for math/science. The Center established this link and coordinates efforts on behalf of the local districts. Additionally, the Van Buren Research and Development Foundation contributed funds to support the participation of Van Buren ISD districts in Eco Races.
- This was the first year the Dickinson-Iron-Menominee Center hosted the TrigSTAR Competition. The goal of the program is to recognize and stimulate the best students of mathematics. All area high school students were eligible to compete in a timed trigonometry test; twenty seven students registered. The local first place winner received \$500, the second place winner received \$300 and the third place winner received \$200. The corporate sponsors were BACCO Construction Company, Champion Incorporated and Coleman Engineering.
- At the Hillsdale-Lenawee-Monroe M/S Center efforts to grow community involvement through sponsorships and scholarships have increased contributions to the Tri-County Science Fair by \$7,000.

# 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 national education goals.

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

<b>Michigan Department of Education School Improvement Framework Performance Indicators</b>	<b>U.S. Department of Education Goals</b>	<b>Michigan Mathematics and Science Centers 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 leadership development in mathematics and science, both within the Center and within targeted K-12 Local Education Agencies (LEAs), with focus on high priority schools.
Staff has the professional technology skills to be effective in their positions.	Maximize technology's contributions to improving education.	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.

**Michigan Mathematics and Science Centers Network  
Data Tables 2010-2011**

**PROFESSIONAL DEVELOPMENT**

**Table 1: Professional Development Participants**

			Reported Gender**		Position					
Partici- pants	Different No. of Individ.	Total Hours	Males	Females	Admin.	Math Tchrs.	Science Tchrs.	Tech Tchrs.	Com- bined Subject	Other or Un- known*
Pre-K	174	1,901	4	168	1	1	0	0	89	83
Elemen- tary	4,249	56,628	507	3,703	104	77	69	15	3,554	430
Middle/Jr. High	1,786	33,383.5	450	1,296	32	666	580	18	141	349
High School	2,475	46,822.5	1,017	1,409	54	893	701	29	84	714
Mixed Levels	1,113	19,172.75	344	754	163	159	170	27	175	419
Other*	1,371	18,921.5	317	902	19	59	48	4	30	1,211
<b>Total</b>	<b>11,168</b>	<b>176,829.3</b>	<b>2,639</b>	<b>8,232</b>	<b>373</b>	<b>1,855</b>	<b>1,568</b>	<b>93</b>	<b>4,073</b>	<b>3,206</b>

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

\*\* 2.7% of individuals did not indicate gender.

Teachers averaged 15.8 hours of participation in Center programming during the 2010-11 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	1	4	0	0	1	6
	Hours	6	18	0	0	.75	24.75
	Participants*	13	100	0	0	24	137
<b>Elementary</b>	Events	132	399	2	0	16	549
	Hours	1,113.75	1,627.25	5.5	0	70	2,816.5
	Participants*	2,065	3,463	7	0	482	6,017
<b>Elementary &amp; Middle/Jr. High</b>	Events	50	48	8	0	0	106
	Hours	399	272.75	35.25	0	0	707
	Participants*	726	447	129	0	0	1,302
<b>Middle/Jr. High</b>	Events	104	73	11	0	10	198
	Hours	740.75	350.25	36	0	65.5	1,192.5
	Participants*	1,165	455	169	0	101	1,890
<b>Middle/Jr. High &amp; High School</b>	Events	121	80	10	0	11	222
	Hours	758.25	495	34.25	0	52.75	1,340.25
	Participants*	1,821	1,036	216	0	451	3,524
<b>High School</b>	Events	196	99	8	0	15	318
	Hours	1,577.25	609	29	0	114.25	2,329.5
	Participants*	2,723	919	79	0	314	4,035
<b>Other (includes K-12 Mixed Levels and non-responses)</b>	Events	99	112	62	0	76	349
	Hours	770.25	802.5	498	0	343.75	2,414.5
	Participants*	2,648	2,092	1,688	0	1,752	8,180
<b>Total</b>	Events	703	815	101	0	129	1,748
	Hours	5,365.25	4,174.75	638	0	647	10,825
	Participants*	11,161	8,512	2,288	0	3,124	25,085

\*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	3	9	0	0	0	12
	Hours	20	51	0	0	0	71
	Participants	44	436	0	0	0	480
<b>Elementary</b>	Events	40	523	15	0	1	579
	Hours	241	2,160.25	134	0	4	2,539.25
	Participants	1,605	26,723	271	0	16	28,615
<b>Elementary &amp; Middle/Jr. High</b>	Events	10	66	8	0	4	88
	Hours	110	818.5	128	0	38	1,094.5
	Participants	1,274	3,204	145	0	517	5,140
<b>Middle/Jr. High</b>	Events	6	80	10	0	18	114
	Hours	40	655	149	0	52.5	896.5
	Participants	681	9,615	151	0	1,475	11,922
<b>Middle/Jr. High &amp; High School</b>	Events	2	18	4	0	0	24
	Hours	15	168	46	0	0	229
	Participants	144	4,016	121	0	0	4,281
<b>High School</b>	Events	64	104	32	0	38	238
	Hours	936.5	1,289.5	102	0	115.75	2,443.75
	Participants	2,847	3,626	513	0	1,764	8,750
<b>Other Mixed Levels</b>	Events	3	24	0	0	3	30
	Hours	8.5	67.5	0	0	8	84
	Participants	1,003	1,768	0	0	210	2,981
<b>Total</b>	Events	128	824	69	0	64	1,085
	Hours	1,371	5,209.75	559	0	218.25	7,358
	Participants	7,598	49,388	1,201	0	3,982	62,169

**For more descriptive information regarding individual Center programming, see individual Center Reports. These can be obtained by contacting individual Center Directors (see page 33). The Network website also gives additional information: [www.mimathandscience.org](http://www.mimathandscience.org).**

**Table 4: Twelve Year Summary Data**

**SUMMARY OF PROFESSIONAL DEVELOPMENT ACTIVITIES 1999-2011**

School Year	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007*	2007-2008*	2008-2009*	2009-2010	2010-2011
Total PD Programs Offered	2,549	2,765	3,436	3,239	1,705	1,928	1,725	2,036	1,849	2,304	2,265	1,748
Total PD Program Hours	14,059	13,067	14,757	14,563	10,507	11,057	11,109	11,933	10,254	12,049	12,592	10,825
Total PD Enrollments	43,655	47,210	21,904	51,527	28,540	34,237	26,484	30,271	28,998	35,419	30,838	25,085
Percent PD Science-Focused Programs	42%	40%	43%	36%	41%	31%	41%	40%	36%	49%	35%	47%
Percent PD Math-Focused	17%	21%	23%	27%	30%	41%	45%	45%	42%	36%	54%	40%
Percent PD Technology-Focused	9%	11%	7%	8%	15%	7%	4%	5%	6%	3%	4%	6%
Percent PD Integrated M/S/T	19%	18%	15%	13%	1%	0%	1%	1%	1%	1%	0%	0%
Percent PD Other	13%	11%	12%	15%	14%	21%	9%	9%	15%	11%	7%	7%

\*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 1999-2011**

School Year	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Outreach Sessions	6,763	6,514	6,990	5,024	1,252	1,579	1,112	1,119	960	1,296	1,205	1,085
Outreach Hours	46,403	52,879	159,952	109,816	37,893	19,151	15,983	17,940	13,877	11,282	7,683	7,358
Outreach Participants	251,251	263,292	309,716	374,813	239,984	206,906	287,047	160,220	108,875	176,421	103,310	62,169

NOTE: The program data above represent a significant decline in the level of activities offered to teachers and students, the number of programming hours offered, and the number of enrollments in programs beginning in 2003-04. This was the year that Centers received a 75% reduction in their base funding from the Michigan Legislature. **This clearly suggests that the reduction has significantly impacted the quantity and accessibility of mathematics and science programming for Michigan's students and teachers.**

However, Math and Science 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 29% since 2002-03 despite the 75% cut in core funding. **Unfortunately, the number of DIRECT student programming hours since 2002-03 have been reduced by 93% due to funding cuts. In collaboration with the Michigan Department of Education, the Centers decided to focus their primary efforts on providing professional development to improve teacher knowledge, skills, and instructional practices, with the intent of improving student learning.**

## 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	Kevin Clark	(269) 471-7725
Capital Area Sci/Math Center	Denise Brady	(989) 743-3471
Central Michigan SMTC	Janis Voegel	(989) 774-7678
COOR S/M Center	Don Mick	(989) 275-9562
Detroit M/S Centers	Alycia Meriweather	(313) 873-4519
Dickinson-Iron-Menominee M/S/T Center	Dee Benjamin	(906) 776-8137
EUP M/S Center	Valerie Masuga	(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
Great Lakes M/S Center	Christy Cloud	(231) 547-9947
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	Megan Schrauben	(517) 768-5281
Kalamazoo Area M/S Center	Michael Tanoff	(269) 337-0004
Lapeer County M/S Center	James Emmerling	(810) 667-6981
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 M/S Center	Jodi Redman	(231) 876-2263
Mason-Lake-Oceana M/S Center	Kathy Surd	(231) 757-4934
Mecosta-Osceola M/S/T Center	Jennifer Harrison	(231) 592-9608
Northwoods M/S/T Center	Vic Bugni	(906) 786-9300
Oakland Schools S/M/T Center	Valerie Mills	(248) 209-2378
Regional M/S Center (GVSU)	Karen Meyers	(616) 331-2265
Saginaw Valley State Univ. Regional M/S Center	Tamara Barrientos	(989) 964-4115
Sanilac County S/M Center	Nick Miu	(810) 648-4700
Glenn T. Seaborg Center-NMU	Debra Homeier	(906) 227-2002
St. Clair RESA M/S Center	Jim Licht	(810) 455-4241
Wayne RESA M/S Center	Libby Pizzo	(734) 334-1375
Western UP M/S Center	Shawn Oppliger	(906) 482-4520