Science and Mathematics Program Improvement (SAMPI)

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Michigan Mathematics and Science Centers Network
Building tomorrow's citizens by inspiring excellence in mathematics and science education today.

The Michigan Mathematics and Science Centers Network (MMSCN) is a primary infrastructure supporting the improvement of science, technology, engineering, and mathematics (STEM) education in Michigan. Programs and services of the MMSCN are made available to all Michigan public and private schools in their service areas. The following report summarizes the work of the Network during the 2016-2017 school year. Individual Centers produce an annual report of accomplishments, which are available from each Center.
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Mission Statement:
Building tomorrow’s citizens by inspiring excellence in mathematics and science education today.

Vision Statement:
Michigan will be a national leader in STEM education and every citizen will understand the importance of STEM competency to career and college readiness and the state’s economic success. The 33 regional Michigan Mathematics and Science Centers individually and collectively as the MMSCN will provide leadership by:

• Elevating the awareness of the importance of STEM education in the global economy.
• Communicating that STEM literacy contributes to every aspect of quality of life in Michigan, including economic development, and making sure that students are well suited for the jobs that await them.
• Developing programs and tools for K-12 education – including teacher professional learning – that build subject area competence and support STEM literacy.
• Establishing a system for consistent delivery of STEM programs.
• Promoting student interest and increased achievement in STEM subjects.
• Driving Michigan efforts to incorporate multi-State standards for STEM education and realize those standards in classrooms across the state.
• Cultivating and strengthening relationships with all stakeholders, including state and national organizations and business/industry.

Identity Statement:
Each Center is a member of a statewide network of 33 Mathematics and Science Centers. The Network is a core element of the system of support for K-12 STEM education in Michigan. We provide high quality STEM opportunities that can reach every child in our state either through direct student services or by providing teacher professional development.

Our membership includes Directors with expertise in every facet of STEM and STEM education. Therefore, the Network is both a catalyst and resource for educational innovation. State and national initiatives can be quickly mobilized throughout Michigan because of the strong working relationships that individual Centers maintain with their constituent schools, teachers and students. Center Directors also nurture and sustain collaborations between business and industry partners and their local stakeholders.

Essential Elements of the Statement
• Fostering the Achievement of STEM Literacy
• Educational Equity for Every Child in Michigan
• Expertise in Every Facet of STEM Education
• Network Resources Leveraged to Local Districts – Local Representation to Network
• Ability to Mobilize Educational Innovations
• Cultivating Collaborations between STEM Education, Business and Industry
In the 29 years of its existence, the Network has provided programs and services to teachers, students, schools, and communities across Michigan. The Mathematics and Science Centers Program was created by legislation in 1988, providing grant funds to establish Centers in cooperation with local and intermediate school districts and higher education institutions. Today, all school districts across Michigan have access in their region to one of 33 M/S Centers.

Mathematics and Science Centers continue to provide quality programming for teachers and students to improve STEM education in Michigan despite more than a decade of reductions in base funding from the State School Aid Act-Section 99. Although the Network and Centers have actively sought grants, contracts, and in-kind contributions to support programming, the overall 80% decrease in state funding levels since 2002 have resulted in fewer professional learning hours for teachers, fewer STEM program hours for students, and decreases in other support services.

Highlights from the 2016-2017 Annual Report

In addition to many regular local and regional activities, the Network facilitated two multi-year statewide projects serving Michigan teachers and their students, as well as several Mathematics and Science Partnerships (MSP) Projects.

Multi-Year Statewide Projects
- Teachers Engaged in Science Leadership Activities (TESLA)
- AP Computer Science Principles and CS Discoveries

Mathematics and Science Partnership (MSP) Projects
- Intel® Math
- Modeling
- Math Recovery®
- UP-SMILE

- 10,991 teachers and other educators participated in professional learning (PL) programs, including: 236 individuals teaching pre-K, 5,712 teaching elementary, 1,383 teaching middle/junior high, 1,617 teaching high school, 946 teaching mixed grade levels, and 1,097 identified as others (administrators, para-professionals, etc.).
- 1,290 professional learning (PL) programs were offered: 428 in math, 716 in science, 21 in technology, 48 in engineering, and 77 in other topics.
- A total of 17,620 hours of PL were provided; 18,882 total PL enrollments.
- 50,985 students participated in student services programs: 26,597 elementary, 8,811 elementary and middle/junior high, 2,493 middle/junior high, 2,737 middle/junior high and high school, 2,804 high school, and 7,543 from mixed grade levels (some students may have attended multiple programs).
- Over the past 18 years, 37,319 PL programs were offered; total enrollment over 18 years was 549,370 (many teachers participated multiple years in multiple programs).
- In the same 18 year period, 2,934,766 students were served directly by Centers (some students were served multiple years in more than one program).
- Four 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 Priority Schools, providing intensive assistance including: classroom-level professional learning, classroom observations to identify areas of need, modeling science lessons, targeted small group PL, content integration advice, assessment assistance, achievement gap analysis, and resource acquisition.
- During the second year of programming, TESLA has prepared almost 100 science education leaders to facilitate NGSX workshops with science teachers, K-12, throughout the state. Since December 2015, NGSX study groups have formed and have completed the 30 hour preparation program. As of September 2018, over 1,500 Michigan science and elementary teachers have been part of study groups. More information on this statewide project can be found on page 9 of this report.
STATEWIDE PROJECTS

Value of Michigan Statewide Projects

The 33 Michigan Mathematics and Science Centers have functioned as a collaborative network since their inception in 1988. The Network provides professional learning and 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 learning opportunities.
- 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.
- 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.
- Bring resource materials into the hands of teachers.

Other aspects of Network 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 communication with local principals, curriculum directors, teachers, etc.
- Teachers learn and implement new technology.
- Centers have cadres of teachers “speaking the same language” and willing to share instructional strategies, successes, and failures.

Accomplishments of Statewide Projects

TESLA - Year 3
Teachers Engaged in Science Leadership Activities

The Michigan Mathematics and Science Centers Network’s four-year project, Teachers Engaged in Science Leadership Activities (TESLA), is creating leadership capacity and professional learning opportunities for science education leaders and science teachers throughout Michigan. Supported by funding from the Michigan Department of Education, TESLA focuses on two critical features of leadership capacity building: in-state experiences and inter-state collaboratives.

To support teachers through professional learning around changes in practice and to become more aligned to A Framework for K-12 Science Education (NGSS), TESLA has been populated with multiple MMSCN-created professional learning experiences. These workshops, which range in length from a few hours to several days, are adaptable, flexible, and focus on key components of the Framework that have been used by professional development facilitators throughout Michigan. One of the powerful aspects of the free access to these resources is that it encourages all facilitators to share common messaging with teachers. In a state the size of Michigan and with so many science teachers, it is difficult to provide similar experiences to all - but MISCIPLAN materials provide a bridge for doing this.

The inter-state collaborative has been realized by the planning and initial implementation of NGSX (Next Generation Science Exemplar System). From September 2015 through August 2016, Michigan prepared almost 100 science education leaders to facilitate NGSX workshops with K-12 science teachers throughout the state. Each region of Michigan has facilitators within their region and access to additional state-wide facilitators who can travel to various locations. NGSX provides support for teachers in implementing modeling, argumentation, and explanation with K-12 science teaching.

Since December 2015, NGSX study groups have formed and have completed the 30 hour preparation program. As of September 2017, approximately 2,207 Michigan science teachers have been part of study groups. Access to the NGSX site (normally $200/teacher) has been provided to all teachers through TESLA funds. Access is provided for all study groups, which are led by Michigan prepared facilitators. This includes study groups facilitated by MMSCN Directors and Associates as well as other facilitators not directly linked to a Center.

Accomplishments of Statewide Projects

TESLA - Year 3
Teachers Engaged in Science Leadership Activities

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Several strengths and limitations have been identified for the TESLA project during year 3 based on the analysis of the quantitative and qualitative data collected through the NGSX and Michigan Science Plan surveys and the interviews with Math and Science Center Directors. Survey data from the NGSX and Michigan Science Plan showed that teachers reported improved familiarity with the NGSS. The directors said they felt one of the main benefits of the TESLA program was exposing teachers in their service area to the NGSS and aligned teaching practices. The program also improved participants understanding of NGSS aligned teaching practices. Open-response data from the NGSX surveys indicated that teachers gained a better understanding of modeling and discourse.

Network statewide projects:
Accomplishments of Statewide Projects

AP Computer Science Principles and CS Discoveries

The Michigan Mathematics and Science Centers Network, as a regional partner with Code.org, has supported 86 high school teachers with the implementation of AP Computer Science Principles (AP CSP) and 14 middle school teachers with the implementation of Computer Science Discoveries (CSD) starting in the summer of 2017. All 100 teachers are implementing a year-long course in computer science for their students using the internationally renowned materials created by Code.org.

The professional learning series for these teachers include a five day kick-off event in the summer of 2017. This is followed by four follow-up professional learning sessions during the 2017-2018 school year. Teachers also have access to an AP Course Audit which is pre-approved by the College Board.

As information from Code.org states, AP CSP introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. More than a traditional introduction to programming, it is a rigorous, engaging, and approachable course that explores many of the foundational ideas of computing so all students understand how these concepts are transforming our world. CSD takes a wide lens on computer science by covering topics such as programming, physical computing, HTML/CSS, and data. The course inspires students as they build their own websites, apps, games, and physical computing devices.

The AP CSP course is projected to have the largest launch of any AP course in Michigan’s history. Furthermore, Michigan had the largest cohort of any state in the nation at the Code.org summer TeacherCon in Philadelphia in the summer of 2017.

Modeling Instruction was created by an NSF-funded grant carried out at Arizona State University. In our work, we make use of their carefully designed framework that has been shown to markedly increase teacher content mastery and instructional skill. The workshops are an immersion design where teachers learn from the same techniques and materials they will utilize with their students. Modeling Instruction relies on findings that show conceptual mastery of science content and practices is developed through student-centered investigations supported by well facilitated, productive academic talk in the classroom. Student preconceptions are directly confronted and compared to indisputable results from class demonstrations and experiments. Skilled teachers use discourse techniques to probe student thinking and prompt them to compare their evidence, models, and explanations. It is an excellent onramp to the vision of the new Michigan Science Standards because of a strong alignment to the instructional implication of the three dimensions of the NRC Framework for K-12 Education.

These are the major components of the program:

- Intensive three week long summer workshop in high school physics, chemistry and biology and also in middle school science
- Follow-up fall Saturday workshops and winter evening webinars
- Lesson Lap events where selected participants host guest participants and higher education partners who observe and reflect on instruction
- The Aspiring Modeling Facilitators Academy, which aims to increase the number of skilled facilitators
Michigan Mathematics and Science Partnership Grants
Math Recovery® Professional Development – Year 2

Supporting the implementation of Math Recovery® Professional Development is a project funded by the Michigan Mathematics and Science Partnership competitive grants program of the Michigan Department of Education.

The original project had six major objectives:

1. To deepen teacher mathematics content knowledge and understanding of the continuum of mathematical thinking, assessment tasks, and instruction to move students forward along the continuum;
2. To strengthen district level expertise in providing on-demand support to teachers to promote strong teaching skills and in turn improve student mathematics achievement;
3. To provide administrative support for Math Recovery implementation to create a system that will allow teachers to close the achievement gap of students in mathematics;
4. To improve student achievement in mathematics by developing mathematical understandings which move students along the continuum of mathematics thinking;
5. To build capacity in Michigan in understanding the development of early numeracy and to support teachers in closing the mathematics achievement gap in Michigan; and
6. To provide a coherent continuum of supports for all students (multi-tiered system of supports) to close the achievement gap and decrease the number of students needing tier 2 and 3 supports.

The key to achieving long-term growth in districts is sustainability and in the 2016-17 year, the project focused professional development efforts on two of the original outcomes 2) continue to strengthen district-level expertise in providing on-demand support to teachers to promote strong teaching skills and increased student success and 5) increase the number of regions in Michigan to be able to offer and support Math Recovery® professional learning.

State Team Meetings
A state team consisting of Math Recovery® facilitators meet regularly to develop resources and tools for trained districts. The development of the implementation supports serves as a statewide bank of resources and tools for any ISD/MSC Math Recovery® Facilitator to use to provide support for coherent statewide instruction in early elementary mathematics. The resources include:

• Building and classroom level progress monitoring and teaching progressions used to inform instruction within the key focus areas of Addition & Subtraction, Place Value, and/or Number Sense (Structuring Number).
• Grade level summary documents to guide systemic data collection within a district Multi-Tiered System of Supports.
• Family Math Night event plans.
• Administrator supports to coach teachers implementing Add+VantageMR® instruction and assessment in their classrooms.

SAMPI interviewed several members of the state team in October 2017, the focus of which was to gather data on progress made toward goals and challenges that have been encountered (see the next page for findings from these interviews).

AVMR® Teacher Training
The training of the second cohort of teachers began in spring/summer 2016 and was implemented by the Muskegon Area ISD Regional Mathematics and Science Center (MAISD) for a total of 279 participants with the following partners: 1) Wayne County Regional Education Service Agency, 2) Macomb Intermediate School District, 3) Genesee Intermediate School District, 4) Wexford-Missaukee Intermediate School District, 5) Kent Intermediate School District,

The goal of the Math Recovery® Add+VantageMR® (AVMR®) two-course training was to provide K-5 teachers with efficient assessment tools to help them recognize their students’ current understandings of number concepts in the domain of “Operations and Algebraic Thinking” and “Numbers and Operations in Base Ten” in the Common Core State Standards (CCSS). It offered a framework to increase students’ level of sophistication in solving problems similar to progressing students in their reading level. AVMR® described constructs that provide a focus for building on students’ knowledge to move them to higher levels of understanding and sophistication in solving math problems. Course 1 provided a detailed understanding of how children develop understanding of early numeracy, and Course 2 focused on number domains of place value and multiplication. In addition to the 40 hours of coursework, all sites provided an additional 40 hours of follow-up support.

MTH 380 Course at GVSU
The MAISD & Grand Valley State University offered a second offering of MTH 380 for Elementary Education Math Majors that integrates Add+VantageMR® training into their coursework in the Spring/Summer of 2017. 10 students enrolled in the course, 8 of which were math majors. The first offering was in June 2016 and enrolled 16 pre-service teachers, 15 of which were math majors.

• Team members agreed their role as individuals was to equally contribute ideas.
• Team members believe progress was made. Several felt they were able to identify areas of need and what might be helpful to districts. Others felt progress was made in ways they didn’t initially anticipate. One commented, “I can’t say it’s moving forward in the way I initially thought it would, but progress is being made.”
• Team members discussed challenges, including varying opinions and backgrounds of team members, and the complexity and scale of the project. Members addressed these challenges by narrowing ideas into more specific tasks, being flexible and knowing that one tool isn’t going to fit every district’s need, talking to people outside of the meetings to learn what they know/understand about the current assessments, and delegating specific tasks to individuals.
• Team members were moving forward toward concrete plans for districts on how to implement and assess Math Recovery®, well-defined guidelines for teachers and interventionists on how Math Recovery® should be implemented, and a shared pool of resources to help teachers along each step of implementation. One member said that even though the state team meetings will eventually wind down, the communication/discussions about what is happening within regions will continue.
The Upper Peninsula Science and Mathematics Integrated through Literacy and Engineering (UP-SMILE) project is funded by the Michigan Department of Education’s Mathematics and Science Partnership competitive grants program. The purpose of UP-SMILE is to support the efforts of middle and high school teachers across Michigan’s Upper Peninsula to bring an integrated approach to their mathematics and science classrooms. UP-SMILE intends to bridge math and science content through literacy and engineering, maximizing integration of content and resulting in meaningful experiences for the students, STEM faculty, teachers, and other educational stakeholders in the Upper Peninsula of Michigan.

NGSX

Middle and high school teacher participants across Michigan’s Upper Peninsula attended a 5-day workshop series on the Next Generation Science Exemplar System (NGSX), a web-based system designed to engage them in the three major dimensions of the Next Generation Science Standards (NGSS): core ideas of science, scientific and engineering practices, and crosscutting concepts. UP-SMILE received additional funding to expand these efforts. Expansion funding was used to implement NGSX sessions at several locations across the Lower Peninsula.

102 UP-SMILE teacher participants attended a 10-day Summer Institute during the summer of 2016. Additional NGSX trainings were offered to 422 K-12 teachers served by various Mathematics and Science Centers across the Lower Peninsula.

The list of Lower Peninsula sites who offered NGSX training included all of the following:

- Sanilac County Science and Mathematics Center
- Mason-Lake-Oceana Math and Science Center
- MAISD Regional Mathematics and Science Center
- Capital Area Science and Mathematics Center
- Wayne County Mathematics and Science Center
- Jackson County Mathematics and Science Center
- Livingston-Washtenaw Mathematics and Science Center
- Allegan/Van Buren Math & Science Center
- Lapeer Math and Science Center
- AMA-St. Clair ISD Math, Science, and Technology Center
- Manistee Regional Mathematics and Science Center
- GVSU Regional Math and Science Center
- SVSU Regional Mathematics and Science Center
- Huron Mathematics and Science Center
- Macomb County Mathematics, Science, and Technology Center

Another part of the UP-SMILE project offered Math Recovery® Professional Development training to K-5 teachers across Michigan’s Upper Peninsula during the 2016-17 school year. This is a 40-hour training called Add+VantageMR® (AVMR®). See the previous section describing the Math Recovery® Professional Development Program on page 12.

The training consists of two AVMR® courses designed to provide a detailed understanding of how children develop understanding of early numeracy (Course 1) and number domains of place value and multiplication and division (Course 2). K-5 teachers are also trained to administer AVMR assessment tools that help them recognize students’ current mathematics understanding and build on their current ways of reasoning.

The training was implemented at the following three sites:

- Delta-Schoolcraft Intermediate School District (DSISD)
- Eastern Upper Peninsula Intermediate School District (EUPISD)
- Glenn T. Seaborg Mathematics and Science Center (Seaborg)

A pre/post content test was administered to all 63 teacher participants. The test contained 12 items covering math concepts and strategies teachers were exposed to during Math Recovery® training. Some items had several parts, bringing the total possible score to 25 points. Paired sample t-tests were used for each of the three sites.

Analysis of pre/post assessments provided evidence that the AVMR training impacted the content knowledge of teacher participants at all sites and pre/post growth was statistically significant for all three sites. Project staff should be encouraged by these finding as they continue to conduct additional Math Recovery® trainings during the 2017-2018 school year. See the table below for details.

<table>
<thead>
<tr>
<th>Total possible score = 25</th>
<th>n</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Score</td>
<td>%</td>
<td>Score</td>
</tr>
<tr>
<td>All Teachers</td>
<td>63</td>
<td>18.2</td>
<td>73.0%</td>
<td>20.3</td>
</tr>
<tr>
<td>DSISD</td>
<td>25</td>
<td>17.9</td>
<td>72.0%</td>
<td>18.9</td>
</tr>
<tr>
<td>EUPISD</td>
<td>25</td>
<td>18.0</td>
<td>72.0%</td>
<td>20.8</td>
</tr>
<tr>
<td>Seaborg</td>
<td>13</td>
<td>19.2</td>
<td>77.0%</td>
<td>22.1</td>
</tr>
</tbody>
</table>

* Statistically significant difference, p < 0.01.

For any questions regarding the UP-SMILE project, contact Kevin St. Onge, Director of the Eastern Upper Peninsula Mathematics and Science Center (EUP) at kevins@eupschools.org or 906-259-8057.
**Accomplishing MMSCN Master Plan Goals**

A five-year MMSCN Master Plan (2013-2017) guides programs and services. Below are highlights of accomplishments for 2016-2017 related to the plan’s two focus areas.

**Focus Area 1: Career- and College-Ready Students**

The network continues its 29 year history of providing high quality professional learning experiences for Michigan teachers so they can more effectively prepare career- and college-ready students in STEM fields. Here are brief summaries of accomplishments related to the five goals for this focus.

Provide substantive teacher professional learning in STEM subject areas, helping teachers focus on the best ways to improve student career and college readiness.

The MMSCN continued to provide substantive professional learning across the entire Network in STEM subject matter, curriculum standards, instruction and classroom practices, and student engagement strategies. These STEM programs—in the form of summer institutes, year-long workshop series, job-embedded activities, and/or online sessions—were designed to help teachers prepare their students for careers and college. In 2016-2017, 10,991 teachers and other educators participated in professional learning; 1,290 programs were offered. This represents an average of 22.4 hours per teacher participant, an increase from the 2015-16 school year. These hours reflect a significant time commitment from participating teachers and administrators, which allows for more in-depth learning to occur.

Provide teacher professional learning to increase knowledge and understanding of curriculum content expectations in science, technology, engineering, and mathematics. MMSCN programs focused on STEM subject matter and included opportunities for professional learning in the use of curriculum materials and instructional strategies related to the new Michigan Science Standards subjects. Examples of projects that served teachers across Michigan included:

- NGSX (Next Generation Science Exemplar System): With the adoption of the new Michigan Science Standards, Centers began to deliver professional learning for teachers designed to deepen their knowledge of content and instructional strategies related to the three-dimensional learning envisioned in the Next Generation Science Standards on which the Michigan Standards are based. Michigan facilitators, who were prepared through an eleven day workshop series led by Clark and Northwestern Universities, began to deliver professional learning aligned with the instructional direction of the new standards. The focus during 2016-2017 was to continue to build capacity through training facilitators from a variety of professional learning partners to deliver the intensive professional learning in 2017-2018. Fifty-six educators, including Mathematics and Science Center directors, curriculum directors, ISD consultants, college/university faculty, and educational non-profit staff have been trained as NGSX facilitators. As of November 2017, almost 900 teachers had been trained by those facilitators.

- MI SCI PLQN: During this year, a team of experts developed materials to serve as an introduction to the new Michigan standards and build understanding of the instructional changes that will be needed. These workshop resources provide ready-to-use facilitator materials for four levels of teacher workshops (Tiers 1-4) and an administrator workshop. Facilitator trainings were held and the workshop guides are available online. Out of the hundreds of teachers attending Tier 1 training, 92% of participants felt they became more familiar with the new state standards.

- Modeling Instruction in Michigan, a multi-Center Mathematics/Science Partnership program involving secondary teachers using the Modeling Instruction that was created by an NSF-funded project at Arizona State University.

Provide and assess programming to build career and college awareness in STEM fields, especially in elementary grades, such as Family Engineering and other awareness-building programs. MMSCN continued to provide direct student programming to build awareness of STEM learning and careers among Pre-K through 5th grade students. In 2016-2017, 26,597 students in these grade levels participated directly in Network programs. A total of 1,223 hours of programming were provided.

**Focus Area 2: Direct Student Programming**

Additional statewide and regional programs to assist teachers and districts with the implementation of Michigan’s mathematics standards that are based on the Common Core State Standards and many other STEM professional learning programs were offered by individual Centers or clusters of Centers. The statewide and regional programs included:

- TESLA (see page 9)
- AP Computer Science Principles and CS Discoveries (see page 10)
- Math Recovery (see page 12)
- UP-SMILE (see page 14)
- Modeling (see page 11)

Assess effects of professional learning on teacher participants as it relates to subject matter and pedagogical content knowledge, classroom/instructional practices, and dispositions consistent with STEM learning.

Various assessment strategies were used by Centers in 2016-2017 to evaluate effects of professional learning on teachers, ranging from classroom observations and teacher subject matter tests to teacher surveys and end-of-session questionnaires (depending on data needs and available human and financial resources). Statewide projects and Mathematics/Science Partnership grants had external evaluators able to gather various kinds of impact data. Evaluation of these sustained professional learning efforts showed improvements in teacher STEM content knowledge, understanding of curriculum materials and standards, and use of effective instructional strategies.

As an example of assessment results, see page 15 which summarizes effects of the UP-SMILE Math Recovery® program in Michigan on teacher participants. More extensive evaluation findings for MMSCN STEM professional learning opportunities are available from the project directors.

<table>
<thead>
<tr>
<th>Project</th>
<th>Project Director</th>
</tr>
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<tbody>
<tr>
<td>TESLA</td>
<td>Mary Starr</td>
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<tr>
<td>AP CSP</td>
<td>Kathy Surd</td>
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<td>Intel® Math</td>
<td>Tammy Barrientos</td>
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<tr>
<td>Modeling</td>
<td>Mike Gallagher</td>
</tr>
<tr>
<td>Math Recovery®</td>
<td>Kristin Frang</td>
</tr>
<tr>
<td>UP-SMILE Math Recovery®</td>
<td>Kevin St. Onge</td>
</tr>
</tbody>
</table>

Within Network statewide professional learning projects, assess impact of programming on students related to the subject matter of the project and dispositions consistent with STEM learning and careers. Evaluation of selected statewide projects and Mathematics/Science Partnership grants included assessment of changes in student STEM content knowledge, STEM-related skills, and attitudes/dispositions toward STEM. Sample findings include: In classrooms where teachers used what they learned in professional learning sessions, students have opportunities to learn STEM subjects in new and more effective ways. For example, teachers of mathematics have learned strategies to help students construct arguments for their ideas and critique the reasoning of others, consistent with the Michigan standards for mathematics.
Focus Area 2: Facilitate the development of long-term partnerships and collaborations with STEM stakeholders – including business and industry and out-of-school time partners.

Key strategies for expanding Network partnerships and collaborations among STEM related stakeholders include the following. For each strategy, a local and/or regional example is given.

Establish and grow additional partnerships with appropriate stakeholders to advance STEM education in Michigan.

Collaboration is a primary strategy of MMSCN to broaden and deepen programs and services to address the STEM education needs of Michigan teachers and students. In the 2016-2017 year, the Network and Centers developed and maintained active partnerships with area businesses, non-profit groups, community organizations, educational institutions, and government agencies. A list of collaborative projects, programs and partners around the state may be found on pages 31-32 of this report.

Continue coordination and implementation of development of regional STEM partnerships.

Centers within the MMSCN worked locally and regionally to build STEM relationships and advisory boards designed to connect business and industry with K-12 students and teachers.

Seek additional funding for regional and statewide STEM education projects that support core operations and special projects.

One of the many strengths of the Centers of the MMSCN is the ability to leverage funds for STEM education projects. These projects include STEM showcases and other events for the community as well as STEM camps and afterschool programs for students. Overall this past year, Centers leveraged $6,403,908 for both core operations and special projects. See page 34 for additional information about leveraged support.

“In December 2015, the Michigan Department of Education recognized that the MMSCN had effectively accomplished two strategies in the current 5-year Master Plan related to the Michigan STEM Partnership and released them from their obligation to those activities. The MMSCN has continued to pursue the above strategies as requested by MDE.”

MAISA Mathematics Leadership Team (MLT) and General Education Leadership Network (GELN): Several MMSCN directors and associates actively engage with the MAISA Mathematics Leadership Team (MLT). Further, three directors and one associate have taken leadership roles to help foster collaboration among the MMSCN, MAISA MLT and GELN, and the Michigan Mathematics Consultants and Coordinators (M’C’C’). Jodi Redman, the Director of the Manistee, Wexford-Missaukee Regional Math/Science Center, a mathematics and science instructional consultant at the Wexford-Missaukee ISD, and the co-chair of M’C’C’ collaborated with the Executive Committee of the MAISA MLT to plan and facilitate a shared professional learning activity for mathematics leaders across the State at the regular M’C’C’ meetings. Jason Gauthier, an associate of the Allegan Area Mathematics and Science Center and a mathematics consultant at the Allegan Area ESA served as the chair-elect for the MAISA MLT and the chair of the MAISA MLT SAT Task Force for the majority of the 2016-2017 school year. Dana Gosen, the Director of the Oakland Science, Mathematics, and Technology Center and a mathematics consultant at Oakland Schools served as the MAISA MLT chair for the majority of the 16-17 school year. A major accomplishment of this past year’s work was a collaboratively developed geometry statement that was coordinated through the MAISA MLT, MMSCN, and the Michigan Council of Teachers of Mathematics (MCTM).

MACUL: Kevin Clark (Berrien) is currently the MACUL Board Past President, however there are currently no collaborations or projects that the Network and MACUL are working on together.

MCTM: Judith Falk (Great Lakes) serves on the MCTM board as the Region 10 Director. MCTM and MMSCN keep each other informed on STEM happenings at the state and work together on initiatives whenever possible. MCTM highlights and promotes current state math initiatives that the MMSCN supports. In May 2016, in light of the redesigned SAT reducing the emphasis on its geometry content, MCTM, in conjunction with the MMSCN and GELN, released a joint statement encouraging secondary math educators and administrators “to focus on changes centered on reductions in instructional time of this content.” State math and science initiatives, resources and professional learning opportunities are linked on the MCTM website.
Network Collaborations With Professional Organizations

M/F2: Jodi Redman (Manistee, Wexford-Missaukee) serves as the co-chair to M/F2, a local affiliate of the NCSM.

MI Sci PL/N: MI Sci PL/N was conceived and convened by current and former MMSCN Directors; Dave Krebs, former director (Muskegon), Alycia Merriweather, former director (Detroit), and James Emmerling (Genesee). It is now led by Jamal Cammack and Mary Lindov (Battle Creek). The MMSCN Professional Learning Committee’s Science Directors continue to oversee the organization. Planning for meetings is done collaboratively with members of several professional organizations such as Create for STEM at MSU, MSTA, MISELA, MDE, etc. MI Sci PL/N holds four face-to-face meetings throughout the year. Its purpose is to enhance communication, encourage cooperation, and inspire collaboration among the members of professional organizations committed to improving science education. Collaboration time is scheduled following the meetings. Essentially these meetings allow members of the various organizations to be aware of what is happening around the state and to make connections as needed.

MSS: The MSS team was conceived and convened by the MMSCN (Mary Starr, MMSCN Executive Director, and James Emmerling, Genesee) to fill a perceived void in professional learning between the proposed Michigan Science Standards and available professional learning programs. This professional learning team includes MMSCN Directors and Associates and ISD representatives, with suggestions and feedback from MSU’s Create for STEM, MDE, other teacher prep institutions, MSTA, and MVU. MI Science PL/N includes “levels” of professional learning for teachers and administrators to enhance their understanding of the vision of Framework aligned Michigan Science Standards Instruction.

MSTA: Mike Klein (Macomb) is the current treasurer and a past president of the Michigan Science Teachers Association (MSTA). He attends all meetings of both organizations (MSTA and MMSCN). The two organizations are joined by similar missions of leadership and support for science education in Michigan. Historically there has not been a significant collaboration between the two groups; however, the MSTA conference in 2016 was the beginning of a more formal relationship. MMSCN presented several sessions as part of a Network strand and was also involved in the preconference workshops. Information sharing occurs via reporting at both meetings and occasional outside meetings between the executive directors of both organizations.

CREATE for STEM: CREATE for STEM is a Michigan State University sponsored research institute. Directed by Joseph Krajcik, a leading researcher and author of A K-12 Framework for Science Education and the Next Generation Science Standards which served as the foundation for the Michigan Science Standards. CREATE for STEM has a broad mandate to research in Education, Assessment, and Professional Development in the fields of Science, Technology, Engineering and Mathematics and has partnered with the Math/Science Centers on many different projects; MI Sci PL/N, researching and piloting aligned curricular materials, and science standards adoption efforts.

NC/SM: The Michigan Council of Teachers of Mathematics (MCTM) and the Michigan Mathematics Consultants and Coordinators (M/C2) are both affiliate organizations of the National Council of Supervisors of Mathematics (NCSM). Several MMSCN Directors and Associates are active members of these organizations, as well as the NCSM. Several representatives serve in leadership positions with the national organization. For example, a past president of NC/SM is Valerie Mills, former Director of OSMTech. Denise Brady (CASM) and Jason Gauthier (Allegan/Van Buren) currently serve on the NC/SM Board of Directors. Dana Gosen (Director of OSMTech) is an NC/SM Central Region 1 Team Member representing Michigan. Together, this team works with other Center representatives to communicate information, provide professional learning, and share resources made available through the NC/SM with Michigan educators.

Open Door CoLaboratory: These are Virtual meetings to create more open communication between MDE, MMSCN, and the MI Sci PLN (statewide science professional developers) community by regularly collaborating on ideas before making them public. These conversations will be useful to address common concerns/questions and for vetting our thinking before sharing our ideas with a wider audience. Online discussions are preceded by conversations in a closed MI Sci PLN Google+ Community.

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, and methods for teaching, writing and literacy.

Support for Students Attending Priority Schools

• M/S Centers identify 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.
• Centers provided training in the use of Data Director, MI School Data, and Illuminate Data and Assessment. Special emphasis was placed on identifying students who have an achievement gap and developing strategies for closing that gap.

Accelerated High School Programs

• Four Centers, in collaboration with local districts, provide advanced mathematics and science courses through half-day accelerated high school programs. Recruitment of minorities is a high priority. See page 23 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 80%. Due to an additional year of significantly reduced funding from the Michigan Legislature, student programming hours have been drastically reduced. In the past year, there were 96% fewer programming hours than thirteen years ago. In addition, some of the 2014-2015 four accelerated high school programs are in jeopardy, with one additional closing in the 2014-2015 school year.

Student outreach services 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 camp 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 like STARLABs
Impacts and Opportunities: Programming for Students

Students Explore STEM Careers and Opportunities

Approximately 100 children ages 5 – 13 participated in age-appropriate classes sponsored by the Central Michigan SMTC which engaged them in learning about STEM in a friendly and success-oriented environment at the Summer Science and Math Camp during the Summer of 2016. The camp ran for 20 hours over two weeks and classes are taught by certified teachers. The programming goals were to include a wide variety of topics, spanning science, mathematics, and computer science disciplines; with at least two appropriate choices at each grade level; and each developed and implemented in a way that encourages critical thinking, inquiry, and hands-on experiences.

Students in the Eastern Upper Peninsula M/S Center (EUPMSC) were given multiple opportunities to explore various STEM fields through projects that were made possible through the EUPMSC. These experiences were provided through projects included in the following list:

- EUP Regional Science and Engineering Fair
- PI Day at LSUS
- Math and Computer Science Field Day
- Trig Star Competition / Soo Locks Engineering Tour
- STEM/DOD Afterschool Programs
- DOD/Inland Seas Next Gen Science Sailing Events

Students Participate in Academic Competitions

Fifty-three students from Grand Travers Regional M/S/T Center (TBAISD)'s Manufacturing Technology Academy and Traverse City Central High School's Sci-Ma-Tech Program submitted and exhibited research projects and received recognition at the 13th Annual Mathematics, Engineering & Science Symposium. Five students submitted and exhibited 3-D printer projects.

The Hillsdale-Lenawee-Monroe M/S Center (HLMMSC) hosted the 18th annual Tri County Science Fair which included projects from 209 students in grades 5 – 12. The Fair was held at Adrian College. Students were encouraged to develop an investigation or design a solution to something that interested them. Students then communicated their findings through journals, boards, and interviews with judges. Numerous local sponsors supported students through recognition of projects that reflected learning in similar interests. The HLMMSC also hosted its annual Science Olympiad which engaged 380 students in grades 3 – 5 in science and engineering tasks. Students participated in numerous events that they had practiced for. These included designing solutions for specific problems, communicating effectively, and processing scientific information.

Accelerated High School Programs

Four Centers currently provide accelerated high school programs: Battle Creek Area, Berrien County, Kalamazoo Area, and Macomb ISD Math/Science Centers. The four Centers serve 61 school districts from seven counties in Michigan. 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.

Students from all four Centers are required to complete research projects, many of which span the whole year and include formal presentations and papers. 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.

From the Centers that reported in the 2016-2017 school year, 815 students were enrolled in accelerated high school programs, with approximately 13% identifying as minority students. Nearly 100% graduating seniors planned on entering college programs. The graduating seniors of Battle Creek were offered more than $4.09 million in scholarships. Approximately 160 students were enrolled in at least one Advanced Placement course during the school year. Below are some examples of outcomes in Accelerated High School Programs:

- Andrews University in Berrien Springs is the host site for the Berrien County M/S Center and university instructors teach all classes. The Center curriculum includes required AP courses in physics, statistics, and calculus and includes the opportunity for undergraduate credit for core courses as well as electives.
- All students in Battle Creek Area M/S Center accelerated secondary program complete a research project of their own design during their time at the Center. These projects are completed while students are enrolled in Independent Research, Research Methods, Advanced Placement Statistics, Analytical Chemistry, or Environmental Biology coursework. In May 2017, the Center held its annual Research Symposium with 76 students presenting their research findings.
- Many Centers provide innovative outreach programming using local resources to provide opportunities and to 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.
- For example, the Lapeer County M/S Center participated in the Girls STEM Conference. This conference exposed junior high girls from across Lapeer County to college and career opportunities and options made available by pursuing challenging math, science and technology endeavors. Fifty-seven girls around the county interacted with female role models working in a variety of interesting fields where these STEM areas are prerequisites. The conference also included hands on activities in dissection and learning binary code.

Other Innovative Student Services

Many Centers provide innovative outreach programming using local resources to provide opportunities and to 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.

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 Math/Science Centers and not usually available in their home schools and districts, open new worlds to these students.
Focus on Priority Schools

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

As Priority Schools are identified by the Michigan Department of Education, individual Centers make programs and services available to help improve teaching and learning of science and mathematics at these schools. The Centers regularly invite all Priority Schools, along with other schools in their service areas, to participate in staff professional learning, student programming, curriculum support activities, and instructional resource distribution. Centers customize services for specific Priority Schools as financial resources become available.

Examples of Programs and Services for Priority Schools

In the five-county service area of Capital Area M/S Center (CASM), the high priority schools are predominantly in the Lansing area. Because of the large service area (46 school districts) CASM’s 2016-17 programming was not specifically targeted to one particular district. Teachers from all areas, including the Lansing area, participated in CASM programming. NGSX Science Professional Learning was offered with maximum attendance in several cohorts in Ingham County by presenters that were trained through funding provided by CASM/MMSCN. CASM also sponsored after school and summer programs for students who were in need of more intensive study of math and science concepts. Additional programs were focused on increasing interest and aptitude in STEM related fields, such as student robotics programs and summer science camps.

The Detroit M/S Center provides multiple student services focused on Priority Schools. Primarily, through our Resource Clearinghouse, kits and materials are provided which are aligned to the instructional sequence. Parent guides have been developed to assist parents at Priority Schools with instruction at home. Probably the most significant way that the Detroit Center impacts Priority Schools is through sponsoring and facilitating district-wide events and student competitions such as You Be the Chemist, Science Olympiad and the Science and Engineering Fair of Metro Detroit.

Teachers in 68 out of 177 (38%) Priority Schools received learning programming in the 2016-2017 school year, in addition to teachers in non-Priority Schools. Priority Schools are invited to Center activities but because of pre-existing Priority School plan obligations, many are not able to attend.

Priority Schools served

| Number of Priority Schools served | 68 |
| Number of teachers from Priority Schools served | 343 |
| Number of different activities/programs provided to teachers in Priority Schools | 243 |
| Number of activity hours provided to teachers in Priority Schools | 3018 |
| Number of total contact hours received by teachers across all Priority Schools | 6049 |

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The Muskegon Regional Math Science Center offered four NGSX cohorts during the 2016/17 school year as a way to support teachers in enacting the vision of the Framework for K-12 Science Education and the Michigan Science Standards. This web-based, five-day professional development supported many teachers in successfully enacting changes in classroom practice.

Northwoods MST Center is also addressing the need to improve early numeracy skills by providing a ten day Math Recovery workshop aimed at K-3 and special education resource room teachers. The program is designed to mesh with the MTSS model. The UP-SMILE Math Recovery extension also provided funds to train a math consultant in Tier 3 math interventions to support students who struggle.

The Jackson County M/S Center had five priority schools and three focus schools in 2016-2017. Several other schools in Jackson County are still considered low performing in mathematics and science, General and Special Education Teachers, Math Coaches, Intervention Specialists, and Title I Supports from these schools, with a special focus on priority and focus schools, have participated in either Math Academy or CEIM 3 at JCISD this year. In addition, the math consultant met with science and math departments presenting the math practice standards and the science and engineering practices along with STEM connections and EiE trainings. Math Study Teams were formed at two low performing districts to dive into the needs of the district. The Math Study Teams are committed to a long-term focus on the importance of improving mathematics instruction that will, in turn, lead to better student achievement.

Mathematics and Science Centers Network Goal:
“Provide professional learning for STEM educators that assist them in providing curriculum and instruction aligned to the current standards.”

State Board of Education Strategic Goal:
“Develop, support, and sustain a high-quality, prepared, and collaborative education workforce.”

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

Statewide Professional Learning

- 1,290 professional learning sessions were offered by M/S Centers in 2016-2017.
- 17,620 hours of professional learning programming were offered by M/S Centers in 2016-2017.
- 10,991 teachers and administrators enrolled in one or more professional learning sessions facilitated by M/S Centers. These participating teachers and administrators averaged 22.4 hours of professional learning offered by M/S Centers in 2016-2017. Detailed numbers of hours, enrollments, and content of professional learning sessions can be found on pages 37-39.
Impacts and Opportunities: Professional Learning Services

How are the Centers Impacting Classroom Practice?

Types of Professional Learning Offered through Centers’ Programming

- Content knowledge workshops
- Distance-learning series
- Summer institutes
- Technology training and integration
- Online webinars and classes
- Professional learning series
- New teacher induction program
- Video conferencing
- Professional learning communities
- Statewide professional learning
- Graduate courses
- Mentoring programs
- In-class coaching
- Study groups
- Sponsorship to attend conferences

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

- Over 94% (31) of the Math/Science Centers coordinated efforts to meet the challenges of addressing the current standards, providing professional learning that focused on the Michigan Science Standards. In all, M/S Centers provided 716 science activities amounting to 11,491 hours for 9,826 participants.

- In addition, at least 81% (26) of the Math/Science Centers held professional learning sessions focusing on developing leadership capacity within districts where teacher leaders engaged with instructional units and lessons designed around best practice strategies for implementing the Michigan Standards for Mathematical Practice. There were 428 activities totaling 5,109 hours for 6,991 participants.

The Mason-Lake Oceana Mathematics and Science Center (with the MMSCN) was selected by Code.org to be Michigan’s regional partner. Working with Code.org has led Michigan to a large movement for AP Computer Science Principles. 88 high school teachers will be trained this summer with four follow-up sessions next school year and a 20 hour on-line support program. All 88 teachers have committed to running a year-long AP CSP course next school year. In addition, we are working with 13 middle school teachers to bring CS Discoveries to their schools during the 2017-2018 school year. These 13 teachers will also attend the week-long training in Philadelphia this summer and will also have the four follow-up sessions and the 20-hour on-line modules. The middle school training will create a pipeline for the high school courses.

Because of the strong background in Math Practices presented by the AMA/IOSCO M/S Center over the last three years, teachers have taken their own spin on making the Math Practices accessible to their students. This includes rewriting the Math Practices in more student-friendly language, adding stuffed animal characters for lower elementary students to make connections between Reading Practices and Math Practices, and using the Math Practices along with growth mindset phrases to foster a change towards problem-solving based mathematics.

Documented changes in teaching practice due to participation in Center programming 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.

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Professional Learning Supporting Michigan’s Standards for Mathematical Practice

Centers around Michigan helped teachers navigate the Michigan’s Standards for Mathematical Practice by holding professional learning sessions related to Mathematical Practices for K-12 teachers, curriculum specialists, and administrators. The primary outcomes were to:

• Investigate the standards at specific grade levels for deeper understanding.
• Interact with the Mathematical Practices document and support materials in order to become familiar with the standards.
• Explore the processes and proficiencies of the Mathematics, ELA-Literacy, 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.

Support of Michigan’s Standards for Mathematical Practice and Science Standards

Allegan/Vanburen M/S Center implemented Cohort 2 of the Elementary Science Leaders initiative, which when combined with Cohort 1 from the previous year, has developed nearly 30 elementary science teacher leaders representing every district in Allegan County. We utilized MI Sci PL@N resources to deepen their understanding of the 3-dimensional intent of the Framework as well as preparation for the transition to the Michigan Science Standards and Cereal City Science Curriculum.

The AMA/Iosco M/S Center focused on building a strong multi-tiered system of support in mathematics, rooted in data-based decision-making. This included continuing to support the strong tier 1 mathematics curriculum at the elementary level, implementing a tier 1 curriculum at the secondary level, building a tier 2 system at the elementary level, and hosting a book study in tiers 2 and 3 at the elementary and middle school levels. All of this is rooted in regular tiered data meetings that were strategically placed after testing cycles.

Two of the districts from the COOR ISD M/S Center ran Summer Learning Labs where the teachers participated in professional learning in the morning and then worked with students on science and engineering in the afternoon. These one and two-week labs were attended by almost all of the K-8 science educators and gave the teachers a solid foundation in the new science standards and allowed them to immediately practice what they were learning with their students the same day.

Assisting the MDE with Math and Science Initiatives

• Local schools are more aware of state mathematics and science initiatives, changes in state assessments, and policy changes because Centers disseminate information to teachers and administrators.

• TESLA was one of the statewide projects impacting hundreds of Michigan teachers and thousands of school students. The projects ensure teachers in Michigan are “speaking a common language” and have access to research-based, current professional learning.

Curriculum Support for Priority Schools

Nearly all the Centers in the Network have been key partners in Michigan’s Math/Science Partnership Grants in 2016-2017. These grants focus on preparing teachers from Priority School districts (underachieving, disadvantaged, or extremely rural) to teach curricula aligned with Michigan Standards. See page 24 for more information about Priority Schools.
Leadership

Statewide Initiatives | Network Leadership | MSciPL@N
--- | --- | ---
The Michigan M/S Centers Network has taken a lead role in multi-year statewide initiatives to improve mathematics and science. See pages 8-10 for details about these programs. | Each quarterly Network meeting included 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 learning. In addition, Center Directors received MDE, Michigan Standards for Mathematical Practice, Michigan Science Standards, and M-STEP updates that they pass on to local school district administrators and teachers. | MSciPL@N was conceived and convened by current and former MMSCN Directors. The professional Learning Committee’s Science Directors continue to oversee the organization. Four face-to-face meetings are held throughout the year. Its purpose is to enhance communication, encourage cooperation, and inspire collaboration among the members of professional organizations committed to improving science education. Essentially, these meetings allow members of the various organizations to be aware of what is happening around the state and to make connections as needed.

Universities and Colleges involved have included:
- Adrian College
- Alpena Community College
- ASM Tech Early College
- Baker College
- Baker College of Cadillac
- Bay College
- Bay de Noc Community College
- Central Michigan University
- Cranbrook
- Eastern Michigan University
- Ferris State University
- Grand Valley State University
- Hope College
- Kalamazoo College
- Kalamazoo Valley Community College
- Kettering University
- Lake Superior State University
- Lansing Community College
- Lawrence Technological University
- Macomb Community College
- Madonna University
- 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
- Siena Heights University
- St. Clair County Community College
- University of Michigan
- University of Michigan – Dearborn
- University of Michigan – Flint
- Wayne State University
- West Shore Community College
- Western Michigan University

Out of state Universities and Colleges involved have included:
- Arizona State University
- Case Western Reserve University (Ohio)
- Columbia University (New York)
- Cooper Union for the Advancement of Science and Art (New York)
- Montana State University
- University of California @ Berkeley
- University of Maryland, Eastern Shore
- University of Notre Dame (IN)
- University of Nottingham (U.K.)
- University of South Florida
- Vanderbilt University
- Washington University (St. Louis)
- Washington College (MD)

Community and Parent Engagement

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

Business/Industry/Agencies have collaborated with Centers to provide:
- Teacher in Industry internship experiences
- Student internships in technical fields such as food science, 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

Examples of Partnerships with Other Institutions and Organizations
- Centers collaborated with at least 37 Michigan and 13 out of state universities and colleges to plan teacher and student programming, write grants, and share resources.
- At least 9 museums and planetariums have shared programming with Centers.

Centers have provided programming and consultation to environmental/Outdoor education centers across the state. Locally, Genesee Area M/S Center (GAMSC) partnerships include a variety of businesses, institutes of higher education, and several community organizations. The Flint River GREEN program highlights these local partnerships through the Flint River Watershed Coalition. This program has encouraged the participation of 16 schools and hundreds of students to take part in water quality monitoring. It provided students with real-world experience using science practices to study their local watershed. The program concludes with an annual student summit, which allows students to present the watershed data they collected and to attend several break-out sessions led by a variety of environmental professionals. Several scientists and engineers from local businesses and organizations took part as program advisors and mentors to the participating classes. Participating businesses and organizations included: General Motors, the City of Flint, the Genesee County Drain Commission, the University of Michigan-Flint, the Michigan State University Extension Office, Genesee County 4-H, and Quaker Chemical.

Examples of Engaging Parents and Other Community Members:
Many Centers organize Family Math, Science, and Engineering 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 experiencing at school.

Huron M/S/T Center staff collaborated with Huron ISD to provide take-home Family Exploration Packs of activities for every kindergarten, first-, and second-grade student in the county (over 900 students total). These packs provide families with fun, engaging activities to do together related to the content students learned this year in mathematics, science, reading, social studies, technology, the arts, and physical education. The Kindergarten pack was added new this year. Approximately 100 students and parents experienced activities from the Family Engineering Kits developed at Michigan Technological University. Over 1,200 people participated in family-oriented programming related to environmental stewardship and awareness through the Huron County Nature Center Summer Programs.

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Examples of Engaging Parents and Other Community Members:
Many Centers organize Family Math, Science, and Engineering 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 experiencing at school.

Huron M/S/T Center staff collaborated with Huron ISD to provide take-home Family Exploration Packs of activities for every kindergarten, first-, and second-grade student in the county (over 900 students total). These packs provide families with fun, engaging activities to do together related to the content students learned this year in mathematics, science, reading, social studies, technology, the arts, and physical education. The Kindergarten pack was added new this year. Approximately 100 students and parents experienced activities from the Family Engineering Kits developed at Michigan Technological University. Over 1,200 people participated in family-oriented programming related to environmental stewardship and awareness through the Huron County Nature Center summer programs.
Community and Parent Engagement

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

Examples of Partnerships with Community Colleges and Universities:

- Macomb M/S/T Center partnered again with Macomb Community College STEM faculty in a service learning program aimed at providing biology and chemistry support to struggling students throughout the county. In a closely monitored environment, MCC organic chemistry students provided tutoring to struggling high school chemistry students from around the county.

- Northwoods Mathematics, Science, and Technology Center (NMSTC) has partnered with Bay de Noc Community College. The faculty co-facilitated professional learning at the K-12 level providing expertise in everything from science to mathematics to GIS mapping. College administrators benefit by staying abreast of changes in K-12 education and anticipating how those developments will impact the post-secondary environment. One major shift has been various models of early college and dual enrollment options for high school students. Two NMSTC districts are participating in the federal Early College Opportunity (ECO) grant which offers students the possibility of graduating from high school with up to twelve college credits on the way toward earning a degree in a STEM field.

Example of a Partnership with other Centers:

The collaboration between Livingston/Washtenaw M/S and the Lenawee ISD that began three years ago around the CEIM Intel Math MSP grant was continued. Included in the partnership this year was the Jackson County M/S Center. This program was slightly different from past years in that the Center did not recruit a new cohort of teachers, but rather developed programming for a group of individuals who had already completed a year of CEIM work with the Center. The planning for this program began in 2015-2016, and the summer training and follow-up Math Learning Community (MLC) meetings continued through 2016-2017.

The Mecosta-Osceola M/S/T Center (MSTC) hosted an Intel Math professional learning for 28 instructors during the 2016-17 school year. This was made possible with a Math Science Partnership grant that was awarded to the MSTC and Wexford-Missaukee M/S Center. The teachers were provided 80-hours of professional learning in mathematics content. The course is collaboratively taught by a practicing mathematician and a mathematics educator. Intel math is a mathematics-based course and places emphasis on deepening the teacher participants’ understanding of core K-8 mathematics concepts.

Resource Clearinghouse

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

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

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

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 dissemination points for several organizations including MCTM, MSTA, and MDSTA.
- As part of the MMSCN statewide TESLA (Teachers Engaged in Science Leadership Activities) initiative, teachers received National Science Teachers Association (NSTA) Learning Center subscriptions to do individualized, online professional development. The Saginaw Valley State University Regional Mathematics/Science Center offered an orientation session to teachers from elementary schools in their district to become acquainted with the Learning Center features and provided access through November, 2016 to meet their personal PD needs.

Centers create and sustain resources to support mathematics and science education

Many Mathematics and Science Centers utilize available human and material resources to provide programming, support to local ISDs/RESAs/RESDs, and provide training aligned to district curriculum.

- As part of the MMSCN statewide TESLA (Teachers Engaged in Science Leadership Activities) initiative, teachers received National Science Teachers Association (NSTA) Learning Center subscriptions to do individualized, online professional development. The Saginaw Valley State University Regional Mathematics/Science Center offered an orientation session to teachers from elementary schools in their district to become acquainted with the Learning Center features and provided access through November, 2016 to meet their personal PD needs.

Local school districts were able to take advantage of St. Clair RESA M/S Center’s kits for Engineering is Elementary and for Family Engineering to host events that were attended by over 100 students and their families.

Maintaining, Improving, and Utilizing STARLAB

Because some of the major themes or ‘Disciplinary Core Ideas’ of the new science standards involve earth and space science, a financial investment was made to maintain and improve the Northwoods Mathematics, Science, and Technology Center’s (NMSTC) StarLab mobile planetarium. As a result, the StarLab has been increasingly utilized to provide engaging STEM experiences in area classrooms as well as at community events involving both students and people of all ages. In addition, the NMSTC has a long-standing partnership with the Delta Astronomical Society whose members have generously provided expertise and financial support of the mobile planetarium. It has also been utilized by the Great Start Readiness Program, which is housed at the Delta-Schoolcraft ISD, for their family and young child outreach programs.

Center’s have also utilized the Northwoods Mathematics, Science, and Technology Center’s (NMSTC) StarLab mobile planetarium. As a result, the StarLab has been increasingly utilized to provide engaging STEM experiences in area classrooms as well as at community events involving both students and people of all ages. In addition, the NMSTC has a long-standing partnership with the Delta Astronomical Society whose members have generously provided expertise and financial support of the mobile planetarium. It has also been utilized by the Great Start Readiness Program, which is housed at the Delta-Schoolcraft ISD, for their family and young child outreach programs.
Severe Funding Cuts: For the fourteenth 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 80% 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 learning 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.

In the past year, Michigan Mathematics and Science Centers leveraged an additional $6,403,908 from grants and community contributions.

Intermediate School Districts and Universities contributed approximately $2,889,107 toward salaries and $433,691 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
Salary support from their fiscal agent, Jackson County ISD, continues to be a substantial benefit for the Jackson County Math & Science Center. With this support they are able to employ a full time math consultant, science consultant and an administrative support person. With the Regional Mathematics and Science Center partnership, JCMSIC contributes 0.2 FTE to LAWMASC for their shared Director and were fortunate to take part in the MSP-funded CEIM 3 Intel Math Continuation program this year and science trainings through the TESLA grant.

The Western Upper Peninsula Center for S/M/E Education brought together businesses, community organizations, local educators and MTU faculty to secure continuation funding through June 30, 2019 from the Great Lakes Fishery Trust and Wege Foundation to implement the Lake Superior Stewardship Initiative (LSSI).

Examples of Leveraged Resources

Examples of Resources Leveraged Through Collaborations with Business, Industry, Universities and Colleges
• Students had the opportunity to visit university campuses during science Olympiads, science fairs and other activities.
• Teacher Quality Grants (Title II, Part A) develop math and science leaders in underachieving schools and building teachers’ math and science content knowledge.
• Partnership with universities and school districts resulted 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, technology, engineering and mathematics content professional learning courses offered to districts.

Examples of Leveraged Support

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.

Centers submit their annual report in order to meet the SBE priority areas. The table below illustrates the correlation of the Michigan Mathematics and Science Centers Network goals with state and national goals.

<table>
<thead>
<tr>
<th>Michigan Department of Education Strategic Goals</th>
<th>U.S. Department of Education Priority Performance Goals</th>
<th>Michigan Mathematics and Science Centers Network Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop, support, and sustain a high-quality, prepared, and collaborative education workforce.</td>
<td>Increase college degree attainment in America.</td>
<td>Create a robust, extensive and inclusive STEM culture</td>
</tr>
<tr>
<td>Create a strong alignment and partnership with job providers, community colleges, and higher education to assure a prepared and quality future workforce, and informed and responsible citizens.</td>
<td>Support implementation of college- and career-ready standards and assessments.</td>
<td>Empower STEM teachers; strengthen educator pipeline</td>
</tr>
<tr>
<td>Provide every child access to an aligned, high-quality P-20 system from early childhood to post-secondary attainment – through a multi-stakeholder collaboration with business and industry, labor, and higher education – to maximize lifetime learning and success.</td>
<td>Increase enrollment in high-quality state preschool programs.</td>
<td>Integrate business and education</td>
</tr>
<tr>
<td>Reduce the impact of high-risk factors, including poverty, and provide equitable resources to meet the needs of all students.</td>
<td>Ensure equitable education opportunities.</td>
<td>Ensure high quality STEM experiences</td>
</tr>
</tbody>
</table>

Appendix

Meeting State and National Goals

Michigan Department of Education Strategic Goals
• Develop, support, and sustain a high-quality, prepared, and collaborative education workforce.
• Create a strong alignment and partnership with job providers, community colleges, and higher education to assure a prepared and quality future workforce, and informed and responsible citizens.
• Provide every child access to an aligned, high-quality P-20 system from early childhood to post-secondary attainment – through a multi-stakeholder collaboration with business and industry, labor, and higher education – to maximize lifetime learning and success.
• Reduce the impact of high-risk factors, including poverty, and provide equitable resources to meet the needs of all students.
Preliminary Finding of an Analysis of Pre/Post Teacher and Student Participation Assessment Data 2016-2017

All Centers were asked to submit results of pre- and post-assessments in selected activities for teachers and students. Center Directors, in collaboration with Michigan Department of Education representatives, created a system for reporting results designed to be consistent across all Centers. Centers were asked to select one teacher activity (professional learning session, workshop, or event) and one student activity (workshop, class or event) at which they administered a pre- and post-assessment pertinent to the activity. A summary of the data is presented below.

For more information about this report, contact Dr. Cody T. Williams at SAMPI-Western Michigan University (cody.t.williams@wmich.edu).

The following represents a preliminary analysis of data from Center pre/post assessment activities.

### Teacher Activities
- More than 538 teachers participated in the reported activities.
- Three Math/Science Partnership programs were reported; all related to mathematics.
- The programs included were Math Recovery®, UP-SMILE Math Recovery®, and Intel® Math.
- Topics of other activities that were identified included: number talks, the Michigan Science Standards, modeling in chemistry, engineering, and technology integration.

### Student Activities
- More than 1,413 students participated in the reported activities.
- Topics for K-8 activities included math, engineering and health.
- Topics for K-5 activities included, math content and attitudes, and astronomy.
- Topics for middle school activities included engineering, computer science, food science, algebra, and coding.

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Michigan Mathematics and Science Centers Network Data Tables 2016-2017

### Professional Learning

Professional learning 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) a series of sessions with a single focus, conducted periodically over a several week/month period.

Teachers averaged 25.5 hours of participation in Center programming during the 2016-2017 academic year.

### Table 1: Professional Learning Participants

<table>
<thead>
<tr>
<th>Participants</th>
<th>Different No. of Indiv.</th>
<th>Total Hours</th>
<th>Males</th>
<th>Females</th>
<th>Admin.</th>
<th>Math Tchrs.</th>
<th>Science Tchrs.</th>
<th>Tech Tchrs.</th>
<th>Combined Subject</th>
<th>Other or Unknown***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-K</td>
<td>236</td>
<td>2,731</td>
<td>5</td>
<td>231</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>43</td>
<td>190</td>
</tr>
<tr>
<td>Elementary</td>
<td>5,588</td>
<td>108,237</td>
<td>542</td>
<td>4,967</td>
<td>126</td>
<td>103</td>
<td>139</td>
<td>12</td>
<td>4,856</td>
<td>352</td>
</tr>
<tr>
<td>Middle/Jr. High</td>
<td>1,332</td>
<td>35,841</td>
<td>353</td>
<td>949</td>
<td>31</td>
<td>302</td>
<td>676</td>
<td>7</td>
<td>96</td>
<td>220</td>
</tr>
<tr>
<td>High School</td>
<td>1,588</td>
<td>49,166</td>
<td>639</td>
<td>885</td>
<td>42</td>
<td>357</td>
<td>824</td>
<td>12</td>
<td>67</td>
<td>286</td>
</tr>
<tr>
<td>Mixed Levels</td>
<td>928</td>
<td>25,504</td>
<td>246</td>
<td>660</td>
<td>163</td>
<td>99</td>
<td>176</td>
<td>19</td>
<td>157</td>
<td>314</td>
</tr>
<tr>
<td>Other*</td>
<td>1071</td>
<td>20,399</td>
<td>225</td>
<td>700</td>
<td>41</td>
<td>37</td>
<td>45</td>
<td>1</td>
<td>19</td>
<td>928</td>
</tr>
<tr>
<td>Total</td>
<td>10,743</td>
<td>241,877</td>
<td>2010</td>
<td>8,392</td>
<td>405</td>
<td>896</td>
<td>1,860</td>
<td>52</td>
<td>5,238</td>
<td>2,290</td>
</tr>
</tbody>
</table>

*Other includes persons who are not teachers or administrators, or did not indicate position.
**v3.2% of individuals did not indicate gender.

*Includes duplicate counts (individual participants enrolled in more than one program).

### Table 2: Professional Learning Activities by Subject

<table>
<thead>
<tr>
<th>Math</th>
<th>Science</th>
<th>Technology</th>
<th>Engineering</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>414</td>
<td>707</td>
<td>21</td>
<td>48</td>
<td>470</td>
</tr>
<tr>
<td>Hours</td>
<td>4,909</td>
<td>11,359</td>
<td>21</td>
<td>3467</td>
<td>77</td>
</tr>
<tr>
<td>Participants*</td>
<td>6,687</td>
<td>9,701</td>
<td>354</td>
<td>593</td>
<td>1,118</td>
</tr>
</tbody>
</table>

*Includes duplicate counts (individual participants enrolled in more than one program).

### Table 3: Professional Learning Activities by Grade Level

<table>
<thead>
<tr>
<th>Pre-K</th>
<th>Elementary</th>
<th>Elementary &amp; Middle/ Jr. High</th>
<th>Middle/ High</th>
<th>Middle/ Jr. High &amp; High School</th>
<th>High School</th>
<th>Other**</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>4</td>
<td>452</td>
<td>124</td>
<td>95</td>
<td>107</td>
<td>116</td>
<td>369</td>
</tr>
<tr>
<td>Hours</td>
<td>29</td>
<td>3,675</td>
<td>1,761</td>
<td>1,013</td>
<td>1,784</td>
<td>4,125</td>
<td>4,901</td>
</tr>
<tr>
<td>Participants*</td>
<td>153</td>
<td>6,297</td>
<td>2,016</td>
<td>930</td>
<td>1,282</td>
<td>583</td>
<td>7,192</td>
</tr>
</tbody>
</table>

*Includes duplicate counts (individual participants enrolled in more than one program).
**Other includes K-12 Mixed Levels and non-responses.

For further summative information of professional learning, contact SAMPI (sampi@wmich.edu). For more descriptive information regarding individual Center programming, see individual Center Reports. These can be obtained by contacting individual Center Directors (“Directory of Michigan Mathematics and Science Centers” on page 45). The Network website also gives additional information: www.mimathandscience.org.
### Table 4: Eighteen Year Summary Data Professional Learning Activities 1999-2017

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

*Only Engineering PL was recorded by Centers from the 2013-2014 school year to present.

For more detailed information regarding subject-focused professional learning activities, contact SAMPI (sampi@wmich.edu)

<table>
<thead>
<tr>
<th>School Year</th>
<th>Total PL Programs Offered</th>
<th>Total PL Program Hours</th>
<th>Total PL Enrollments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2000</td>
<td>2,549</td>
<td>14,059</td>
<td>43,655</td>
</tr>
<tr>
<td>2000-2001</td>
<td>2,765</td>
<td>13,067</td>
<td>47,210</td>
</tr>
<tr>
<td>2001-2002</td>
<td>3,436</td>
<td>14,757</td>
<td>21,904</td>
</tr>
<tr>
<td>2002-2003</td>
<td>3,239</td>
<td>14,563</td>
<td>51,527</td>
</tr>
<tr>
<td>2003-2004</td>
<td>1,705</td>
<td>10,507</td>
<td>28,540</td>
</tr>
<tr>
<td>2004-2005</td>
<td>1,928</td>
<td>11,057</td>
<td>34,237</td>
</tr>
<tr>
<td>2005-2006</td>
<td>1,725</td>
<td>11,109</td>
<td>26,484</td>
</tr>
<tr>
<td>2006-2007</td>
<td>2,036</td>
<td>11,933</td>
<td>30,271</td>
</tr>
<tr>
<td>2007-2008</td>
<td>1,849</td>
<td>10,254</td>
<td>28,998</td>
</tr>
<tr>
<td>2008-2009</td>
<td>2,304</td>
<td>12,049</td>
<td>35,419</td>
</tr>
<tr>
<td>2009-2010</td>
<td>2,265</td>
<td>12,592</td>
<td>30,838</td>
</tr>
<tr>
<td>2010-2011</td>
<td>1,748</td>
<td>10,825</td>
<td>25,085</td>
</tr>
<tr>
<td>2011-2012</td>
<td>1,866</td>
<td>9,845</td>
<td>28,413</td>
</tr>
<tr>
<td>2012-2013</td>
<td>1,899</td>
<td>10,871</td>
<td>29,860</td>
</tr>
<tr>
<td>2013-2014</td>
<td>2,235</td>
<td>12,301</td>
<td>31,274</td>
</tr>
<tr>
<td>2014-2015</td>
<td>1,454</td>
<td>9,802</td>
<td>21,173</td>
</tr>
<tr>
<td>2015-2016</td>
<td>1,047</td>
<td>11,400</td>
<td>16,029</td>
</tr>
<tr>
<td>2016-2017</td>
<td>1,267</td>
<td>17,287</td>
<td>18,453</td>
</tr>
<tr>
<td>Totals</td>
<td>37,319</td>
<td>218,278</td>
<td>549,370</td>
</tr>
</tbody>
</table>
The professional learning program data above and the student services data on the following page 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 2003-2004. 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 learning to ensure teachers are highly qualified and using best practices. Due to leveraged grant monies and a special allocation from the Legislature, professional learning programming hours have only been reduced by 33%, the lowest number of hours 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 92% due to funding cuts. In collaboration with the Michigan Department of Education, the Centers decided to focus their primary efforts on providing professional learning to improve teacher knowledge, skills, and instructional practices, with the intent of improving student learning.

### Table 5: Student Services Activities by Subject

<table>
<thead>
<tr>
<th></th>
<th>Math</th>
<th>Science</th>
<th>Technology</th>
<th>Engineering</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>71</td>
<td>413</td>
<td>24</td>
<td>39</td>
<td>65</td>
<td>612</td>
</tr>
<tr>
<td>Hours</td>
<td>236</td>
<td>2,081</td>
<td>306</td>
<td>502</td>
<td>82</td>
<td>3,987</td>
</tr>
<tr>
<td>Participants*</td>
<td>8,065</td>
<td>29,547</td>
<td>2,933</td>
<td>291</td>
<td>7,986</td>
<td>50,859</td>
</tr>
</tbody>
</table>

### Table 6: Student Service Activities by Grade Level

<table>
<thead>
<tr>
<th></th>
<th>Pre-K</th>
<th>Elementary</th>
<th>Elementary &amp; Middle/ Jr. High</th>
<th>Middle/Jr. High</th>
<th>Middle/Jr. High &amp; High School</th>
<th>High School</th>
<th>Other**</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>0</td>
<td>354</td>
<td>78</td>
<td>54</td>
<td>17</td>
<td>77</td>
<td>32</td>
<td>612</td>
</tr>
<tr>
<td>Hours</td>
<td>0</td>
<td>1,221</td>
<td>548</td>
<td>400</td>
<td>161</td>
<td>1574</td>
<td>83</td>
<td>3,987</td>
</tr>
<tr>
<td>Participants*</td>
<td>0</td>
<td>26,507</td>
<td>8,811</td>
<td>2,457</td>
<td>2,737</td>
<td>2,804</td>
<td>7,543</td>
<td>50,859</td>
</tr>
</tbody>
</table>
### Table 7: Eighteen Year Summary Data - Student Activities 1999-2017

For more descriptive information regarding individual Center programming, see individual Center Reports. These can be obtained by contacting individual Center Directors (see page 45). The Network website also gives additional information: www.mimathandscience.org.

<table>
<thead>
<tr>
<th>School Year</th>
<th>Student Outreach Sessions</th>
<th>Student Outreach Hours</th>
<th>Student Outreach Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2000</td>
<td>6,763</td>
<td>46,403</td>
<td>251,251</td>
</tr>
<tr>
<td>2000-2001</td>
<td>6,514</td>
<td>52,879</td>
<td>263,292</td>
</tr>
<tr>
<td>2001-2002</td>
<td>6,990</td>
<td>159,952</td>
<td>309,716</td>
</tr>
<tr>
<td>2002-2003</td>
<td>5,024</td>
<td>109,816</td>
<td>374,813</td>
</tr>
<tr>
<td>2003-2004</td>
<td>1,252</td>
<td>37,893</td>
<td>239,984</td>
</tr>
<tr>
<td>2004-2005</td>
<td>1,579</td>
<td>19,151</td>
<td>206,906</td>
</tr>
<tr>
<td>2005-2006</td>
<td>1,112</td>
<td>15,983</td>
<td>287,047</td>
</tr>
<tr>
<td>2006-2007</td>
<td>1,119</td>
<td>17,940</td>
<td>180,220</td>
</tr>
<tr>
<td>2007-2008</td>
<td>960</td>
<td>13,877</td>
<td>108,875</td>
</tr>
<tr>
<td>2008-2009</td>
<td>1,296</td>
<td>11,282</td>
<td>176,421</td>
</tr>
<tr>
<td>2009-2010</td>
<td>1,205</td>
<td>7,683</td>
<td>103,310</td>
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<tr>
<td>2010-2011</td>
<td>1,085</td>
<td>7,358</td>
<td>62,169</td>
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<td>2011-2012</td>
<td>1,076</td>
<td>9,304</td>
<td>61,720</td>
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<tr>
<td>2012-2013</td>
<td>860</td>
<td>6,579</td>
<td>65,720</td>
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<tr>
<td>2013-2014</td>
<td>768</td>
<td>6,607</td>
<td>77,367</td>
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<tr>
<td>2014-2015</td>
<td>1,075</td>
<td>8,984</td>
<td>78,175</td>
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<tr>
<td>2015-2016</td>
<td>744</td>
<td>699</td>
<td>56,075</td>
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<tr>
<td>2016-2017</td>
<td>614</td>
<td>3,992</td>
<td>50,985</td>
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<tr>
<td>Totals</td>
<td>39,736</td>
<td>542,662</td>
<td>2,934,046</td>
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Location of Michigan Mathematics and Science Centers

There are 33 regional Centers in the Michigan Mathematics and Science Centers Network. These centers provide leadership, curriculum support, professional development, and student services to educators in local school districts. The centers also serve as a resource clearinghouse for educational materials and information, and work to foster community involvement in the areas of mathematics and science. The Mathematics and Science Centers Network supports the delivery of high quality mathematics and science education for the students of Michigan.

### Directory of Michigan Mathematics and Science Centers

<table>
<thead>
<tr>
<th>#</th>
<th>Map #</th>
<th>Center Name</th>
<th>Contact Person</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Allegan/Van Buren M/S Center</td>
<td>Amy Oliver</td>
<td><a href="mailto:aoliver@alleganaesa.org">aoliver@alleganaesa.org</a></td>
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</tr>
<tr>
<td>2</td>
<td>AMA/IOSCO M/S Center</td>
<td>Mary Christensen-Cooper</td>
<td><a href="mailto:christensenm@amaesd.org">christensenm@amaesd.org</a></td>
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</tr>
<tr>
<td>3</td>
<td>Battle Creek Area M/S Center</td>
<td>Cindy Olden</td>
<td><a href="mailto:cindy@bcamscc.org">cindy@bcamscc.org</a></td>
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</tr>
<tr>
<td>4</td>
<td>Berrien County M/S Center</td>
<td>Kevin Clark</td>
<td><a href="mailto:kevin.clark@berriensisd.org">kevin.clark@berriensisd.org</a></td>
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<tr>
<td>5</td>
<td>Capital Area S/M Center</td>
<td>Denise Brady</td>
<td><a href="mailto:brady@aresd.org">brady@aresd.org</a></td>
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<tr>
<td>6</td>
<td>Central Michigan S/M/T Center</td>
<td>Julie Anne Cunningham</td>
<td><a href="mailto:cunning2ia@cnic.edu">cunning2ia@cnic.edu</a></td>
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<tr>
<td>7</td>
<td>COOR ISD M/S Center</td>
<td>Adair Aumock</td>
<td><a href="mailto:aumock@coorsd.net">aumock@coorsd.net</a></td>
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<tr>
<td>8</td>
<td>Detroit M/S Center</td>
<td>Koldana Colston</td>
<td><a href="mailto:kolonda.colson@detroit12.org">kolonda.colson@detroit12.org</a></td>
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<tr>
<td>9</td>
<td>Dickinson-Iron-Menominee M/S/T Center</td>
<td>Tara Hartman</td>
<td><a href="mailto:hartman@disd.org">hartman@disd.org</a></td>
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<tr>
<td>10</td>
<td>Eastern UP M/S Center</td>
<td>Kevin St. Onge</td>
<td><a href="mailto:kevins@eup.org">kevins@eup.org</a></td>
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<tr>
<td>11</td>
<td>Genesee Area M/S Center</td>
<td>James Emmerling</td>
<td><a href="mailto:jemmerling@geneseeisd.org">jemmerling@geneseeisd.org</a></td>
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<tr>
<td>12</td>
<td>Grand Traverse Regional M/S/T Center</td>
<td>Tom Wessels</td>
<td><a href="mailto:twessels@tbaisd.org">twessels@tbaisd.org</a></td>
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<tr>
<td>13</td>
<td>Great Lakes M/S Center</td>
<td>Judith Falk</td>
<td><a href="mailto:falkj@charoenisd.org">falkj@charoenisd.org</a></td>
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<tr>
<td>14</td>
<td>GVSU Regional M/S Center</td>
<td>Kristofer Pachla</td>
<td><a href="mailto:pachlkri@gvsu.edu">pachlkri@gvsu.edu</a></td>
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<tr>
<td>15</td>
<td>Hillsdale-Lenawee-Monroe M/S Center</td>
<td>Andrea Pisani</td>
<td><a href="mailto:apsani@washtenawisd.org">apsani@washtenawisd.org</a></td>
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<tr>
<td>16</td>
<td>Huron M/S/T Center</td>
<td>Scott Whipple</td>
<td><a href="mailto:swipple@hhsd.k12.mi.us">swipple@hhsd.k12.mi.us</a></td>
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<tr>
<td>17</td>
<td>Jackson County M/S Center</td>
<td>Heather Holshoe</td>
<td><a href="mailto:heather.holshoe@jcsd.org">heather.holshoe@jcsd.org</a></td>
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<tr>
<td>18</td>
<td>Kalamazoo Area M/S Center</td>
<td>Michael Tanoff</td>
<td><a href="mailto:mtanoff@kamscc.k12.mi.us">mtanoff@kamscc.k12.mi.us</a></td>
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<tr>
<td>19</td>
<td>Lapeer County M/S Center</td>
<td>Dawn Mosher</td>
<td><a href="mailto:dmosher@lapoisd.org">dmosher@lapoisd.org</a></td>
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<tr>
<td>20</td>
<td>Livingston/Washtenaw M/S Center</td>
<td>Andrea Pisani</td>
<td><a href="mailto:apsani@washtenawisd.org">apsani@washtenawisd.org</a></td>
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<td>21</td>
<td>Macomb ISD M/S Center</td>
<td>Mike Klein</td>
<td><a href="mailto:mklein@misd.net">mklein@misd.net</a></td>
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<td>22</td>
<td>MAISD Regional M/S Center</td>
<td>Kristin Frang</td>
<td><a href="mailto:kfriang@muskegonisd.org">kfriang@muskegonisd.org</a></td>
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<tr>
<td>23</td>
<td>Manistee, Wexford-Missaukee Regional M/S Center</td>
<td>Jodi Redman</td>
<td><a href="mailto:jredman@wmisd.org">jredman@wmisd.org</a></td>
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<td>24</td>
<td>Mason-Lake Oceana M/S Center</td>
<td>Kathy Surd</td>
<td><a href="mailto:ksurd@wsesd.org">ksurd@wsesd.org</a></td>
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<td>25</td>
<td>Mecosta-Osceola M/S/T Center</td>
<td>Larry Wyn</td>
<td><a href="mailto:lwyn@moisd.org">lwyn@moisd.org</a></td>
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<td>26</td>
<td>Northwoods M/S/T Center</td>
<td>Lisa Carley</td>
<td><a href="mailto:lcarley@cdssd.k12.mi.us">lcarley@cdssd.k12.mi.us</a></td>
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<td>27</td>
<td>Oakland S/M/T Center</td>
<td>Dana Gosen</td>
<td><a href="mailto:dana.gosen@oakland.k12.mi.us">dana.gosen@oakland.k12.mi.us</a></td>
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<td>28</td>
<td>St. Clair County RESA M/S/T Center</td>
<td>Jim Licht</td>
<td><a href="mailto:jlicht@acresa.org">jlicht@acresa.org</a></td>
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<td>29</td>
<td>Sanilac County S/M Center</td>
<td>Nick Miu</td>
<td><a href="mailto:nmui@sanilac.k12.mi.us">nmui@sanilac.k12.mi.us</a></td>
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<tr>
<td>30</td>
<td>Sault Ste. Marie M/S Center (NMU)</td>
<td>Chris Stander</td>
<td><a href="mailto:cstan@nmu.edu">cstan@nmu.edu</a></td>
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<td>31</td>
<td>SVSU Regional M/S Center</td>
<td>Tamara Barrientos</td>
<td><a href="mailto:tarzola@svsu.edu">tarzola@svsu.edu</a></td>
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<tr>
<td>32</td>
<td>Wayne RESA’s M/S Center</td>
<td>Tiffany Martell</td>
<td><a href="mailto:martell@resnet.org">martell@resnet.org</a></td>
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<tr>
<td>33</td>
<td>Western UP Center for M/S and Environmental Education</td>
<td>Shawn Opliger</td>
<td><a href="mailto:shawn@cooperisd.org">shawn@cooperisd.org</a></td>
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