STATE OF MICHIGAN
DEPARTMENT OF EDUCATION
LANSING

RICK SNYDER
GOVERNOR

MICHAEL P. FLANAGAN
STATE SUPERINTENDENT

August 26, 2013

MEMORANDUM

TO: State Board of Education

FROM: Michael P. Flanagan, Chairman

SUBJECT: Approval of the 2013 Master Plan for Michigan's Mathematics and Science Centers

Section 99 of the FY2013 School State Aid Act requires the Master Plan for Mathematics and Science Centers from December 11, 2007, be re-evaluated and updated by the Michigan Department of Education (MDE) and approved by the State Board of Education no later than September 30, 2013. The MDE, Office of Education Improvement and Innovation, solicited input and worked with educators, policy makers, and businesses over the past two years to re-evaluate and update a Master Plan based on today's education climate and mathematics and science needs. The 2013 Master Plan was presented to the State Board of Education at its August 13, 2013 meeting.

The Mathematics and Science Centers are an established infrastructure that provides assistance, resources, and services to students, teachers, and the communities they serve. Centers are designed to enhance the knowledge and skills of educators and students to improve the quality of mathematics and science education in Michigan. The 2013 Master Plan provides a strategy that enables Michigan to achieve this goal.

It is recommended that the State Board of Education approve the 2013 Master Plan for Michigan's Mathematics and Science Centers, as attached to the Superintendent's memorandum dated August 26, 2013.

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MASTER PLAN

FOR THE

Michigan Mathematics and Science Centers Network

July 2013

Building tomorrow's citizens by inspiring excellence in mathematics and science education today.

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Executive Summary

The Michigan Mathematics and Science Centers Network (MMSCN or Network) has spent the past five years providing a new level of leadership in Science, Technology, Engineering and Mathematics (STEM) education in the state. From professional learning based on the Michigan Merit Curriculum (MMC) to the creation of the Michigan STEM Partnership, the Network has applied its expertise to improving STEM teaching and learning.

During the next five years, the Network will use its resources to advance STEM education in Michigan by focusing on two areas:

1. Increasing the capacities of teachers to improve student career and college readiness through substantive teacher professional learning in STEM subject areas. The Network will assess impact of that programming on K–12 students, particularly in the areas of their disposition toward STEM learning and careers.

2. Continue facilitating the development of the Michigan STEM Partnership by expanding Network partnerships and collaborations among STEM-related stake-holders. This will include actively involving more key business and industry representatives in steering committee and regional hub–level initiatives.

This work is not without its challenges in light of funding changes to the Centers. While a number of specific initiatives have been funded by the State, including award-winning *Algebra for All* professional learning, substantial cuts to operational funding for staffing the 33 Regional Centers that make up the Network have left many of the Centers without full-time directors to do the critical work.

The Network has continued to be solutions-oriented. Recently the Network used existing funds to hire an executive director to support the Centers as they work to deliver equitable core services and programs to students across the state, particularly those in high priority schools, and to seek additional operational funds.

Most important, data collection continues to provide the Michigan Department of Education (MDE) with knowledge about performance of the Centers individually and collectively as the Network. Every effort is made to measure student achievement tied to Center activities and to meet the state's new guidelines for professional learning.

Michigan Needs the Network

Now More Than Ever: A Critical Time and a Critical Need

REINVENTING MICHIGAN - It's a chorus being sung statewide from a multitude of diverse camps – from Ford Motor Company's Business Leaders for Michigan to the 501(c)(4) Students Reinventing Michigan, to several well-respected bipartisan think tanks, such as the Center for Michigan and Michigan Future. It is also the leading call to action of Michigan's current administration. Reinventing Michigan is the overarching context in which the MMSCN must be examined, preserved and, ideally, strengthened. In spite of the advancements made in the past five years and the positive momentum of Network activities, Michigan remains greatly in need of advancing STEM education and, fortunately, has the Network in place to help meet that need. By focusing on

K-12 STEM education, the Network is addressing these needs long term. Raising student proficiencies at the lower-level grades will build a foundation for middle and high school success, making the Network a critical component of addressing Michigan's needs.

Michigan's Workforce Requires STEM Skills

High-wage jobs, whether in STEM or other sectors, demand STEM skills, and STEM professionals are in high demand in Michigan. In STEM fields, there are 1.1 available jobs per unemployed person. In non-STEM fields, there are 5.8 unemployed people per available job. High-skill jobs requiring at least a four-year degree are forecasted to grow from 31 percent of Michigan's total jobs in 2008 to 37 percent in 2018.[1] Beyond the direct link to a job and a career, STEM education is equally important in developing transferable, critical thinking skills that apply to every trade and profession. In Michigan, we retain pockets of leadership in automotive, advanced manufacturing, alternative energy, medical devices and other areas. However, if we as a state cannot feed these industries the brainpower and the talent they need to grow and to remain competitive, the industries will continue to go elsewhere. Even middle-skill jobs, those requiring an associate's degree, post-secondary award or on-the-job experience, are forecast to remain at almost half (47 percent) of the available jobs[2] and require foundational STEM skills such as mathematics, critical thinking and problem-solving. The percentage of Michigan's population 25 years or older with an associate's degree or higher was 33.6 percent in 2010, which is below the national average of 35.8 percent.

Michigan Needs College-Ready High School Graduates

In a 2009 Michigan Auditor General report on remedial education at the state's community colleges, the cost of remedial education – at the community college level only – was reported to be more than $25 million, with mathematics remediation accounting for more than half of the total need. The problem is not confined to the community college level, and the problem is greater than just the cost of remediation. A 2012 article by the Center for Michigan reported:

> *More than a third of incoming college students in Michigan take high school–level classes on campus – essentially repeating material they should have learned before they got their diplomas. Those remedial classes may cost students, schools and taxpayers more than $100 million a year, and often don't lead to a degree; many of the 23,000 students taking remedial courses each year drop out before they ever take an actual college-credit course, and few graduate.*
>
> *College readiness wouldn't matter if Michigan was producing enough college graduates. But an [Center for Michigan] analysis projected that by 2018, more than*

[1] "Future of the U.S. Workforce, Middle Skills Jobs and the Growing Importance of Postsecondary Education." Achieve, September 2012.

[2] Ibid

37 percent of jobs will require a bachelor's degree or more, compared to 29 percent today.

The percentage of high school graduates enrolling in universities and community colleges is increasing, but many aren't academically prepared to succeed. About 35 percent of Michigan high school grads that enroll directly into one of the state's four-year or community colleges take at least one remedial course, according to state data.

The problem is most severe in Michigan's community colleges, where 62 percent of incoming students start out in remedial classes. Few of them end up with a degree. Only 15 percent earn a two-year associate's degree within three years, a rate that is sixth worst in the nation. (Michigan's six-year bachelor's degree completion rate is 55 percent, slightly below the national average.)

Among students enrolled in community colleges and Michigan's public universities, 27 percent don't make it past their freshman year. State data doesn't specify how many of those dropouts were among the 35 percent who took remedial courses, but they likely make up a large chunk.

We need a cultural shift in how we view and value STEM learning.

Michigan Future, in its Michigan's Transition to a Knowledge-Based Economy: Fourth Annual Progress Report (August 2011), describes the urgency for Michigan:

- *Michigan is 34th among states in the proportion of adults with a four-year degree. In an increasingly knowledge-driven economy, our low college attainment rate is probably the major barrier to re-creating a high-prosperity Michigan.*

- *Employers need workers to expand. Too small a labor force and employers will face an inability to find the workers they need. Add to that the increasing demand for college-educated workers in a state with low college attainment, and it is quite likely that in the future, Michigan employers will face labor shortages. Ultimately, they will expand elsewhere, to where the workers are. Unless we substantially increase the proportion of college-educated adults, Michigan will continue to be a low-prosperity state.*

- *Jobs seek talent. Quite simply… economic development priority one is to prepare, retain, and attract talent.*

Current results do show that Michigan is headed in the right direction. Since the MMC's more rigorous requirements have been in place, ACT College Readiness scores are on the rise.

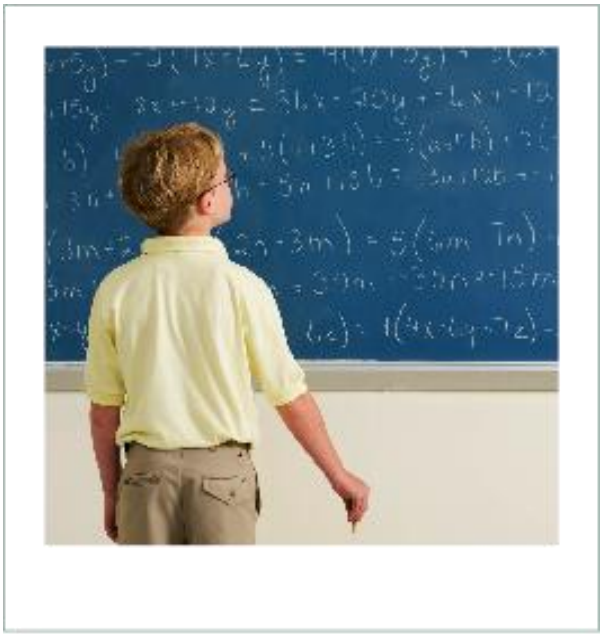
The Network is a Critical Component of Addressing Michigan's Needs

Higher standards, better curricula, better teaching, greater parental support, and broader community understanding all are needed to decrease these gaps. Taken together, they amount to a cultural shift in how we view and value STEM learning. The MMSCN has the knowledge and vision, the programs and spokespeople, to fuel this change. During the next five years, the Network needs to expand its scope of involved stakeholders and widen its influence. It needs to take a larger stage and have a more focused conversation with the students, parents, teachers, businesses, policymakers and people of Michigan.

Introduction and Key Issues

Michigan is in the midst of major education reform, but the State must continue to aggressively push forward in order to meet its education and economic goals. In April 2006, Michigan took a significant first step with the adoption of the MMC, the product of an extraordinary partnership between Michigan's Executive Branch, the Michigan State Board of Education, the State Superintendent, Legislature, and numerous education associations that worked together to better prepare students for greater success and to secure the economic future of our state. The Merit Curriculum students entering the eighth grade in fall 2006 were the first Merit Curriculum class to graduate in 2011. The MMC data again shows promise that we are heading in the right direction. Graduation rates have increased, the MME scores are on the rise, and the dropout rate is declining.

The MMSCN played a leadership role in the progress of education in Michigan before the MMC and during its development and enactment. During the course of the past five years, the MMSCN extended itself and pushed for progress even beyond the MMC through its leadership nationally in mathematics and science standards as well as the Michigan STEM Partnership. For example, in the Manistee, Wexford-Missaukee region, Lake City high school has 100% of their middle and high school math teachers, including their middle school special education teacher, attending network Math/Science Partnership (MSP) initiatives. Their Michigan Merit Exam (MME) scores have increased an average of 4.7% per year over the past four years. In 2008 their achievement data for mathematics was 11% proficient and in 2012/2013 they had 30% of their students proficient on the MME for a total increase of 19%. This is a critical juncture for the Network and the forward movement of education in Michigan.



The Network has provided services to most of Michigan's Persistently Lowest Achieving schools during the past five years.

To frame the Network's 2013 to 2017 Master Plan, it is important to review the contributions it has made since the last Master Plan.

Looking Back: 2008 to 2012

MMSCN Accomplishments

The past five years have brought seminal change to the MMSCN and to mathematics and science education in Michigan. Much has been accomplished toward the 2008 to 2012 Master Plan key issues and focus areas. Below are some examples of this progress.[3]

Key Issue: A greater role for the Network and a change in its status to a 501(c)(3) organization.

A change in status to a 501(c)(3) allowed the Network to move to a funding model that is more sustainable, given the 82 percent reduction to base funding since 2002. Since incorporating as a 501(c)(3), the Network has received outside money, including Michigan Mathematics and Science Partnerships and Title IIA(3) grants as well as grants from other sources for specific programs, and some in-kind contributions. The Network and individual Centers have used creative ways to leverage funds as fully as possible. These leveraged funds have varied from $5.5 million to $10 million per year. Note that despite these gains and the perseverance of Network leadership, adequate funding continues to be a challenge for the Network. While the Network has received funding to execute specific initiatives, static operational funding often does not cover the cost of a full-time Center director. The work takes more time than the allotted hours, resulting in director turnover and putting Centers at risk.

Key Issue: Language that calls for a stronger emphasis on Centers being evaluated on outcomes.

The Network continued to challenge itself and its Centers to focus efforts on measurable student and teacher outcomes. Network statewide projects involving teacher professional learning have included an associated results-based external evaluation. For each statewide project from 2008 to 2012, data were gathered to determine effects of the program on participating teachers and students to provide rigorous measurement of Center and Network outcomes of statewide projects. Detailed results are available yearly in the Center annual reports, but overall, the measures indicate positive learning outcomes for both students and teachers. For instance, the High School Mathematics and Science Success (HSMASS) project, a four-year statewide professional learning project, demonstrated pre- to post-test increases in student scores for students of participating teachers in every test. Similarly, pre- to post-test scores for the participating teachers improved, as did other measures, such as student attitudes.

Other statewide projects with similar pre- to post- outcomes for teachers or students included the Michigan Mathematics and Science Teacher Leader Collaborative (MMSTLC) and Algebra for All. Algebra for All received the Education Excellence Award for staff development from the Michigan Association of School Boards in 2011.

The Network offered 12,218 professional learning programs in Mathematics, Science and Technology for a total of 45,720 hours of teacher professional learning.

[3] Data are available from 2008 through 2011.

The Network has partnered with Michigan Virtual University (MVU) in providing "blended learning" professional learning opportunities for mathematics teachers across the state as part of the Algebra for All initiative. Using a combination of face-to-face and online strategies, teachers have had opportunities to learn algebra-related subject matter and pedagogical content to help improve the teaching and learning of mathematics, especially algebra, in support of Merit Curriculum requirements.

Focus Area: Centers will deliver targeted support to high-priority schools consistent with the six basic services.

The Network has annually served between 52 and 78 percent of Michigan's Priority Schools, as identified by the MDE and of critical interest to the Network.

- This represented between 72 and 242 persistently lowest-achieving schools each year throughout the entire state, from Detroit through the Upper Peninsula.

- 920 teachers from these lowest-achieving schools were provided with professional learning in mathematics and science (as were hundreds of teachers from other schools); 756 different programs for teachers were provided during the same period, representing 7,003 activities hours and 22,588 total contact hours received by teachers from persistently lowest-achieving schools.

Additionally, more than 450,000 Michigan students have benefited from Center programs.

Key Issue: Creating a path for greater participation by other stakeholders, including business, in mathematics and science education in Michigan.

Another set of significant accomplishments for the Network in this time frame, and equally important to the Network's future work, relates to the growing awareness and support for STEM education in Michigan. With the financial support of the W.K. Kellogg Foundation, the Network led STEM summits in 2007 and 2008. STEM efforts were slow to coalesce because they were exclusively organized at the grassroots level, but in 2010, the Network became the official STEM leader for Michigan, taking on the additional role of facilitating the Michigan STEM Partnership. In this role, the Network has identified a variety of STEM-focused organizations, initiatives, agencies, and businesses with which to partner in improving STEM education in Michigan. With additional funds acquired through these partnerships, the Network has created a path for greater participation of STEM stakeholders. For instance:

- The Michigan STEM Partnership (Partnership) is a statewide public-private collaboration elevating STEM education in a way that increases student career or college readiness. The Legislature has provided a $100,000 allocation to the Network for the 2012-2013 school year to help initiate the STEM Partnership. The Michigan Economic Development Corporation has contributed another $150,000 to support the five regional hubs and Michigan's participation in STEMx, a national collaborative of state STEM education coalitions. The hubs cut along regional Center boundaries and have recruited members from STEM

stakeholders to participate locally, with overall coordination at the state level through the Network.

- The emerging Partnership has executed several foundational projects, including the creation of a searchable asset map of the state's STEM education assets and experts. In addition, it has facilitated business reviews of the Next Generation Science Standards, promoted Family Engineering Nights for elementary school students and their parents at regional Centers, and is partnering with Colorado to send a cohort of 15 teachers from around Michigan to do research in Africa in 2013, funded by Merck.

- Through the MSP competitive grants program administered by the MDE, the Network has received funds at the Network and individual Center levels to develop and implement mathematics and science programs to improve the teaching and learning of STEM-related subjects, particularly focused on building teacher knowledge and skills, and to improve student learning. This has required that the Network and Centers establish working partnerships with college mathematics and science faculty. During the past five years, nearly all the Centers have participated in one or more mathematics/science partnerships.

Looking Ahead: 2013 to 2017

MMSCN Master Plan Focus Areas

The Network has worked tirelessly and continues to push hard to reverse negative student achievement trends. Without the Network, it's certain that Michigan would be experiencing even greater challenges.

Much has been accomplished in the past five years, particularly in relation to identifying best practices for teaching STEM subjects and preparing teachers for teaching the rigors of the STEM disciplines to all students.

There is much to be done in the next five years. The return of prosperity to Michigan as a state hinges on educational attainment, which is severely at risk given current conditions. As a result, the MDE has launched significant efforts to improve Michigan's status in Career and College Readiness to ensure that all Michigan students have greater opportunities and access to the careers of their choice.

- Michigan's K–12 education system imparts the knowledge and skills most valued by employers and higher education. Among them are the critical thinking skills that are developed through the study of science and mathematics – for example, using argument and reasoning to do research, construct arguments and critique the reasoning of others, and the ability to solve problems, construct explanations and design solutions.

- All students graduate from high school with the core academic knowledge and skills necessary for success in careers, college and life for the benefit of their futures, the future of Michigan and the future of our nation.

The MMSCN has long been in an important partnership with the MDE in reaching out to Michigan schools. It has a history of providing high-quality professional learning and

programs, marshaling the combined expertise of the Network directors to create and execute substantive programs. There is a longstanding relationship between the individual Centers and the educators they serve, so the Centers know the needs in their regions and the administrators and teachers trust the Centers and Network to provide professional learning that meets those needs. When there is a need to gather information from the schools, the Centers only have to put out the call. A recent example was reviewing Next Generation Science Standards. Because of existing relationships, Michigan had the highest number of teacher, business, and community responders of all the reviewing states.

Over the course of the next five years, the Network will continue to be a strong collaborator with the MDE to:

- Achieve a Career- and College-Ready Michigan, the MDE's first priority,

- Advance STEM knowledge and skills and a culture that supports them. Another benefit of the Network is its status as a statewide infrastructure, which often acts as a direct link with the MDE. The Network is able to serve as a conduit, reaching every school in the state and connecting schools and communities with a larger, more global Michigan. The Network also is connected to Michigan's community colleges and universities, which use the Network and its Centers to interact with Michigan's schools. The Network often is sought out as a partner in national grants by institutions of higher education and online learning. In a review of Michigan as a finalist for the first round of National Math+Science Initiative states, chief program officer, John Winn, cited the Network's infrastructure as a significant plus for the state. The existing Network infrastructure was important in Michigan's ability to quickly establish the Michigan STEM Partnership and the five regional STEM hubs because these regional partnerships were already in place. Other states have had to expend considerable time and resources to develop their structures. Michigan is fortunate to have one in place.

Michigan is poised to regain its position as a national leader in STEM education.

The Next Five Years

The Network has significantly narrowed its focus to these two critical and interrelated paths for the period 2013 through 2017.

FOCUS AREA 1: Career- and College-Ready Students

The Network has provided the infrastructure for helping teachers understand changing state standards, including high school graduation requirements and Common Core State Standards (CCSS) in mathematics. The Network hosted reviews of proposed statewide standards in science, securing business and industry input through the Michigan STEM Partnership. Going forward, the Network will continue to address the stated need for preparing teachers to help all students meet the Michigan Career- and College-Ready standards. The Network is the organization that the MDE will rely on to implement teacher professional learning in mathematics and science standards. Note that one of the three key recommendations included in the Change the Equation Vital Signs report for Michigan emphasizes the importance of teacher preparation and support, specifically recommending that:

> *Current teachers must receive excellent professional development, especially as new mathematics and science standards take effect. Rather than reporting on the amount of professional development teachers receive, states should measure and report on its quality. (Source: Vital Signs Michigan, released September 2012)*

Simultaneously, the Network commits, through its work, to advance the CCSS in mathematics. Michigan has voluntarily adopted these standards, which outline a base of knowledge and skills sufficient to succeed in an entry-level job, enter a workforce training program or move on to college-level academic work without remediation.

Key strategies for increasing the capacities of teachers to improve student career and college readiness for the period 2013 to 2017 include:

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

- Provide teacher professional learning to increase knowledge and understanding of curriculum content expectations in science, technology, engineering, and mathematics.

- 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.

- 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.

- 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.

The Network fully comprehends and appreciates that the ultimate goal of its work is improved student outcomes, which are measured in a variety of ways that can be subject to change. The Network dedicates its efforts, as does every one of the Centers that comprise the Network, to improving student learning and performance in mathematics and science, as well as to the critical thinking and problem-solving skills that extend beyond those disciplines, but that are often learned through them. In this Master Plan, the Network declares its intent to continue to work closely with its evaluator – Science and Mathematics Program Improvement (SAMPI) – during the course of the Master Plan's five-year period to develop appropriate metrics that more closely align the evaluation of the Network projects with Michigan's teacher and student outcomes.

FOCUS AREA 2: Facilitate the development of the Michigan STEM Partnership

The Network has long believed in and supported the critical importance of STEM education and celebrates recent trends to elevate these disciplines as part of the national and state education and economic development dialogue. STEM disciplines identified by the National Science Foundation include engineering, mathematics, agricultural sciences, biological sciences, physical sciences, psychology, economics, other natural and social/behavioral sciences, computer science, and earth, atmospheric and ocean sciences. As educators, MMSCN members deeply understand that STEM education is critical to the education of our children and the future of our state, but that STEM literacy is not confined to the classroom. A common definition of STEM literacy is "the ability to identify, apply, and integrate concepts from science, technology, engineering, and mathematics to understand complex problems and to innovate to solve them."[4] STEM education and literacy require a culture that supports them. Michigan desperately needs to embrace the cultural shift that reflects a belief in the tenets of a new prosperity for the state – one that relies on the knowledge-based economy and educational attainment as a cornerstone. Michigan's STEM Partnership is the organization that can help advance not only STEM education and skills but also STEM literacy.

The Network was essential in developing the Michigan STEM Partnership and facilitated Michigan's being among the first 13 states in the national STEM network. Michigan's STEM work must persist; the Network is perfectly positioned to facilitate an organized approach to STEM education, providing the structure, system, and professional learning for teachers to move Michigan forward on STEM measures. During the next five years, this will allow Michigan to be among the nation's leaders in STEM education via access to best practices and resources.

Statewide STEM literacy is a long-term goal for Michigan that many sectors support and promote. The Network and the STEM Partnership are a central part of this effort, but such a significant cultural shift requires deep and broad involvement. The Network's infrastructure, and particularly the fact that community involvement is one of the six core services[5] of the Network and its Centers, means that the Network can play an integral role in supporting this statewide shift.

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[4] Balka, 2011.

[5] While the legislation uses "basic" to describe these services, we feel that "core" better describes the role of these services in the regions served. From here on out, the six basic services will be referred to as core in this document.

Key strategies for expanding Network partnerships and collaborations among STEM-related stakeholders include these:

- Continue coordination and implementation of the Michigan STEM Partnership by the Network.

- Seek additional funding for the STEM Partnership to support core operations and special projects.

- Establish partnerships with appropriate stakeholders to advance STEM education in Michigan.

Roles and Responsibilities

The MMSCN serves as a catalyst and resource for improvement in the teaching and learning of STEM subjects. The Centers provide essential services to local school districts within their regions. Each Center is expected to deliver at least two of the six core services specified in state statute in accordance with the needs of its service area. These services support the strategic goals of the Michigan State Board of Education and the School Improvement Framework. They allow key relationships to be developed and maintained with all stakeholders.

The six core services and examples of how Centers can provide them are as follows:

1. LEADERSHIP - To reflect national and state standards, research, and a shared vision for improving STEM education. For example:

    - Promote a shared vision of high expectations in STEM education that:

        - Offers equal access to all students and educators.

        - Fosters the belief that all students can excel in STEM learning.

        - Correlates with the MMC, Michigan's Career- and College-Ready Standards, School Improvement Framework, other Michigan curriculum documents, and other materials as adopted by the Michigan State Board of Education.

        - Reflects effective instructional practices to help teachers enhance the learning of all students.

    - Promote interest in, and exploration of, STEM career pathways.

    - Promote themselves as a primary resource for teaching and learning in STEM areas.

    - Expand collaboration with organizations, agencies, businesses and professionals at a national, regional, local, and statewide level.

2. STUDENT SERVICES - To improve and enhance STEM literacy. For example:

- Ensure that programs and services for Michigan students are correlated with current state curriculum standards.

- Provide Michigan students with access to high-quality STEM programs.

- Provide opportunities for Michigan students to discover their interests and engage in activities that allow them to explore careers in the STEM fields.

- Include outcome measures to show growth and achievement of important program goals.

3. PROFESSIONAL LEARNING - To strengthen and update teaching practices based on current research and local needs. For example:

   - Provide professional learning for STEM educators, in support of MDE initiatives, that assist them in providing curriculum and instruction aligned to the current Michigan standards for Michigan students. The current state standards will be a focus of professional learning for this Master Plan.

   - Ensure that professional learning reflects and models state professional learning standards, as well as state and national standards, in content; teaching and learning; and assessment.

   - Advocate that all educators who participate in Center professional learning programming work toward attaining best instructional practices for all students in their classrooms, including instructional practices for remediation to give students the extra support needed.

   - Provide leadership development in STEM areas, both within the Center and within targeted K–12 Local Education Agencies (LEAs), with focus on Priority Schools.

4. CURRICULUM SUPPORT - To help develop curricula in local districts that incorporate research in teaching and learning as well as recommended state standards. For example:

   - Partner with regional stakeholders to support STEM achievement in identified Priority Schools.

   - Assist districts with statewide mathematics and science test alignment and analysis as they strive to close the gap in student achievement.

   - Help districts align local curricula to implement the standards and benchmarks as outlined in the MMC, School Improvement Framework and other relevant standards and benchmarks identified by the MDE.

   - Facilitate and model the integration of technology and engineering into the mathematics and science curricula.

   - Assist the MDE with initiatives in STEM areas.

5. COMMUNITY INVOLVEMENT - To increase awareness, nurture ownership, and identify resources for innovative and bold educational programming. For example:

    - Collaborate with community groups to co-sponsor STEM programs and services.

    - Involve the community in planning and implementing programs through advisory boards and task forces.

    - Acquire and leverage direct and in-kind human and financial resources to provide the six core services in STEM learning.

    - Promote public understanding of the goals and issues in STEM education.

6. RESOURCE CLEARINGHOUSE - To collect and transfer information; to identify, acquire and distribute materials; and to locate and effectively utilize human resources. For example:

    - Supply information and access to educational materials (e.g., books, documents and electronic resources) and classroom teaching equipment in STEM areas.

    - Create and sustain an Internet presence to support STEM education.

    - Maintain an inventory of available human and material resources in STEM areas for all students.

Each individual Center's plan/application will list specific goals, essential assessment questions for performance effectiveness, and data collection and analysis of strategies specific to its annual strategic plans. The annual report for each Center will include outcome data for the specific goals selected.

Serving All Students

Centers deliver core services in different ways. Regions vary considerably in geographic area, population, educational needs, and educational resources available (see Appendices A and B: Map and Listing of Centers). Services are determined by needs and priorities of Center stakeholders through collaborative strategic planning, as identified in each Center's strategic plan and in accordance with the system of accountability developed by the MDE in collaboration with the Network. This planning results in localized combinations of programs, resources, and consultative arrangements to build the capacity of teachers and others to provide successful STEM education as evidenced by student achievement outcomes.

Programs are offered directly to teachers through professional learning and to students through enrichment activities and/or accelerated programs. Increasing the participation and achievement of underrepresented students is also a high priority for Centers to assist schools in their efforts to ensure that no child is left behind. Centers continually track numbers of participants and administer pre- and post- tests.

The Centers serve all schools, but they put a special focus on high-priority schools by intentionally recruiting and offering available space to them first. The MDE recently established three new categories for schools in achievement reporting. The Top to Bottom ranking includes all five tested content areas and high school graduation rate data, and uses the MDE's preferred rules, developed in conjunction with a diverse set of education stakeholders throughout the 2010-2011 school year. This list is being published to provide information to all schools and to provide "light of day" reporting on the achievement, improvement, and achievement gaps of all schools in the state.

- FOCUS SCHOOLS consist of the 10 percent of schools on the Top to Bottom list with the largest achievement gaps between the top 30 percent of their students and the bottom 30 percent, based on average scale score. In addition to being required by the U. S. Department of Education for Elementary and Secondary Education Act (ESEA) flexibility, identifying Focus Schools is a critical step toward Michigan achieving its overriding goal of closing the achievement gap within schools and reducing the achievement gap statewide.

- REWARD SCHOOLS consist of schools that achieved Adequate Yearly Progress (AYP) goals and were identified in one of three ways: 1) top five percent of schools on the Top to Bottom list, 2) top five percent of schools making the greatest gains in achievement (improvement metric), or 3) Beating the Odds schools. Beating the Odds schools are those that are overcoming traditional barriers to student achievement and are outperforming schools with similar risk factors and demographic makeup.

- PRIORITY SCHOOLS (formerly known as Persistently Lowest Achieving Schools) are Michigan public schools identified in the bottom five percent of the statewide Top to Bottom ranking.

Centers also are expected to provide curriculum enhancement program options for students. In 2012, five of the 33 Centers provided a full-year program for students with high ability. These full-year programs must include a multiyear, coordinated curriculum for a minimum of 450 hours per year with a minimum of 2½ contact hours per student per day. Students receive high school credit in mathematics, science, and technology from their local schools for successfully participating in such a Center-based program.

Network Collaboration

Centers not only provide services tailored to the needs of their regions, they also participate in statewide projects such as the Network (see Appendix C: Listing of Initiatives and Partners). This collaboration allows efficient sharing of resources and expertise for the benefit of teachers and students across the state.

The Network plays a vital role in providing STEM education leadership along with disseminating information in this era of school reform. Network leaders assembled representatives from businesses, foundations, and other education groups to design the Michigan STEM Partnership in 2010. Center directors now serve on the Partnership's steering committee and manage the five regional STEM education hubs.

With funding from the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC), the Partnership was able to create an asset map of Michigan's STEM education programs and experts, and establish a Family Engineering program to expose K–6 students and their parents to potential STEM careers. Additional funding from the state Legislature and the Michigan Economic Development Corporation has allowed the Partnership to hire an executive director, become a founding state in STEMx, attend national conferences to exchange best practices, and support the work of the regional hubs. The executive director will pursue additional funding to sustain the Partnership (see Appendix D: Michigan STEM Partnership Annual Report).

Grant Requirements

The Michigan Mathematics and Science Center Program (MMSCP) is committed to ensuring that all students and educators in Michigan have access to Center services. Each Center is subject to all MDE requirements and must address two or more of the required services, as described in this Master Plan, and implement them according to its individual strategic plan.

Each Center, on a rotating basis, must submit a five-year strategic plan. The plan must include goals, strategies, and performance effectiveness assessment measures for each of the six core services that the Center addresses. Each goal in the plan includes an assessment question and methods for gathering the data. An external panel reviews the plan and makes recommendations to the MDE for funding approval. The external panel consists of MDE staff and Center representatives. It often also includes STEM educators, representatives from universities and community colleges, and personnel from business and industry. A Center whose five-year strategic plan is approved by the MDE maintains its operational status.

Each Center must submit an annual application to the MDE that includes an updated strategic plan and budget. The yearly application must address the following, keeping in mind that any Center's ability to conform to these criteria is commensurate with its current level of funding:

- Delivery of two or more of the core services described in the Master Plan.
- Employment of a qualified (as determined by the MDE) director and staff designated to coordinate and deliver services.
- Detailed budget with rationale.
- Membership in the MMSCN with full participation, including regular attendance at Network meetings and performance determined by the MDE/Network accountability matrix (see Appendix E).
- Participation in statewide initiatives of the Network that focus on student achievement and contribute data related to student achievement.
- Other criteria as defined by the MDE.

Each Center must provide an annual report to the MDE that details expenditures, outlines accomplishments, compiles statistical indicators and shows evidence of progress toward defined outcomes described in its five-year strategic plan.

A planning schedule with submission due dates can be found in Appendix G. Annual approval of funding for Centers is contingent upon a review of each Center's annual report and updated application, as defined by the MDE.

Governance Requirements and Funding For Centers

Each Center must have an appropriate governance structure that conforms to the requirements in place at that Center. The governance plan is part of the foundational documentation of the Center.

Centers are also required to maintain an Advisory Group that includes key stakeholders from schools, e.g., principals; superintendents; teachers from elementary, middle or junior high and high schools; and community partners. Governance structures vary among the Centers, but all Centers must include Advisory Group representation from their respective fiscal agents and from teachers with knowledge, skills, and interest in mathematics and/or science, from all three grade group levels.

It is also important that one or more principals with knowledge or interest in these subject areas be represented. Each Center may also include non-school partners (colleges, museums, business, higher education) in its governance structure. Centers may use various mechanisms to build stakeholder representation into their governance structure. To the extent possible, the governance structure should be representative of the population it serves. Changes in the governance structure will be subject to peer review and external review with final recommendation by the MDE, in the same manner as changes to the Center's strategic plan.

Funding for Centers

To maintain and strengthen Michigan's leadership in mathematics and science education, the Centers must receive stable and significant state and federal, and private funding to support the basic infrastructure for their services, facilities, and staff. Through the delivery of core services, the Centers support the efforts of the MDE in its initiatives to assist Priority Schools, support high expectations, and help to close the gap in achievement.

Funding of the Mathematics and Science Centers is based on the appropriations made by the Michigan Legislature under Section 99 of the State School Aid Act (MCL 388.1699). Annual funding recommendations are presented by the MDE to the Governor through the Department of Technology, Management, and Budget. The Legislature acts on the Governor's recommendation in its approval of the State School Aid Act. Based on the MDEs review of each application and strategic plan, individual awards are given under the State School Aid Act.

The MDE and the Centers agree that making essential services and important programs in mathematics and science accessible to all of Michigan's K–12 teachers and students through the work of the 33 regional Centers requires investment. Across Michigan, Centers vary in the number of K–12 students they serve. "Large" Centers (currently,

there are six) require more funds than do "medium" Centers (14) and "small" Centers (13). Regardless of size, every Center needs a base level of funding in order to, at a minimum, employ a qualified Center Director and cover the costs of essential operations.

The Network seeks reinstatement of base funding of $7.2 million to the State Aid allocation to provide for a minimum level of Center services. Without adequate funding, Centers are unable to provide comprehensive and equitable services throughout the state; lack the human capital to leverage additional money to benefit Michigan's K–12 students and teachers; and are challenged to diversify the sources of funds to improve mathematics and science education in Michigan. A number of Center directors have to split their time between their Centers and other duties assigned by their fiscal agent because their base-level funding no longer covers their entire salary. This has resulted in less focus on Center duties and obligations to Network initiatives and, in some cases, the loss of directors to more stable positions.

The Centers recently dedicated a portion of their Network allocation to hiring an executive director to assume some of the responsibilities that were overwhelming the volunteer Network officers. The Network executive director will seek funding for Center operations. While the Centers have received funding as part of a number of successful statewide Network initiatives, that funding has not supported operational costs. As Michigan's fortunes improve, it is essential that the need to restore enough operational funding to maintain full-time Center directors dedicated to this critical area of education be recognized by the Legislature.

Data Collection and Evaluation

To ensure that funds are used effectively, the Network evaluates its programs and services continuously on an informal and formal basis. Evaluation of the goals and outcomes of each Center's strategic plan is aligned to:

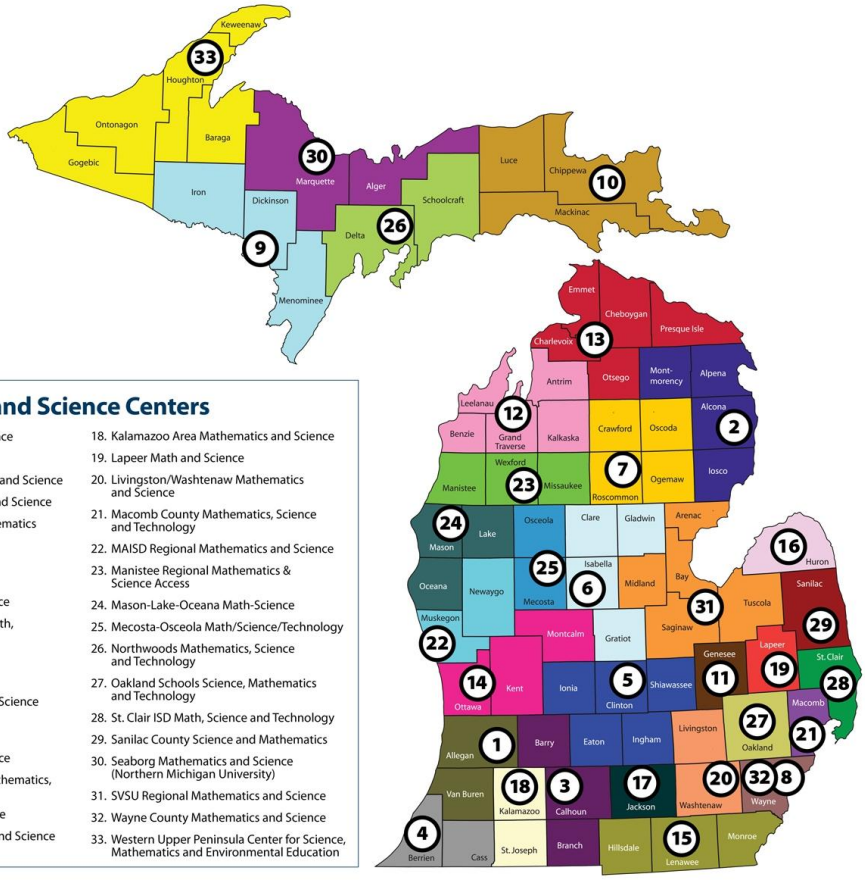
- Provide information to Center staff to guide decision-making and strengthen efforts.
- Determine the impact of programming on students, teachers, and schools.
- Communicate progress and achievement to stakeholders.

Centers participate in common data collection around key indicators that provide the MDE, the Centers, and the Network with knowledge about performance of the Centers and their effectiveness in reaching teachers and students in their regions; about dollars leveraged to support STEM education in their regions; and about the staff and facilities the Centers provide. Areas of common data collection include performance indicators of services provided to each district in the region as well as outcome measures for district improvement in STEM learning. Every effort is made to measure student achievement tied to Center activities and to meet the state's new guidelines for professional learning.

Each Center summarizes the results of its internal evaluation in a Network annual report organized around the six core services and tied to the goals and outcomes of its

own strategic plan. This annual report is submitted to the MDE and reviewed with the State Superintendent.

APPENDIX A: Map of Centers



Michigan Math and Science Centers

1. Allegan County Math and Science
2. AMA/Iosco Math and Science
3. Battle Creek Area Mathematics and Science
4. Berrien County Mathematics and Science
5. Capital Area Science and Mathematics
6. Central Michigan Science/ Mathematics/Technology
7. COOR ISD Math and Science
8. Detroit Mathematics and Science
9. Dickinson-Iron-Menominee Math, Science & Technology
10. Eastern UP Math and Science
11. Genesee Area Math/Science
12. Grand Traverse Regional Math, Science & Technology
13. Great Lakes Math and Science
14. GVSU Regional Math and Science
15. Hillsdale-Lenawee-Monroe Mathematics, Science, and Technology
16. Huron Mathematics and Science
17. Jackson County Mathematics and Science
18. Kalamazoo Area Mathematics and Science
19. Lapeer Math and Science
20. Livingston/Washtenaw Mathematics and Science
21. Macomb County Mathematics, Science and Technology
22. MAISD Regional Mathematics and Science
23. Manistee Regional Mathematics & Science Access
24. Mason-Lake-Oceana Math-Science
25. Mecosta-Osceola Math/Science/Technology
26. Northwoods Mathematics, Science and Technology
27. Oakland Schools Science, Mathematics and Technology
28. St. Clair ISD Math, Science and Technology
29. Sanilac County Science and Mathematics
30. Seaborg Mathematics and Science (Northern Michigan University)
31. SVSU Regional Mathematics and Science
32. Wayne County Mathematics and Science
33. Western Upper Peninsula Center for Science, Mathematics and Environmental Education

APPENDIX B: List of Centers

2011-2012 Student Populations – Fall 2011*

Center Name	ISD/RESA	Student Population	Total Population
Allegan/Van Buren M/S Center 310 Thomas Street Allegan, MI 49010	Allegan+	18,144	
	Van Buren	15,974	34,118
Alpena-Montmorency-Alcona/Iosco M/S Center Educational Service District 2118 US-23 South Alpena, MI 49707	Alpena	4,254	
	Alcona	772	
	Montmorency	1,010	
	Iosco	4,234	10,270
Battle Creek Area M/S Center 765 Upton Avenue Battle Creek, MI 49037	Calhoun	20,875	
	Branch	6,988	
	Barry	9,252	37,115
Berrien County M/S Center 711 St. Joseph Avenue Berrien Springs, MI 49103	Berrien	25,035	
	Cass	7,615	32,650
Central Michigan S/M/T Center EHS Building, 132 CMU Mt. Pleasant, MI 48859	Clare	4,577	
	Gladwin	3,195	
	Isabella	6,818	
	Gratiot	6,942	21,532
COOR M/S Center 11051 North Cut Road, POB 827 Roscommon, MI 48653	Crawford	1,677	
	Ogemaw	2,205	
	Roscommon	2,998	
	Oscoda	959	7,839
Western UP Center for S/M/EE Copper Country ISD, POB 270 Hancock, MI 49930	Keweenaw	6	
	Baraga	1,243	
	Houghton	5,422	
	Ontonagon	656	
	Gogebic	1817	9,144
Northwoods M/S Center 2525 Third Avenue South Escanaba, MI 49829	Delta	5,696	
	Schoolcraft	842	6,538
Detroit M/S Center 5057 Woodward, Room 119 Detroit, MI 48202	Detroit	*63,235	63,235
Dickinson-Iron/Menominee M/S Center 1074 Pyle Drive Kingsford, MI 49802	Iron	1,338	
	Menominee	3,225	8,474
Eastern UP M/S Center 315 Armory Sault Ste. Marie, MI 49783	Chippewa	5,102	
	Luce	755	
	Mackinac	1,488	7,345

Center Name	ISD/RESA	Student Population	Total Population
Genesee Area M/S/T Center 2413 West Maple Avenue Flint, MI 48507-3493	Genesee	71,943	71,943
GVSU Regional M/S Center C-1-120 Mackinac Hall Allendale, MI 49401	Ottawa	43,986	
	Kent	102,022	
	Montcalm	11,602	157,610
Huron M/S Center 711 East Soper Road Bad Axe, MI 48413	Huron	4,562	4,562
Capital Area S/M Center 1025 North Shiawassee Corunna, MI 48817	Eaton	16,829	
	Clinton	10,989	
	Shiawassee	12,517	
	Ionia	9,427	90,326
Jackson County M/S Center 6700 Browns Lake Road Jackson, MI 49201	Jackson	24,307	24,307
Kalamazoo Area M/S Center 600 West Vine Street, Suite 400 Kalamazoo, MI 49008	Kalamazoo	35,181	
	St. Joseph	10,975	46,156
Lapeer County M/S Center 690 North Lake Pleasant Road Attica, MI 48412	Lapeer	13,929	13,929
Hillsdale-Lenawee-Monroe M/S Center 4107 North Adrian Highway Adrian, MI 49221-9309	Hillsdale	6,626	
	Lenawee	16,151	
	Monroe	24,162	46,939
Livingston and Washtenaw M/S Center 1819 South Wagner Road / POB 1406 Ann Arbor, MI 48106-1406	Livingston	28,748	
	Washtenaw	46,133	74,881
Macomb County M/S/T Center 44001 Garfield Road Clinton Township, MI 48038	Macomb	136,497	136,497
Manistee/Wexford-Missaukee M/S Center 9905 East 13th Street Cadillac, MI 49601	Manistee	3,190	
	Wexford	5,162	
	Missaukee	2,255	10,607
Mason-Lake/Oceana M/S Center 2130 West US Highway 10 Ludington, MI 49431-9307	Mason	4,136	
	Lake	599	
	Oceana	3372	8,107
Mecosta-Osceola M/S/T Center 15760 190th Avenue, POB 1137 Big Rapids, MI 49307	Mecosta	5,936	
	Osceola	4,318	10,254

Center Name	ISD/RESA	Student Population	Total Population
Muskegon-Newaygo M/S Center 1001 Wesley Avenue Muskegon, MI 49442-2398	Muskegon	28,787	
	Newaygo	8,390	37,177
Oakland Schools M/S/T Center 2100 Pontiac Lake Road Waterford, MI 48328-2735	Oakland	191,165	191,165
SVSU Regional M/S Center 7400 Bay Road, University Center Saginaw, MI 48710-0001	Arenac	2,367	
	Bay	14,873	
	Midland	12,755	
	Saginaw	30,423	
	Tuscola	9,198	69,616
St. Clair RESA M/S Center 499 Range Road, Box 5001 Port Huron, MI 48061-5001	St. Clair	24,493	24,493
Sanilac County M/S Center 175 East Aiken Road Peck, MI 48466	Sanilac	6,877	6,877
Great Lakes M/S Center 08568 Mercer Boulevard Charlevoix, MI 49720	Emmet	5,194	
	Charlevoix	4,169	
	Cheboygan	3,124	
	Otsego	3,825	
	Presque Isle	1,538	17,850
The Glenn T. Seaborg Center for Teaching and Learning Science and Mathematics 1401 Presque Isle Marquette, MI 49855	Marquette	8,211	
	Alger	1,098	9,309
Grand Traverse Regional M/S Center 880 Parsons Road Traverse City, MI 49686	Antrim	3,516	
	Benzie	2,226	
	Kalkaska	2,076	
	Grand Traverse	13,231	
	Leelanau	2,133	23,182
Wayne County M/S Center 33500 Van Born Road Wayne, MI 48184	Wayne	289,768	
			**226,533

* Detroit population is unaudited Fall Count 2012-13 numbers and includes Detroit Proper, Detroit Public School Charters and students in the Education Achievement Authority.

** Detroit population was removed from the Wayne County population total.

APPENDIX C: Network and Center Initiatives and Partners

Both the MMSCN, as a whole, and individual Centers in their respective regions work to develop outreach strategies to communicate, coordinate, and collaborate with statewide mathematics and science initiatives, such as those listed below. Through fostering partnerships and leveraging funding from a variety of sources, the MMSCN is able to deliver services to diverse audiences around the state.

Within its operating structure, the MMSCN has formed the Mathematics and Science Leadership Teams. The purpose of these groups is to seek out partnerships and grants to provide STEM opportunities to teachers and students throughout Michigan. Below is a sampling of those programs.

Collaborations Through Grant Funding

The following MMSCN initiated and/or collaborative statewide programs are supported by federal and state grant funding. Each of these programs has an evaluation report that is available and submitted to MDE.

- Project PRIME (Promoting Reform in Mathematics Education) - Project PRIME is a statewide initiative being offered by the MMSCN, Wayne RESA, and the University of Michigan–Dearborn's Center for Mathematics Education. The emphasis in this statewide initiative, funded through a Mathematics and Science Partnership Grant, is on school teams of mathematics teachers collaborating in professional development focused on developing the teachers' (1) math content knowledge, (2) pedagogical knowledge, and (3) knowledge of how to teach the algebra and geometry curriculum to foster student understanding.

- SaM3 (Science and Mathematics Misconceptions Management) - The goal of the SaM3 professional development program is to increase a teacher's ability to elicit and address student misconceptions, utilizing the content areas of Energy (science) and Fractions (mathematics) as a context for applying misconception management strategies. Funding for the SaM3 grant program is provided through Section 99.6 of the State Aid Grant, and is administered by the MDE. Over the four years of the grant, districts throughout the state will be impacted by this in-depth, sustained professional learning opportunity.

- EMATHS (Embracing Mathematics, Assessment, and Technology in High Schools) - EMATHS is a Michigan Mathematics and Science Partnership Competitive Grant project. The goals of the project are to increase teachers' content knowledge, to increase the use of best practices around classroom practices, and to embed technology into effective instruction. The MMSCN is collaborating in the dissemination of the materials to teachers around the state through professional development.

- STEM (Strengthening Tomorrow's Education in Measurement) - The STEM Project aims to assist educators (classroom teachers, pre-service teachers, curriculum developers, and assessment professionals) in enriching students' classroom experiences and learning about the measurement of space (length, area, and volume). The STEM project has been supported with two sequential grants from

the National Science Foundation's REESE program received by Michigan State University (MSU). The MMSCN is participating in the project by providing in-depth sustained professional development for teachers using materials and resources developed by the grant team.

At the writing of this document, the Science Leadership Team is exploring the National Science Foundation (NSF) grant opportunities with MSU and Eastern Michigan University for the dissemination of and professional learning around Michigan's Career- and College-Ready standards.

Collaborations Involving External Funding (Non-Grant)

- FAMILY ENGINEERING is an informal education program that actively engages elementary-aged children and their families in fun, hands-on engineering activities and events. Through collaboration with and funding received from the National Defense Education Program, Square One Education Network, Michigan Technological University, and the Michigan STEM Partnership, Centers around the state hosted Family Engineering events that provided students and parents the opportunity to explore science and engineering concepts and careers. In March 2012, Family Engineering events held concurrently with Michigan STEM Week promoted 21st-century skills of inquiry, creativity, teamwork, and collaborative problem-solving.

- MICHIGAN STEM PARTNERSHIP is a statewide public-private collaboration elevating STEM literacy and competencies in a way that increases Michigan's economic strength to retain and attract desirable jobs. The MMSCN worked in collaboration with the MDE to establish the Michigan STEM Partnership, leveraging funds from the TARDEC, Michigan Economic Development Corporation (MEDC) and the MMSCN itself. The MMSCN continues to facilitate and support the growth and development of the Partnership through collaborations with business, industry, and other STEM organizations around the state and with grants from both the MDE through Section 99.7 of the State Aid Grant and MEDC.

Collaboration with Other STEM Groups (Professional Organizations)

The Network is active in collaborations with the following STEM organizations in the State of Michigan. In many cases, Center directors hold leadership roles in these various groups:

- Michigan Science Teachers Association (MSTA)
- Michigan Council of Teachers of Mathematics (MCTM)
- Michigan Mathematics Consultants and Coordinators (M2C2)
- Michigan Association for Computer Users in Learning (MACUL)
- Michigan Virtual University (MVU)

Local STEM Outreach (Varies by Center)

Responding to the needs of their regions, Centers offer opportunities for students to strive for excellence in STEM through programs such as these:

- SCIENCE OLYMPIAD tournaments are rigorous academic interscholastic competitions that consist of a series of challenging and motivational team events that are well balanced between the various science disciplines of biology, earth science, chemistry, physics, and technology. There is also a balance between events requiring knowledge of science concepts, process skills, and science applications.

- FIRST ROBOTICS inspires young people to pursue careers and become leaders in science and technology by engaging them in exciting mentor- and values-based robotics programs. The FIRST Robotics Competition is an international high school robotics competition that gives students real-world engineering experience.

- FIRST LEGO LEAGUE is a robotics program for nine- to sixteen-year-olds that is designed to get children excited about science and technology, and teach them valuable employment and life skills.

APPENDIX D: Michigan STEM Partnership 2012 Annual Report

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

Partnership Development

Successes include the following:

- A strong steering committee (see below) of education and business members who provide direction to the regional hubs. The public-private steering committee developed the following mission and vision statements:

  - MISSION: A partnership of educators, businesses, communities, and government that cultivates a society that promotes innovation, elevates student achievement, and supports the development of the 21st Century workforce through high-quality STEM education.

  - VISION: Our vision is to build and retain a STEM literate population by connecting public-private STEM champions into dedicated partnerships that establish Michigan as a national leader in economic and talent development, innovation, and prosperity.

- Five regional hubs with established leadership, charters, and a quarterly meeting schedule. Each hub has built memberships of regional K–20 educators and business representatives.

- Participation in the first Michigan STEM Week by hosting Family Engineering Events across the state, giving K–6 students and their parents exposure to potential STEM careers to increase interest at an early age.

- Membership in STEMx, a national network of statewide STEM education organizations. Michigan is one of 13 member states and sent a representative to the first STEMx meeting in Columbus, Ohio.

- A panel discussion at the annual STEM Synergy Summit hosted by Square One Education Network at Eastern Michigan University.

- Representatives attended the Change the Equation conference in Washington, D.C., and the U.S. News STEM Solutions Conference in Dallas.

- Supporting NGSS reviews hosted by the regional MMSCN.

- Documentation of more than 200 state STEM education assets and experts on a searchable asset map on the *mistempartnership.com* website, hosted by the MVU. The website also includes information about the Partnership and a calendar of hub and steering committee meetings.

- Partnering with the State of Colorado to send 15 teachers on a research trip to Africa in the summer of 2013. During the XSci project, the teachers will work at Jane Goodall's Gombe Stream Research Center and climb Mt. Kilimanjaro. Teachers will be selected from each of the five hubs.

- Developed the @stempartnership Twitter following to more than 500 people, including Governor Rick Snyder and House Speaker Jase Bolger. Using the #michstem hashtag, @stempartnership provides STEM education news from Michigan and across the country in addition to Partnership news.

Steering Committee

The Partnership Steering Committee members include representatives from Workforce Intelligence Network, MVU, Dow Chemical Company, MEDC, Consumers Energy, Presidents Council, State Universities of Michigan, Van Andel Institute, MMSCN, MDE, and the TARDEC. Each of the five hubs also has a representative. The Steering Committee is responsible for monitoring the five regional hubs and statewide projects.

Funding

The Partnership was granted $100,000 by the Michigan Legislature for an executive director and operational expenses, and $150,000 for hub activities and conference attendance by the MEDC. The steering committee subcommittee has finalized a job description and hired an executive director.

For more information about the Michigan STEM Partnership, visit: www.mistempartnership.org.

APPENDIX E: Network Accountability Matrix

Responsibility	Verification	Funding Level*	Consequence	Person or Entity Responsible***
ASSURANCES – Each Center shall:				
1. Honor all assurances on Page 2 of Sec. 99 application	Network Meeting Minutes, records	Mandatory at all levels of funding.	State and Federal penalties exist for failure to achieve compliance.	Director, Supervisor MDE verifies
2. Submit a strategic plan for approval by MDE	Plan approved by MDE	Mandatory at all levels of funding.	Funding withheld until plan is submitted and approved by MDE.	Director, MDE verifies
3. Employ qualified staff	Sect. 99 Application	Mandatory at all levels of funding.	Funding for unqualified personnel withheld until personnel issue resolved.	Director, MDE verifies
4. Access available to all qualified students and professional staff, including nonpublic	(Letter of invitation is on file)	Mandatory at all levels of funding.	Funding withheld until compliance is verified.	Director, MDE verifies
5. Participate in Michigan M/S Centers Network (4 full meetings per year)	Network Meeting minutes	State Funding*/ Attendance Required 38–99% funding: 3 meetings/year 100% funding: 4 meetings/year.	10% loss of funding for each non-compliance (one meeting can be via distance-video).	MSN Secretary, MDE verifies
6. Have an Evaluation Plan on file	Plan available	Mandatory at all levels of funding.	Funding withheld until compliance is verified.	Director, MDE verifies
7. Submit an Annual Report to MDE by November 30	Report on file	Mandatory at all levels of funding.	Funding withheld until compliance is verified.	Director, MDE verifies
STRATEGIC INITIATIVES – Priority Funding				
The State Board of Education has mandated that each Center address one or more Strategic Initiatives determined by the Board each year.	Each Center shall address one or more initiatives in their Annual Report	Mandatory at all levels of funding.	10% loss of funding.	Director, MDE verifies

Responsibility	Verification	Funding Level*	Consequence	Person or Entity Responsible***
SIX CORE SERVICES				
Each Center performs core services as outlined in the State School Aid Act and as directed in the Master Plan approved by the State Board of Education: 1. Leadership 2. Professional Development 3. Student Services 4. Curriculum Support 5. Community Involvement 6. Resource Clearing house	See Annual Report and SAMPI** Data. Each Center will complete the Strategic Plan Evidence Form, attached. Evidence should be entered in the SAMPI** database so it can be verified	Mandatory at all levels of funding; however, fewer people are served with lowered funding, as has been documented. 75% of Strategic Plan Objectives must be met in each service areas selected.	100% loss of funding for failure to provide core services as directed by the State School Aid Act and the State Board of Education Master Plan.	Director, MDE verifies

* Refers to percent funding compared to recommended base funding level of $7.2 million for 33 Centers serving all of Michigan.

** Refers to the Science and Math Program Improvement Center at Western Michigan University. SAMPI conducts an annual data collection effort to tabulate the numbers of students and professional staff who take advantage of Network programming.

*** Top line refers to the person responsible for collecting the data; the bottom line refers to the person who verifies the data was collected. MDE Verification may include a team made up of MDE, Office of Field Services, and assigned Center Directors.

APPENDIX F: History of the Centers

The Need for Mathematics and Science Education in Michigan

Michigan's need for mathematics and science education is critical and undisputed. A variety of sources, from the Lt. Governor's Commission on Higher Education and Economic Growth to the recent Michigan Future, Inc. report, call for an emphasis in education that supports a knowledge-based economy. The MDE and the State Board of Education created, and the Governor signed into law, the new MMC to better prepare Michigan's young people for success in college or the work place.

While the MMC outlines what students must know and be able to do to be successful, implementation remains the responsibility of each district.

The Michigan Mathematics and Science Centers Program (MMSCP or the Program), through its Mathematics and Science Centers and the Network that supports them, provides important and effective programs, services, and resources that help Michigan's K–12 schools implement the MMC and supports the quest for mathematical power and scientific literacy of all Michigan students.

This five-year Master Plan for the MMSCP defines goals and services of the MMSCN and the 33 Centers throughout the state. The plan incorporates Michigan's current challenges and needs, and redefines and reestablishes the required components of the Program to best support a prosperous Michigan.

In 1988, the Michigan Legislature created the MMSCP to establish 17 regional Centers in cooperation with school districts, higher education, science museums, and professional associations with the goal of providing equitable access to expertise and services in mathematics and science education to all K–12 schools in Michigan. The MMSCN, a coordinated body of directors, was established to foster Center development and evolution. Today, the Network comprises 33 strategically placed Centers to serve all Michigan school districts and all Michigan students.

Michigan's mathematics and science knowledge base stands at a crossroads alongside Michigan's future economic prosperity, which must begin to take shape as a knowledge-based economy to replace the downturn in manufacturing. While mathematics and science skills are more critical than ever to Michigan's growth, funding for the state's 33 Centers was slashed dramatically in the 2003–2004 academic year and has not been restored.

Origins of the Mathematics and Science Centers Program

The program, established during the 1988-1989 school year, provided grants to establish Mathematics and Science Centers in cooperation with local and intermediate school districts, universities and community colleges, science museums, and state and national mathematics and science associations, as well as with leaders from business and industry. Since its inception, the Program has undergone several changes through revised legislation.

The name of the Program changed from the Mathematics and Science Challenge Grant to Mathematics and Science Center Program Grant. The Program initially required that public or private sources provide matching funds, but the current matching funds requirement has been reduced to 10%. Today, however, nearly every Center obtains external funding in addition to that provided through the MMSCP. Some Centers have formed excellent partnerships with local businesses and industries, while others have tapped community groups or foundations. The result has been an impressive and collaborative effort by the schools, Centers, and communities to improve the quality of mathematics and science education in Michigan.

The initial Program required each Center to conduct both accelerated programs for secondary students and outreach activities to improve mathematics and science in kindergarten through 12th grade. Today, all Centers provide opportunities for intensive student programs. Several Centers provide academic-year, shared accelerated programs for students with high ability.

In 1988-1989, the Mathematics and Science (M/S) Centers Network (coordinated body of directors) was established to foster developing and operating Centers by providing communication channels, leadership, and resources for their evolution. The table on Page 39 shows the funding history and the number of M/S Centers over the past 19 years.

A Context for the Future – Michigan's Education and Economic Climate

This is an important time for the Program and a critical time for Michigan. The course of the next five years (the duration of this Master Plan) will likely determine whether the Program can flourish and be given the opportunity to serve Michigan at this critical time. Much has changed since the adoption of the last Master Plan in 2002. Michigan has slumped into what is often referred to as a "one-state recession." Job losses due to contraction of Michigan's automotive and manufacturing sectors continue to plague the state. State budget woes are severe. The last few years have seen $3 billion cut from the state's budget, with predicted shortfalls continuing for the foreseeable future.

Simultaneously, much attention has been focused on Michigan's deficits in educational attainment and the out-migration of young educated graduates to other parts of the country. Notably, Michigan ranks 34th in the nation in the number of residents possessing a four-year degree. As manufacturing jobs in Michigan and the U.S. have shrunk by 19 percent, the nation has experienced a 32 percent increase in knowledge-based employment, compared to only 17 percent growth of knowledge-based employment in Michigan.

Significant steps are being taken to address the components of these issues that involve education. In December 2004, the final report of the Lt. Governor's Commission (Cherry Commission) on Higher Education and Economic Growth was issued. This report concluded that education is at the root of much of Michigan's current economic malaise and made a compelling argument for "Michigan to raise the floor of preparation for all students… (and) have the courage to move ahead boldly to develop more rigorous high school standards." The Commission's Preparation Workgroup established its first recommendation to "set high expectations for high school students through standards, curriculum, and assessment."

In April 2006, Governor Granholm signed into law one of the most comprehensive sets of high school graduation requirements in the nation, the MMC, which defines a common set of required credits for graduation and provides educators with a common understanding of what students should know and be able to do for credit. This law is the result of an extraordinary partnership among the Executive Branch, Legislative Branch, the State Board of Education, State Superintendent, and numerous education organizations. It also provides students the learning opportunity, knowledge, and skills they need to succeed in college or the workplace. There is considerable emphasis on mathematics and science education within the MMC.

The second recommendation of the Cherry Commission's Preparation Workgroup specifically identified the "importance of effective professional development of teachers, administrators, and instructional leaders to support implementation of high expectations standards at the high school level."

Michigan has in place an infrastructure that supports excellence in the teaching and learning of mathematics and science, and can significantly contribute to advancing the MMC, teacher professional development, and student success. This infrastructure is the MMSCP.

The existence of this infrastructure and the proven success of the MMSCN in rolling out the MMC prompted the MDE to ask the Network to take the lead on creating a statewide science, technology, engineering and mathematics (STEM) coalition similar to other states. With counsel from Battelle in Ohio, design of the Michigan STEM Partnership began in 2010. The public-private partnership is made up of STEM champions from education, business/industry, philanthropy, and policy (see Appendix D). The Partnership is directed by a steering committee and has five regional hubs. Funding from the State Legislature and the Michigan Economic Development Corporation in 2012 supports an executive director, regional hub activities and Michigan's membership in the national STEMx organization of statewide STEM coalitions.

APPENDIX G: Yearly Timeline for Center Activity

DATE	ACTION
July 1 - June 30	Program Year
July 1 - June 30	Collection of Outcome and Participation Data
June 1 - June 1	Collection of Pre/Post Data for Report to Legislature
July 31	Annual Statistical Data DUE to SAMPI
July	State Aid Act Signed
August	**Application due to the MDE by last Friday.** (assuming State Aid Act is signed at least 3 weeks prior)
August	**All data and other information submitted to SAMPI for compilation and analysis.**
September	Center applications needing revision(s) are returned. (Two weeks from MDE date.)
September	Revisions are DUE to the MDE by last Friday.
October 1	Fiscal Year Begins
October/November	MDE Approval of Application
October/November	Award Letters to Centers from the MDE
October	Payment Sent to Centers from the MDE
October 30	Annual Narrative and Statistical Report Due to the MDE - includes annual Statistic Data and Financial Resource Information
November 1	If applicable, Carryover Request Letter Due to the MDE. Carryover Funds MUST be sent by June 30 of the coming year.
December/April	External Review with Approval of NEW 5-year Strategic Plans
January	M/S Center Network Annual Report Distributed to Executive Board
February	Final M/S Center Network Annual Report Distributed to Centers/MDE (Network Meeting)

APPENDIX H: Funding Formula

Each year's state funding allocation will be distributed among the 33 Centers according to the following formula:

Each Center starts with a base amount, called "x."

1a) Those Centers classified as SMALL Centers (<20,000 student population in most recent state-reported data) will have a multiplier of 1.0000 times "x".

1b) Those Centers classified as MEDIUM Centers (between 20,000 students and 90,000 students in the most recent state-reported data) will have a multiplier of 1.3333 times "x".

1c) Those Centers classified as LARGE Centers (>90,000 student population in most recent state-reported data) will have a multiplier of 1.6666 times "x".

2a) Those Centers currently PROVIDING a full-year student program will have an additional multiplier of 1.1538 (1.5/1.3) times the above multiplier in Step 1.

2b) Those Centers NOT PROVIDING a full-year student program will have an additional multiplier of 1.0000 times the above multiplier in Step 1.

The value for "x" will be calculated from the total state allocation using each Center's final multiplier. Each Center's allocated amount will equal its base amount, "x" multiplied by its final multiplier.

NOTE: Current Center Size determination and the 2011–2012 Center Allocation Table are listed at the end of this appendix for clarification.

Changes in Center Multipliers

Two types of changes can occur that result in changes in annual allocations to Centers:

- Changes in population served by individual Centers
- Changes in full-year student programming at individual Centers

Changes in Population Served by a Center

If the student population served (as defined in Master Plan) changes and results in an INCREASED change of Center size, and thus an increased allocation multiplier to that Center per the funding formula; then allocations to existing Centers are decreased proportionally in order to fund the mandated increased allocation to the Center in question.

If the student population served (as defined in Master Plan) changes and results in a DECREASED change of Center size, and thus a decreased allocation multiplier to that Center per the funding formula; then the surplus funds shall be distributed proportionally among all Centers based on the current allocation formula.

Changes in Programming at a Center:

If a Center's full-year student programming status (as defined in the Master Plan) changes and results in a scheduled INCREASED allocation to that Center per the funding formula:

If existing Centers are NOT receiving minimum funding defined in the current Master Plan ($7.2 million), then no additional funds shall be allocated to support the change in full-year student programming at the Center in question.

If existing Centers ARE receiving minimum funding stated in the current Master Plan ($6.5 million) AND if additional funds above the minimum funding are available through the State's award to the Centers and if all necessary adjustments related to population served have been made, then the Center shall receive full or pro-rated funding due it according to the Master Plan. Once additional funds are given to the Center for the full-year student programming, the Center will continue receiving funding via its multiplier in subsequent years, even if the Centers no longer receive minimum funding.

If the full-year student programming status (as defined in the Master Plan) at a Center changes and results in a scheduled DECREASED allocation for that Center per the funding formula:

If existing Centers are NOT receiving minimum funding stated in the current Master Plan, then these funds shall be distributed proportionally among all Centers based on the current allocation formula. If the Center reinstitutes full-year student programming in a later year, no additional funds will be allocated to support the change until existing Centers ARE again receiving minimum funding stated in the current Master Plan ($7.2 million) AND additional funds above the minimum funding are available through the State's award to the Centers and all necessary adjustments related to population served have been made.

If existing Centers ARE receiving minimum funding stated in the current Master Plan, then extra funds shall be distributed among the Centers or earmarked to support collaborative projects of the Centers' Network, according to a plan developed by the MDE in counsel with the Centers.

NOTE: No additional funds can be granted for changes in full-year student programming unless, a) all Centers are receiving minimum funding ($7.2 million) stated in the current Master Plan and, b) all Centers are receiving appropriate funding proportional to the student population they serve.

Center Size based on most recent (2011-2012) student population to be used for 2013-14 Section 99 grant funding.

Center Name	Population Category	Population (Student) 2011-12
Capital Area S/M Center	C	98,298
Macomb M/S/T Center	C	139,489
GVSU Regional M/S Center	C	165,502
Oakland Schools M/S/T Center	C	202,127
Wayne County M/S Center	C	221,425
Detroit Mathematics and Science Centers	B	63,235
Great Lakes	B	21,173
Central Michigan S/M/T Center	B	23,299
Grand Traverse Area Regional M/S/T Center	B	25,132
Jackson County M/S Center	B	26,768
St Clair M/S/T Network	B	27,838
Allegan/Van Buren	B	32,706
Berrien County M/S Center	B	34,706
Battle Creek Area M/S Center	B	38,324
Muskegon-Newaygo	B	41,849
Kalamazoo Area M/S Center	B	46,482
Hillsdale-Lenawee-Monroe M/S Center	B	51,059
Livingston/Washtenaw M/S Center	B	78,511
SVSU Regional M/S Center	B	79,493
Genesee Area M/S/T Center	B	83,299
Huron M/S/T Center	A	5,252
Northwoods Math Science Center	A	7,565
Sanilac County S/M Center	A	8,191
Eastern Upper Peninsula	A	8,228
COOR	A	9,318
Mason-Lake-Oceana M/S Center	A	9,377
Mecosta-Osceola M/S/T Center	A	10,017
Western U.P. Center M/S/Environmental Education	A	10,103
Seaborg Center – NMU	A	10,200
Alpena Montmorency Alcona Iosco	A	12,207
Dickinson Iron	A	12,807
Manistee Regional M/S Center (Wexford-Missaukee)	A	13,032
Lapeer	A	15,255

A = Service to area with student population to 20,000
B = Service to area with student population over 20,000 up to 90,000
C = Service to area with student population over 90,000

2011-2012 Center Allocation

Allegan Co. Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
AMA-Iosco Mathematics and Science Center	A	N	43,919	1	1	1	43919
Battle Creek Area Mathematics and Science Center	B	Y	43,919	1.333333	1.1538	1.538399615	67565
Berrien Co. Mathematics and Science Center	B	Y	43,919	1.333333	1.1538	1.538399615	67565
Central Michigan Mathematics, Science and Technology Center	B	N	43,919	1.333333	1	1.333333	58559
Capital Area Science and Mathematics Center	C	N	43,919	1.66666625	1	1.66666625	73199
COOR Science and Mathematics Center	A	N	43,919	1	1	1	43919
Western U.P. Center for Science, Mathematics and Environmental Education	A	N	43,919	1	1	1	43919
Detroit Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
Dickinson-Iron-Menominee Mathematics and Science Center	A	N	43,919	1	1	1	43919
Eastern U.P. Mathematics and Science Center	A	N	43,919	1	1	1	43919
Genesee Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
Grand Traverse Reg. Mathematics, Science, and Technology Center	B	N	43,919	1.333333	1	1.333333	58559
Great Lakes Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
GVSU Reg. Mathematics and Science Center	C	N	43,919	1.66666625	1	1.66666625	73199
Hillsdale-Lenawee-Monroe Mathematics, Science and Technology Center	B	N	43,919	1.333333	1	1.333333	58559
Huron Mathematics, Science, and Technology Center	A	N	43,919	1	1	1	43919
Jackson Co. Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
Kalamazoo Area Mathematics and Science Center	B	Y	43,919	1.333333	1.1538	1.538399615	67565
Lapeer Co. Mathematics and Science Center	A	N	43,919	1	1	1	43919
Livingston-Washtenaw Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
Macomb Co. Mathematics and Science Center	C	Y	43,919	1.66666625	1.1538	1.922999519	84457
Manistee Reg. Mathematics and Science Center	A	N	43,919	1	1	1	43919
Mason-Lake-Oceana Mathematics and Science Center	A	N	43,919	1	1	1	43919
Mecosta-Osceola Mathematics, Science and Technology Center	A	Y	43,919	1	1.1538	1.1538	50674
Muskegon-Newaygo Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
Northwood's Mathematics, Science and Technology Center	A	N	43,919	1	1	1	43919
Oakland Schools Science, Mathematics, and Technology Center	C	N	43,919	1.66666625	1	1.66666625	73199
Sanilac County Science and Mathematics Center	A	N	43,919	1	1	1	43919
The Seaborg Center-Northern Michigan University	A	N	43,919	1	1	1	43919
St. Clair ISD Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
SVSU Regional Mathematics and Science Center	B	N	43,919	1.333333	1	1.333333	58559
Wayne Co. Mathematics and Science Center	C	N	43,919	1.66666625	1	1.66666625	73199
TOTALS						42.69199262	1874998
Base Calculation						43919.24305	

History of Funding Table

1988-89	25		$1,000,000	
1989-90	27	20	$2,117,100	
1990-91	24	16	$1,872,100	
1991-92	20	20	$2,372,100	Designated and competitive grants from Sec. 99 State Aid Act
1992-93	20	20	$2,372,100	First Master Plan
1993-94	20	20	$2,850,000	
1994-95	28	28+8 satellites	$6,240,000	Funded according to Master Plan
1995-96			$7,614,000	Expanded services
1996-97 through 1998-99 funding stayed constant				
1999-2000	25	25+8 satellites	$8,304,870	
2000-01	29	29+4 satellites	$9,665,270	Update of Master Plan requested
2001-02	33	33	$10,232,300	Master Plan approved by SBE
2002-03	33	33	$10,232,300	
2003-04	33	33	$2,500,000	Centers survived on carryover funds
2004-05	33	33	$2,500,000	Services and staff cut
2005-06	33	33	$2,500,000	New funding sources sought; update of Master Plan requested
2006-07	33	33	$2,500,000+ $1,000,000	Additional grant for implementing Merit Curriculum; 501(c)(3) status sought to apply for additional funds
2007	33	33	$2,500,000+ $1,000,000	Master Plan approved by State Board of Education
2007-08	33	33	$2,499,995+ $1,000,000	Additional grant for implementing Merit Curriculum; 501(c)(3) status obtained to apply for additional funds
2008-09	33	33	$2,499,995+ $1,000,000	Additional grant for implementing Merit Curriculum
2009-10	33	33	$2,499,995+ $1,000,000	Additional grant for implementing Merit Curriculum
2010-11	33	33	$1,875,000+ $750,000	Additional grant for implementing Merit Curriculum
2011-12	33	33	$1,874,995+ $750,000	Additional grant for implementing Merit Curriculum
2012-13	33	33	$1,874,998+ $750,000+ $100,000	Additional grant for implementing Merit Curriculum and support of the Michigan STEM Partnership

APPENDIX I: Network Support to Centers

MMSCN: The Network's role in service to Mathematics and Science Education in Michigan.

The Network exists to support Michigan's individual Mathematics and Science Centers for the purpose of maintaining high expectations for teaching and learning, increasing the achievement of all students, assisting Priority Schools, and advancing STEM education in Michigan.

Under the previous Master Plan, the Network became a 501(c)(3) organization in order to increase its functions of coordination of services, ensure consistency across regions, and secure external funding for the Centers. As a 501(c)(3), the Network has a Board of Directors comprised of its members (the Center Directors), and an Executive Committee comprised of elected officers and committee chairs. These roles are all strictly voluntary and are responsibilities added to existing workloads of Center directors.

This Master Plan continues to acknowledge the role of the MMSCN in providing statewide outreach, partnership development, and funding development activities in support of the Centers. Ultimately, the role of the Network is to pursue new avenues of collaborative support from all sources (philanthropic, business, grants, and others) and provide the greatest leverage possible of the MMSCP.

Delivery of Network Services

Essential Network Services are:

- Statewide outreach and partnership development
- Funding development
- Coordination of statewide initiatives undertaken by its member Centers

As a 501(c)(3), the Network operates with elected officers (president, vice-president, secretary, and treasurer), part-time support staff (business office), and part-time Executive Director. The position of Executive Director is funded through a voluntary assessment paid by each Center, demonstrating the value that Centers place on this position. However, more sustainable methods of funding need to be secured for this position.

The primary role of the Network will be to:

- Promote the MMSCN and its member Centers as a "first-line" resource for professional learning, teaching, and student learning in mathematics and science, and convene these resources throughout the state to support them.
- Assure Network/Center representation on the Michigan STEM Partnership.

- Support the efforts of the MDE to hold Centers accountable to standards of performance and participation associated with awards made through the MMSCP (see Accountability Matrix in Appendix E). To this end, the Network will coordinate mentoring among its Centers to ensure the greatest probability of success for all Centers.

- Convene a statewide advisory board (the Michigan STEM Partnership) consisting of representatives of business, philanthropy, policy/government, MDE and education to assist in planning and implementation of programs and services provided by the Network or Centers.

- Convene the Network's member Centers as necessary to assist the Centers in performing essential Center services.

- Collaborate with representatives from other sectors to cosponsor and otherwise support science, technology, engineering, and mathematics programs and services throughout Michigan.

- Secure long-term funding for Center services and Network activities from all sources: government, business, philanthropy, and other.

- Assume primary responsibility for community involvement in those instances in which the community is understood to be the entire State of Michigan, while continuing to encourage the Centers to collaborate with local and regional groups for their individual activities.

- Develop, strengthen, and promote the Network as Michigan's leader in advancing mathematics and science education in Michigan.

- Pursue, broker, coordinate, and nurture partnerships with statewide, regional, and local entities in order to provide better educational opportunities in mathematics and science to all students and deeply integrate the MMSCN and its member Centers with other groups closely aligned with the Network's purpose. The Network must reach out to the business, philanthropic and higher education communities in pursuit of these partnerships.

APPENDIX J: Strategic Planning

The Network approved new mission and vision statements as part of the Master Plan process in 2012. A Strategic Plan is under development and will be finalized in September 2013, once the Master Plan is approved.

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.

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