STATE OF MICHIGAN
DEPARTMENT OF EDUCATION
LANSING

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March 28, 2005

TO: State Board of Education

FROM: Jeremy M. Hughes, Ph.D., Chairperson

SUBJECT: Presentation on Michigan Mathematics and Science Centers - Support for High Priority Schools

In 1988, the Michigan Legislature provided targeted support for the reformation and improvement of teaching and learning in mathematics and science by establishing Mathematics and Science Centers.

Michigan's Mathematics and Science Centers are key elements in the infrastructure that connects a variety of stakeholders within defined geographic regions through a network across the state. Centers are partners with MDE, ISDs, universities, schools, and museums. Mathematics and Science Centers focus on the improvement of mathematics, science and technology instruction for all K-12 students with a major emphasis on increasing student achievement in high priority schools, as well as providing high quality, needs based professional development for educators.

This presentation will provide an overview of the Mathematics and Science Center Network and will focus on the support that the Battle Creek Area Mathematics and Science Center is providing for high priority schools.

Attachment A is a copy of the Mathematics and Science Center Network Annual Report.

Attachment B is an overview of the Michigan Mathematics and Science Centers.

Attachment C is an overview of the Battle Creek Area Mathematics and Science Center Program.

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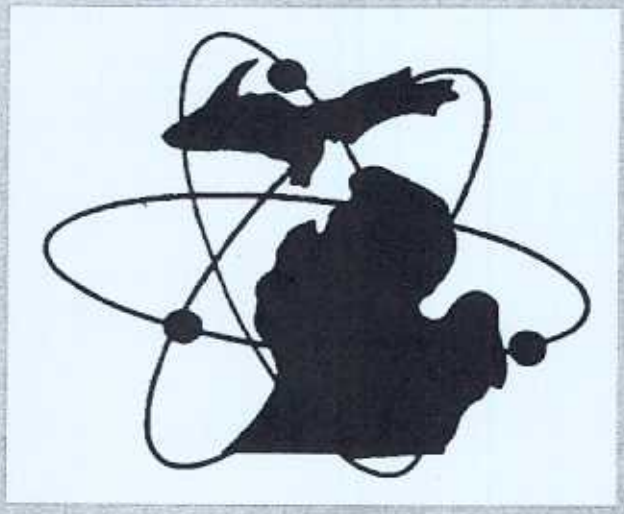
ATTACHMENT **A**



Michigan Mathematics and Science Center Network

2003-2004 Annual Report

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MICHIGAN MATHEMATICS AND SCIENCE CENTERS:

Catalysts for change and improvement of mathematics

Mathematics and Science Centers are a primary infrastructure supporting the improvement of mathematics, science, and technology education in Michigan. Programs and services of the thirty-three Mathematics and Science Centers are made available to all Michigan public and private schools in their service areas. ***This report summarizes the work across all Centers during the 2003-04 school year. Each Center also produces an annual report of accomplishments available through each Center.***

2003-2004
REPORT FOCUS:

Significantly reduced state funding in 2003-2004 has meant Centers needed to strategically focus on the highest priorities (supporting underachieving schools and high quality professional development for all teachers). In each section of the report, these two priorities will be highlighted.

FUNDING CHANGES

The Mathematics and Science Centers Program was created by legislation in 1988, providing $1 million in competitive grant funds to establish Centers in cooperation with school districts, higher education institutions, science museums, and professional associations. Since that time, the program has undergone significant changes, including development of a Master Plan for funding and operating Centers. There were 17 Centers in 1989 serving disparate areas throughout Michigan. Today, all school districts across the state have access in their region to one of 33 Mathematics and Science Centers in Michigan. Base funding for centers is now part of the annual State Aid Act-Section 99 and totaled $2.55 million for the 2003-2004 school year. This is a **75%** reduction in state funding from the previous year. **Future mathematics and science programming for schools is in jeopardy as Center Directors search for the financial resources to provide schools, teachers, and students with needed resources. In 2003-2004, state funding cuts resulted in 28% fewer professional development hours for teachers, 65% fewer programs for students, and the elimination of one accelerated high school program.**

SIX BASIC SERVICES. *Centers provide programs and services in these areas:*

Leadership—to reflect national and state standards, research, and a shared vision for improving mathematics and science education **See Page 8 & 9**	**Student Services**—to improve and enhance mathematics and science learning for all *239,984 enrollments in student activities 2003-2004* **See Page 6 & 7**	**Community Involvement**—to increase awareness, nurture ownership, and identify resources for innovative and bold educational programming **See Page 12 & 13**
Professional Development—to strengthen and update teaching practices based on current research and local needs 1,705 Professional Development sessions were offered; 14,186 Teachers participated. **See Page 4 & 5**	**Curriculum Support**—to help develop curricula in local districts, incorporating research in teaching and learning, as well as state and national standards **See Page 10 & 11**	**Resource Clearinghouse**—to collect and transfer information; identify, acquire and distribute materials; and to locate and effectively utilize human resources **See Page 14 & 15**

MEETING STATE AND NATIONAL GOALS

Centers serve as catalysts and resources for improvement in the teaching and learning of mathematics and science. They provide services that enhance and extend beyond those available at local districts within their region. A major focus of their work is supporting schools in meeting the strategic goals of the State Board of Education, the priorities of the Michigan Department of Education, and the goals of No Child Left Behind (NCLB).

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

State Board of Education Strategic Goals	**No Child Left Behind** (major goals)	**Michigan Mathematics and Science Center Network Goals**
Ensuring excellent educators	Preparing high quality teachers	Provide professional development opportunities that enable and sustain effective teaching in mathematics and science, by keeping teachers current in the field and able to develop positive learning environments for all students.
Elevating educational leadership	Preparing high quality principals	Provide Teacher Leader programs to develop expertise at a building level in content, pedagogy, assessment and other essential components to teaching high standards.
Embracing the information age		Facilitate and model the integration of technology into the mathematics and science curriculum.
Ensuring early childhood literacy	Requiring schools to use research-based instructional programs	Facilitate the integration of literacy instruction into the content areas of mathematics and science. Assist schools in identifying research-based programs.
Integrating communities	Partnering with parents and communities	Engage businesses, universities, museums, governmental agencies, and parents in supporting and providing quality mathematics and science education and experiences.

SUPPORTING MICHIGAN DEPARTMENT OF EDUCATION PRIORITIES

A major focus of Michigan's Mathematics and Science Centers in 2003-2004 has been to support the development and dissemination of Michigan's new Grade Level Content Expectations (GLCEs) in both mathematics and science. Support has ranged from serving on advisory teams, reviewing GLCEs, and providing workshops for teachers and administrators to become familiar with the GLCEs. Work with teachers has begun in developing mathematics lessons and assessments that are aligned with the GLCEs. Mathematics and Science Center personnel and teachers recruited by Centers are now serving on committees supporting the development of the science GLCEs.

Michigan's Mathematics and Science Centers also support the Michigan Department of Education's priorities in the following ways:

Michigan Department of Education Priorities	**No Child Left Behind** (major goals)	**Michigan Mathematics and Science Center Network Goals**
Helping low performing schools	Improving accountability Providing evidence of effectiveness Planning evaluation	Support principals in identifying the professional development needs of teachers, analyzing MEAP data to identify instructional needs of students, and working with school improvement and curriculum development teams to align programming and instruction with state and national standards.
Closing the achievement gap	Improving the academic achievement of the disadvantaged	Provide opportunities to under-represented students to explore mathematics and science careers.
High expectations	Promoting innovative programs	Provide accelerated mathematics and science programming to motivated math and science students (with a focus on recruiting under-represented students).

PROFESSIONAL DEVELOPMENT

State Board of Education Strategic Goal: "Ensuring excellent educators"

NCLB goal: "Preparing high quality teachers"

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

14,186 teachers enrolled in one or more professional development sessions. Teachers averaged 11.5 hours of professional development offered by Centers in 2003-2004.*

*Detail numbers of hours, enrollments, and content of professional development sessions can be found in the Appendix pages

Professional Development Targeted at Underachieving Schools

- Financial supporting of teachers to attend Math GLCE Institutes during the summer
- Working with teachers to develop and implement inquiry-based lessons
- Supporting MMLA teams to assist teachers in high need districts
- Targeting underachieving schools for lesson observations
- Training of teachers to analyze MEAP data to identify gaps in student knowledge and problem-solving abilities
- Modeling of standards-based inquiry-focused mathematics and science lessons

TYPES OF PD OFFERED TO TEACHERS THROUGH CENTER PROGRAMMING

- **Intensive one-day workshops**
- **Multiple-day workshops**
- **Professional development series**
- **Graduate courses**
- **Courses leading to certification in mathematics and science**
- **Distance Learning Series (Annenberg Workshops)**
- **Sponsorship of teachers to attend Educational Conferences**
- **New teacher induction programs**

1,705 professional development sessions offered by Centers in 2003-2004.

10,507 hours of professional development programming offered by Centers in 2003-2004.

How are Mathematics and Science Centers supporting teachers in meeting NCLB challenges?

- Collaborations with universities and colleges to work with public schools to align elementary curricula, strengthen teachers' content knowledge, and produce assessments aligned to GLCEs
- Strengthening teachers' skills in using inquiry-based science kits through professional development workshops, technical assistance and modeling
- Facilitation of Annenberg video case-study courses such as "Teaching Science as Inquiry"
- Collaboration with universities to develop and provide teachers with mathematics and science content courses to assist them with achieving "highly qualified" status
- Development of "Trainer of Trainer" professional development models that engage teachers in planning and delivering content-based instruction
- Providing access to new teachers to mentoring programs and workshops that cover content, instructional practices, assessment, strategies for engaging parents, and professional responsibilities

IMPACTS OF MICHIGAN'S MATHEMATICS AND SCIENCE CENTERS' PROFESSIONAL DEVELOPMENT SERVICES

Impact on *SCHOOLS*

- Schools received support for the induction of new teachers.
- Through MMLA, teachers were trained to support schools in mathematics reform/improvement efforts.
- Local district administrators received support to attend national ASCD meeting—"What Works in Schools." Local follow-up meetings were facilitated by a M/S Center to discuss strategies for school improvement.

Impact on *STUDENTS*

- Teachers involved in "Building a Presence in Science" report increases in science MEAP scores in their buildings. Building a Presence in Science is a collaboration between the Michigan Science Teachers Association and the Michigan Mathematics and Science Center Network to develop science leaders and "Points of Contact" in all districts across the state.

More specific information can be found in the document: "Spotlight on Professional Development." Information on obtaining a copy can be found on the Network website: www.mscenters.org

Impact on *TEACHERS*

- Teachers were supported in developing and implementing their own units and lessons.
- Teachers had opportunities to earn graduate credits for low or no cost.
- Teachers had access to individual technical assistance from M/S Center personnel.
- Teachers received support for understanding new state Grade Level Content Expectations (GLCEs).
- Teachers gained skills in "lesson-study," a process of analyzing lessons and developing instructional plans that will increase student learning.

Impact on *COMMUNITIES*

- Parents have become more engaged with schools through Family Math and Science Programs.
- Environmental Education programs offered by Centers promoted environmental stewardship.
- Volunteers were recruited and trained by Centers in some regions to provide monthly inquiry-based environmental education programs to elementary schools.
- Community education classes in natural science or technology were offered by Centers.
- Local industries and businesses have given financial and material support to Center programs and outdoor education facilities.

STUDENT SERVICES

Michigan Dept. of Education Priority:
"Closing the achievement gap."

Programs for Under-represented Students

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

NCLB goal:
"Improving the academic achievement of the disadvantaged."

Support for Students Attending Underachieving Schools

Centers annually identify underachieving schools for targeted programming. Students in underachieving schools are offered summer courses and special mathematics and science opportunities that support and enhance classroom work.

1,252 enrichment activities were offered to students. This represents over 37,893 hours of programming.

NCLB goals:
"Promoting innovative programs"
Michigan Dept. of education priority:

Accelerated High School Programs

8 Centers provide advanced mathematics and science courses. Recruitment of minorities is a priority for these accelerated half-day programs. Outcomes reported from these programs include:

- 100% matriculation to college
- Increases in scholarship opportunities
- Presentation of original research at national conferences

Centers save Michigan families money by providing **Dual Enrollment opportunities with local colleges.**

What types of services are provided to students?

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

IMPACTS OF MATHEMATICS AND SCIENCE CENTERS' PROGRAMMING FOR STUDENTS

Impact on *SCHOOLS*

- Schools were able to offer students access to advanced mathematics and science courses that would otherwise not be available.
- Schools received support in developing research projects for students. M/C Centers facilitated student participation in regional and national research symposiums.

Impact on *TEACHERS*

- Students had experience with inquiry-based lessons making it easier for teachers to implement new inquiry-based lessons.
- Through observing the modeling of science teaching delivered in classrooms by traveling science van instructors, classroom teachers learned new strategies for evaluating their teaching and students' learning.
- Teachers received support in teaching key science concepts by students' participation in Water Festivals where students are engaged in hands-on activities teaching about watersheds, biodiversity, and pollution.

Impact on *STUDENTS*

- MEAP scores improved.
- Teachers and parents report improved student attitudes toward mathematics and science.
- Students were more effectively working in teams.
- 100% of high school students attending Accelerated Mathematics and Science Programs offered by Centers matriculate to higher education.
- Students had access to a wide range of academic competitions such as Science Olympiads, Lego Leagues, and Intel competitions.
- Students enrolled in accelerated course programs offered by Centers earned college credits through dual enrollments and AP courses.

Impact on *COMMUNITIES*

- Students were engaged in service-learning projects such as water quality monitoring.
- Pre-service university education students volunteered to assist in local classrooms through Center coordinated programs.
- Community organizations and industries had opportunities to support summer programming for students that foster interest in science and mathematics careers (such as STEPS—Science, Technology, and Engineering Preview Summer).
- Through internship programs, students worked many hours in community businesses and medical establishments.

LEADERSHIP

State Board of Education Strategic Goal: "Elevating Educational Leadership"

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

LEADERSHIP Focus on Underachieving Schools

➤Personal contacts were made with "high-priority" schools to offer Center services.

➤ Meetings with curriculum teams from "high-priority" schools to review alignment of curricula with the Michigan Curriculum Framework were held across the state.

➤Intensive interventions in "high priority" schools that include needs assessments, small group professional development based on needs, assistance in developing assessments, and "gap analysis" were provided by many Centers.

➤Centers support principal coaches (individuals that have a proven track record of success) in mentoring principals from high-priority schools.

➤ Centers participate on building-level school improvement teams at high priority schools to study student performance data and determine effective instructional interventions (particularly for "at-risk" students).

➤Assistance is provided to "high-priority" schools to locate needed resources and technical assistance.

Professional Development Focus on LEADERSHIP

➤Monthly professional development sessions for administrators were offered to keep administrators updated on strategies for school improvement and changes brought about by NCLB requirements.

➤The statewide initiative-Michigan Mathematics Leadership Academy (MMLA) provided teacher leaders with skills to advance the quality of teaching and learning in their schools.

➤Collaboration with MSTA in the Building a Presence in Science program (BAPS), enabled Centers to groom science teachers to take science leadership roles in their schools.

➤Learning communities in which teachers become responsible for leading change in instructional practices were developed.

➤Partnerships with Universities and Colleges in Math/Science Partnership Grants to develop research-based professional development models were developed and externally funded.

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