

Mecosta-Osceola Math/Science/Technology Center 2011-2012 Annual Report

The Mecosta-Osceola Math/Science/Technology Center (MSTC) serves Mecosta and Osceola Counties in the west central portion of the lower peninsula of Michigan. The mission of the Center is to improve the quality of math, science, and technology for students, teachers, schools, and the community.

Overview of the Year's Accomplishments



1) Regional Science Fair and Family Engineering Night – Laura Forbes (**MSTC High School Pull-out Program HQ Math & Science Teacher**) was instrumental in bringing an array of contextual engineering programs to families in our area and combining the Family Engineering Night with the Regional Science and Engineering Fair. Many of our community partners shared in the planning and success of this event. Volunteers included: Dr. David Frank (FSU), MSTC and MOCC staff and student, several LEAs, FSU College of Arts and Sciences and FSU College of Engineering and Technology, the American Chemical Society, the Robotics Club and grants from Square-One Network, and TARDEC. Over **70 families and 100 students participated** in the Family Engineering Night.



Students from Reed City Middle School, St. Mary's, St. Peter's, Chippewa Hills Middle School, and Evart Middle School competed in the Regional Science Fair, as well as high school students from the Math, Science, and Technology Center. All schools that participated received a free Family Engineering Night resource book so they could duplicate this event in their schools.

2) MSTC Students published in scientific journals as a result of high-level research – MSTC students Rachel Rounds and Kevin Beach are highlighted in scientific journals. They presented their research at the state-wide JSHS competition at Wayne State University on March 1st and 2nd, 2012. The students were published as a result of the JSHS event. These students have been recognized many times for outstanding research and excellence. Rachel has attended ISEF twice and was a national winner this year for her research project.

3) GREEN INITIATIVES – Mecosta-Osceola ISD joined the ranks in the state of Michigan to become part of Michigan's Green Schools. Morley Stanwood Alternative School, Big Rapids New Directions High School, Mecosta-Osceola Education Center and the Mecosta-Osceola Career Center were all awarded Green

Schools membership this year for the first time. Each had supported several community projects that helped foster awareness of environmental science and life-cycle issues in our area. Our ISD is enthusiastic about creating more opportunities for growth in these initiatives because we live in a river community.

One of the Green Schools projects was the Rain Garden. As a result of a partnership with the Muskegon River Watershed Assembly, the Mecosta-Osceola Career Center benefited from the construction of two new rain gardens at the north end of the MOISD campus. As part of the MOCC remodel and addition project, water retention ponds were installed as a system to manage the storm water runoff from the building and parking lots. These structures reduce pollutants leaked from cars to the pavement from entering the local creeks and streams. In addition, these structures also reduce the flow rate of water and help protect against erosion. Prior to the creation of the Rain Garden, weeds and non-native vegetation resided in these spaces. The new gardens were designed by area botanists who selected native plants for ornamental and functional purposes.

The Muskegon River Watershed Assembly (MRWA) is an organization that is committed to the protection and preservation of the Muskegon River. Terry Stilson, Project Coordinator for MRWA has been actively pursuing funding for this project. To date more than \$10,000 in grants has been awarded to this project. The Mecosta County Community Foundation, Wege Foundation and the MRWA have all contributed resources to the rain gardens. This project is more than just the financing the supplies (compost, mulch, plants, landscaping materials, etc); there will be a lot of labor and project pieces required. Alongside community groups such as the Big Rapids Garden Club and the FSU Outdoor Club, students from the MOCC and the MOEC will be providing labor for the construction and maintenance phase. This will include tilling, mulching, planting, etc. There was a lot of work behind the scenes; actual construction began in May. For more information on the MRWA visit them at <http://www.mrwa.org> . If you follow the project link to the Cadillac Library Rain Garden, you can get a better idea of what our project entailed.

4) Data-Driven Initiatives expand PD for Educators in Common Core – The Mecosta-Osceola ISD conducted 31 Professional Development (PD) training opportunities to support the Common Core training for K-12 educators, which reached 255 participants in our service area (Big Rapids, Chippewa Hills, Crossroads Charter Academy, Morley-Stanwood, Ewart, and Reed City). PD also incorporated a diverse range of topics to support positive behavior, integrate support systems and response to Intervention topics. Our service area does not include any underachieving districts, but we do train our educational staff to work with disadvantaged youth and various socio-economic groups to lend additional support for learning. Four of our ISD Administrative Team have been trained in the SIG or Priority School Process and stand ready to serve the LEA districts if they need assistance in a school improvement process. During the 2011-2012 school year, 32 professional development offerings were held, which trained 331 employees from our surrounding LEAs in RTI/PBiS and curriculum support and development specifically designed to meet the needs of supportive instruction.

5) Collaboration with MS Network creates opportunities for sharing at local and state levels i.e., host site for Project Prime, MSU Measurement and presentations at state conferences including: Michigan Science Teachers Association, Michigan Secondary Association of Secondary School Principals, and Michigan Career Educator's Conference. We shared our ISD and PD spaces so that learning could take place for the Network Project Prime and MSU Measurement. We shared our message across the state, as well as taught others the value of assessment at the aforementioned conferences.

6) Presentations at state conferences – 25 Years of Math, Science 7 Technology Celebrated – March was definitely a “lion” showcase for MSTC/STEM education. This month Dr. Harrison presented at the Michigan Science Teachers Association Conference, sharing the great things we do at the MOISD and around the state in collaboration with the Michigan Mathematics and Science Centers Network in celebration of 25 years of bringing math and science education to students in Michigan. Part of this initiative has expanded to include large-scale events like the family Engineering Night and the Green Schools Initiatives program as well as statewide math and science literacy education. Even in tough economic times, professional development and leveraging resources remains in the forefront.

Organization of the Report

The Strategic Plan identifies six service areas: Leadership, Professional Development, Student Services, Curriculum Support, Community Involvement, and Resource Clearinghouse. This report will focus on Professional Development and Student Services for the entire service area. In addition, there will be a narrative targeting work done with high-priority schools in the area.

REGION-WIDE PROFESSIONAL DEVELOPMENT

Goal: For educators who participate in Center Professional Development to reflect best instructional practices in their own settings.

Who participated in the professional development?

Professional development opportunities were provided for classroom teachers, classroom support staff, administrators, parents/community members, and others involved in K-12 education. The table below describes who participated.

Table 1: Participants Receiving Professional Development

Participants	# of Indiv. Total Hours		Reported Gender		Position						
			M	F	Admin	Math Tchr	Sci Tchr	Tech	Comb Subj	Other or Unknown*	
Pre-School	1	14	0	1	1	0	0	0	0	0	0
Elementary	6	84	0	6	2	0	0	0	3	1	
Middle/Jr. High	3	69	2	1	1	1	0	0	0	1	
High School	34	971.5	18	16	3	3	1	0	1	26	
K-12 Mixed Levels	6	119.5	1	5	2	0	0	0	1	3	
Other*	8	168	2	6	0	0	0	0	1	7	
Total	58	1426	23	35	9	4	1	0	6	38	

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

Professional development was delivered in many ways, depending upon the identified needs. Two primary formats included: (1) **Single events**, lasting for a portion of one day to several consecutive days, focused on a particular topic, skill, or issue; and (2) **Series**, which were a series of sessions (one building on the previous one and conducted periodically over a several week/month period). The goal was to systematically strengthen teaching practices based on local needs and current research. Table 2 on the following page represents a picture of the number of sessions offered and the rate of attendance.

Teachers, on average, spent 24.6 hours on mathematics, science, or technology professional development.

Table 2: Professional Development Activities

		Math	Science	Technology	Other	Total
High School	Events	1	2	2	3	8
	Hours	27.5	9	20	21	77.5
	# Participants	6	17	65	40	128
K-12 Mixed Levels	Events	0	0	1	1	2
	Hours	0	0	14	7	21
	# Participants	0	0	18	1	19
Total	Events	1	2	3	4	10
	Hours	27.5	9	34	28	98.5
	# Participants	6	17	83	41	147

Spotlight on Professional Development

The MOISD General Education Department worked with our six LEA Districts in specific data-driven professional development initiatives as well as delivering specialized training around the Common Core. There were 851 educators served in professional development offerings for the 2011/2012 school year. All offerings either related to The Common Core, RTI/PBiS, technology, assessment/data, or school improvement topics. The Mecosta-Osceola ISD conducted 31 Professional Development (PD) training opportunities to support the Common Core training for K-12 educators, which reached 255 participants in our service area (Big Rapids, Chippewa Hills, Crossroads Charter Academy, Morley-Stanwood, Evart, and Reed City).

The Math, Science Technology Center Director attended training in RTI, Assessment, AdvancedEd QAR Team, and several Math/Science topic related areas to support instructional delivery. The MSTC Director presented at several conferences, including the Michigan Career Educator's Conference and the Michigan Association Secondary School Principal's Conference for Teacher Evaluation Systems and co-presented on behalf of the Network at the Michigan Science Teachers Association. Dr. Harrison also attended the Synergy STEM Conference and was active in the STEM Network. Her professional development efforts involved teacher evaluation at the state level in committee work, in Project and Performance-Based Evaluation practices, and in CTE.

Spotlight on the Value of Statewide Projects



Math, Science, Engineering and Technology Extravaganza

– On March 20, MSTC held the “Discover the joy of Engineering through hands-on activities for the whole family” program. The Mecosta-Osceola Regional Science and Engineering Fair was expanded to include **Family Science and Engineering Night**, made possible through a grant funded through the Michigan Mathematics Science Centers Network by **TARDEC** and **Square One Education Network**. The evening included family competition challenges as well as science and engineering discovery stations appropriate for all levels of learners. Kindergarten through 5th grade students participated in the Science and Engineering “**Passport to Reading Adventure Challenge**”. MOCC Teacher Education students hosted a **Pre-K STEM Lab for 3-5 year-olds**. Our LEA Middle Schools showcased their top student finalists and their projects in area **Science Fair projects** in the Miller Conference Center

alongside MSTC and local high school entries were pre-adjudicated at **Ferris State University**. Finally, students from **FSU College of Arts and Sciences**, as well as the **College of Engineering and Technology**, gave live demonstrations of the applications of science, technology, and mathematics. The public was welcomed to participate. **Participating LEA middle schools** that assisted in the event received training and free resource guides to be able to duplicate the Family Engineering Night at their districts.

Michigan Green Schools – is a non-profit 501(c)3 agency dedicated to assisting all Michigan schools – public and private – to achieve environmental goals, which include protecting the air, land, water and animals of our state, along with world outreach through good ecological practices and the teaching of educational stewardship of students pre-kindergarten through senior high school.

The MOISD is proud to be a new member of this initiative. **Morley-Stanwood Alternative High School, Big Rapids New Directions, the MOISD Education Center, Career Center and Math, Science and Technology Center** have all achieved Green Schools status. A certificate, signed by Governor Rick Snyder and a Green Schools Flag was presented to each school by the Green School County Coordinator (Dr. Jennifer Harrison). As we become a Green Schools community, we will have more learning resources available to our ISD to enhance environmental science lessons. For more information, please visit: <http://michiangreenschools.us/>
The “Green Schools” initiatives fall into four categories: Energy, environment, miscellaneous projects, and reduce-reuse-recycle. Some examples of our “Green” initiatives are:

Reduce, Reuse, Recycle

The MOISD Maintenance and Operations Department used “Green Clean” cleaning supplies that are environmentally “friendly”. These supplies were used campus-wide. Mark Klumpp, Steve Locke & Maintenance Crew led this charge.

The Environment

Students and staff in Big Rapids (New Directions) planted flower beds and maintained them throughout the year. Staff took care of them in the summer months. (Principal Josh Easler and Building Coordinator Amy Bordano.)

Special Education Transition Center Program has built a “Blue Bird Box” Program. This entailed building and maintaining several nest boxes for Eastern Blue Birds set up throughout our 80 acre campus. Education Center Principal Jim Gerakinis and Transitions Center Teacher John Fox collaborated with Education Center students to make this happen.

Energy

The Innovative Engineering Program at the Career Center incorporated renewable energy activities into the curriculum. Students learned the principles of solar, wind, geothermal, biodiesel, and other forms of alternative energy solutions. This class partnered with business and industry to create cutting-edge innovative vehicle designs and apply their concepts in real world applications. Contextual math and science were brought to life in natural settings and eco-systems were explored. High school students participated in competitive events and mentored middle school students to encourage the engineering life cycle. Students from all six LEAs in Innovative Engineering – Doug Ward’s class and Mr. Mill’s math class were involved.

Miscellaneous Projects

Morley Stanwood Alternative High School has an active Ecology Club that participated in a biannual park cleanup (Latimore Park) and tree planting activity on Earth Day (April 22nd). Principal James Nelson and Building Coordinator Ryan Redinger worked with staff and students on many projects at their school.

Math, science and technology students conducted full-scale experiments on soil and erosion issues, hybrid plant growth, and ecological conservation. Ferris State University faculty guided students, with the assistance of the MSTC Science teacher (Laura Forbes, College of Arts & Sciences faculty at Ferris State University).

Student Services

Student services are delivered based on identified needs to improve and enhance mathematics and science education. Students who participate in enrichment activities have the opportunity to explore new concepts, develop process skills, cooperate on group tasks, and discuss their findings. Student services include:

- ❖ school-day classroom programs provided by Center staff
- ❖ after-school and summer enrichment and support programs
- ❖ field trips to museums, natural areas, laboratories, and businesses to expose students to practical application of mathematics and science knowledge
- ❖ organization of science and mathematics fairs and academic competitions
- ❖ an accelerated mathematics, science, and technology high school program (MSTC)

Table 3: Student Services Activities Provided in 2011-2012

		Math	Science	Other	Total
High School	Events	4	5	6	15
	Hours	108	75	196.5	379.5
	# Participants	465	42	1342	1849
K-12 Mixed Levels	Events	0	1	0	1
	Hours	0	1	0	1
	# Participants	0	60	0	60
Total	Events	4	6	6	16
	Hours	108	76	196.5	380.5
	# Participants	465	102	1342	1909

Spotlight on Innovative Student Services

Synergy Conference – Dr. Harrison represented the MOISD as both the CTE Director and the MSTC Director at a “Synergy Conference” that was sponsored by the Square One Network. Our **MOISD IVD cars and students were featured in a special presentation.**



The future of careers in engineering and our economic future were the thrust of this summit. **STEM-focused careers, project-based learning and early college** concepts were highly encouraged for future Career and Math Science Center education. This year the concept car was powered by lithium ion batteries and a proprietary spring action design engineered by students who learned concepts of engineering, patenting, and design processes and applied high-level mathematics in a contextual approach. They built their concept car and tested it against other full-scale Innovative Vehicle Design cars.

Spotlight on Partnerships

MHSMSS

The **Michigan High School Math & Science Symposium (MHSMSS)** was held on Wednesday, April 25, 2012 at the **GVSU Eberhard Center on the Pew Campus of Grand Valley State University** in downtown Grand Rapids.

The symposium gave students who worked on a science research project under the mentorship of a teacher or scientist the opportunity to present their research findings to a group of peers in a setting that resembled a meeting of professional scientists. The program began with several student presentations to the entire assembly and then broke into smaller classroom size groups for the remaining presentations. Students participated by presenting a project or attending as an observer. Teachers were invited to bring students who were interested in research or contemplating a project for the next academic year.

Many former participants have received recognition and scholarships for the research work they have done. A publication of the proceedings of the symposium that spotlights the students' presentations and achievement in science is sent to colleges and universities in Michigan. The institutions of higher learning hold this kind of activity in high regard.

Spotlight on High-Priority Schools

The Mecosta-Osceola ISD did not have any High-Priority Schools in the 2011-2012 school year. PD also incorporated a diverse range of topics to support positive behavior, integrated support systems and Response to Intervention topics. Our service area does not include any under achieving districts, but we do train our educational staff to work with disadvantaged youth and various socio-economic groups to lend additional support for learning. Four of our ISD Administrative Team have been trained in the SIG or Priority School Process and stand ready to serve the LEA districts if they need assistance in a school improvement process. During the 2011-2012 school year, 32 professional development offerings were held which trained 331 employees from our surrounding LEAs in RTI/PBiS and Curriculum support and development specifically designed to meet the needs of supportive instruction.

Mecosta PULL-OUT PROGRAM TABLE
Table 4: School-Year Program Enrollees

		9 th	10 th	11 th	12 th	Total
Caucasian	M	0	1	6	6	13
	F	0	7	7	9	23
African-American	M	0	0	0	0	0
	F	0	2	0	0	2
Asian-American	M	0	1	0	1	2
	F	0	1	0	0	1
Hispanic	M	0	0	0	0	0
	F	0	0	0	0	0
Mixed Ancestry	M	0	1	0	1	2
	F	0	0	0	0	0
TOTAL	M	0	3	6	8	17
	F	0	10	7	9	26
	All	0	13	13	17	43

Spotlight on the Advanced High School Program

The Mecosta-Osceola MSTC program is a 10th, 11th and 12th grade cohort program that specializes in teaching math and science at an accelerated pace. Students work together with their high school Math/Science highly qualified teacher during their 10th grade year on the Ferris State University campus and engage in research projects. They are encouraged to participate in symposiums at the state and national levels. Each student is paired with FSU faculty and works on a graduate-level research projects. Many of our students have already had their research published. During their 11th and 12th grade years they are immersed in college-level courses that are taught by FSU faculty.

MSTC students Kevin Beach and Rachel Rounds presented their research at the state-wide JSHS competition at Wayne State University on March 1st and 2nd, 2012. The students were published as a result of the JSHS event. These students have been recognized many times for outstanding research and excellence. Rachel has attended ISEF twice and was a national winner this year for her research project.



MOISD 10th grade Math/Science/Technology Center (MSTC) student Rachel Rounds (Evert) earned top honors at the Regional Science and Engineering Fair. This allowed her to qualify for the second year in a row to attend the Intel International Science and Engineering Fair (Intel ISEF) held May 13-18 in Pittsburgh. This program of the Society for Science & the Public is the world's largest international pre-college science competition. The Intel ISEF is the premier global science competition for students in grades 9-12. Each year it enables more than 1,500 high school students from about 70 countries, regions, and territories to display their independent research and compete for over \$3 million in awards. For the first time in several years an MOISD placed among the top international achievers. Rachel took a

4th place in Animal Sciences - winning \$500, and making her rethink the "I think I'll take a year off of research" stance. According to her MSTC Instructor, Mrs. Laura Forbes, "She did a fantastic job defending her project, and her scientific method was superb - an award well deserved."

MSTC Experience Physics

Tenth grade students of the MSTC spent two days immersed in real physics learning opportunities as they traveled to the Chicago area to visit Six Flags Great America, the Museum of Science and Industry, and FERMI Labs. At Six Flags, the students used their accelerometers and data vests to measure and collect data while they suffered for the causes of science as they rode one roller coaster after another. Students experienced both positive and negative acceleration, G-forces, centrifugal and centripetal forces, and sore necks. At the Museum of Science and Industry students explored concepts related to industrial advancements, technology, medicine and science. As part of the Fermi Labs

visit, students asked questions and learned from a working physicist, as he broke apart the components of matter and energy. Students were intrigued as he discussed theoretical principles concerning dark energy, dark matter and black holes. The MSTC cohort was also led on a tour of the facilities where they were able to see an actual particle accelerator.

A total of 43 students attended the program this year. Seven students represent non-Caucasian groups. All of our graduating seniors are attending a post-secondary institution in the fall of 2012, and of those graduating 12 reported obtaining scholarships totaling **\$876,622**. These dollar amounts were verified through their LEA counseling offices. Many of the students received renewable scholarships for all four years of their post-secondary education.

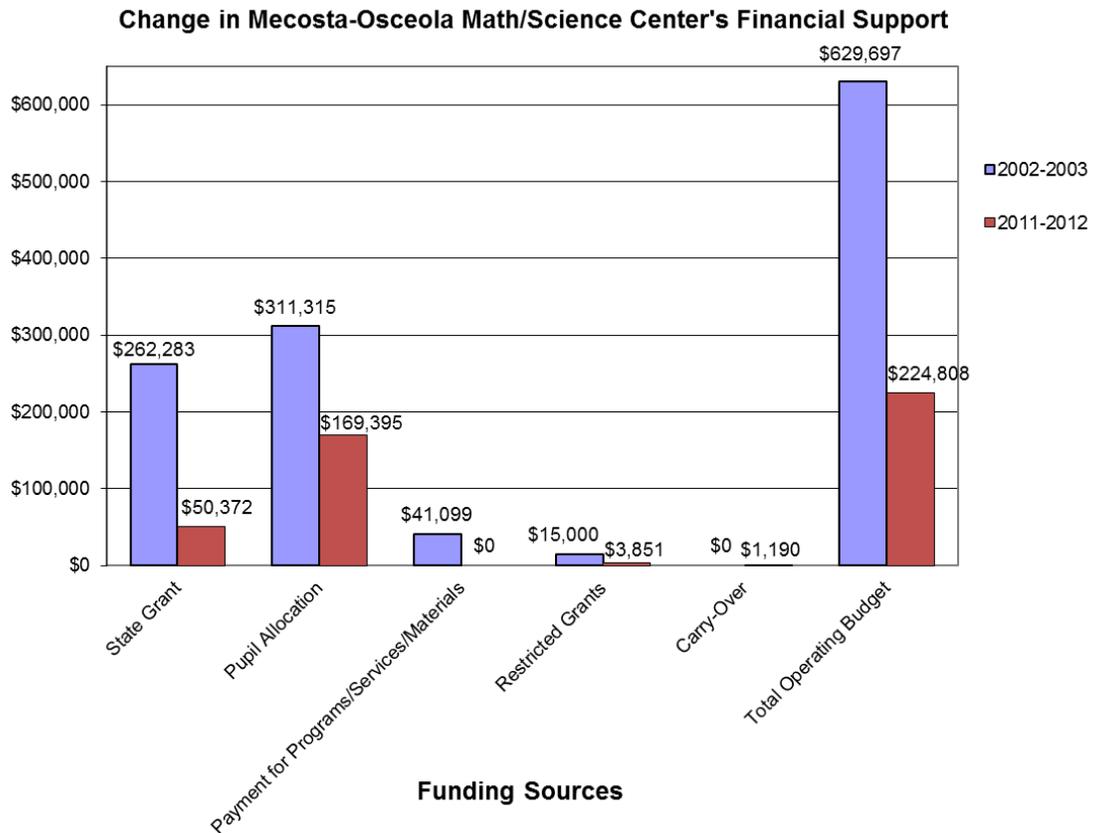


What was the impact of Mecosta-Osceola Math/Science/Technology Center?

<p style="text-align: center;">Impact on Students</p> <ul style="list-style-type: none"> • Awareness of environmental issues • Impact of ecology and habitat • Impact and understanding of life cycle • Awareness of Green technologies • Involvement in student competitions • Student research project • Engagement in student symposium • Literacy • Career education in sciences • Career education in math • Connections to engineering • Engineering is fun • Engineering is contextual 	<p style="text-align: center;">Impact on Teachers</p> <ul style="list-style-type: none"> • More connectedness to professional development • PD is more related to relevant subjects • Teachers' need for access to PD/time away from class is more problematic • Educational communities are more collaborative • Teachers need more time to process PD • Common Core needs to be rolled-out in a more timely manner
<p style="text-align: center;">Impact on Schools</p> <ul style="list-style-type: none"> • Created opportunities that positively affected multiple schools for the least amount of dollars. • Creative professional development scheduling to provide more opportunities for more staff to attend. Offerings held more often in shorter increments, on-site or in teacher classrooms. • Provided math and science outreach. Phasing out high school pull-out program due to financial burden on LEAs. • Schools were appreciative of resources that are pooled to affect larger groups. 	<p style="text-align: center;">Impact on Communities</p> <ul style="list-style-type: none"> • Communities embrace collaborative events that have meaning • Communities understand projects that have a direct impact on their "livelihood" • Projects that are "disconnected" or disjointed do not work for teachers, schools, students, or communities. Systems-based approaches should always be well thought out and meaningful for the stakeholders whom they serve.

Director's 2011-2012 Budget Discussion

HS Pull-out program has only two years left in the cycle as a direct result of the impact of reduction in funding. Our LEAs cannot support the program without state or federal dollars. Throughout the years we have leveraged our resources and shifted this program to keep it “on life support” as long as we could. Our community rallies around it, and our ISD Board has even agreed to fund the MSTC program this past year to “keep it going”. The “brutal facts” are, without an income to support school resources, our high school center-based program cannot continue.



In addition to the financial support illustrated in the graph above, “in-kind” services received by the Center (donated time, facilities, or equipment) were valued at \$20,620.

Director's Summary 2011-2012

This summer our teacher leaders from two districts, Chippewa Hills and Cross Roads Charter Academy, have participated in the SAM3 training. This was not placed in the wrap-up for the 2011/2012 Grant year because it will be a new initiative for the upcoming school year. We are excited about the 12 new teachers who are currently being trained in this initiative and the brand new partnerships that are being forged. The SAM3 training appears to be solid and focused and our new year goals will work into a focused direction.

This past year has also been a process of alignment for our MSTC and we have been slowly crafting our way to aligning a solid program that will best serve our community. Presently our HS pull-out program is a true Math-Science program and it has taken many years to align it into a full cohort model where students take a “pathway” of carefully selected courses and work in tandem. Sadly we are down to our final two years of the program due to lack of funding from our LEAs and unprecedented funding declines from the state. Our ISD combined departments, donated in-kind dollars, leveraged resources, and held together its partnerships with Ferris State University as long as possible. The parents of this community have been extremely supportive, and the media have been astoundingly wonderful as well.

As for Professional Development, our focus has been razor-sharp in preparing for the Common Core roll-out. We have had record participation and growth in our offerings and depth in delivery. Our MSTC team has been well-trained and stands ready to assist our LEAs in their School Improvement needs. Monthly meetings with our area Curriculum experts are held and assessment is discussed as well as addressed through data-driven decisions that are supported through common practices. Our focus continues to be STEM-driven and many products of this can be seen in our students' successes.

Next year the directorship will transfer completely to the General Education Department. This is a solid move as our services become more PD-related. We have two years on our pull-out program. Dr. Harrison will remain as the Director of the HS MSTC program as well as the Green Schools coordinator, and Mr. Locke will serve as the principal. Ferris State University will still serve students for the next two years. We will no longer have an HQ Math/Science teacher. Mrs. Laura Forbes will remain on our staff as a coordinator under General Education and will still be working closely with special projects such as the Family Engineering Night and Science Fair.