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Summary of 2014 STEM Grants

SUPERIOR HUB

Round 1

1. Taking STEM Outside (ends September 2014)

\$2,500

Michigan Tech Center for Science and Environmental Outreach

This project will engage 1000 K-8 students in Houghton, Baraga, Keweenaw, Gogebic and Ontonagon counties in outdoor learning in earth, life and physical science concepts as well as science practices in hands-on field activities.

Round 2

1. Celebrating Lake Superior: Water Festival (ends December 2014)

\$5,476

Michigan Tech Center for Science and Environmental Outreach

This project will engage 1,000 Gr. 4-8 students from local schools in a day-long Water Festival held at MTU's Great Lakes Research Center, building upon highly successful programs launched in 2011 where faculty, graduate students, high school teams, and community members guided students in learning about Lake Superior and how scientists engage in research. The Festival provides students with the opportunity to interact with real-life Great Lakes research scientists sparking interest in STEM careers and potential educational paths. Classroom teachers will prepare students prior to the Festival and extend their learning after.

2. Earn While You Learn (ends December 2014)

\$3,640

Six County Employment Alliance, Escanaba

Earn While You Learn offers youth an opportunity to explore careers while earning a paycheck. This summer activity will grow the career and employability skills of three youth who will be hired as Robotics Camp Facilitators. The Camp is a five week (Monday- Thursday) project that focuses on the development of four weeks of four

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day summer camps for Dickinson County youth ages 7-12 to be held at Bay College West in Iron Mountain.

Youth will:

- Learn the STEM-based curriculum and become familiar with the software and kits via of the LEGO Generation NXT kits and VEX Robotics.
- Plan two workshops for camp participants per skill level -a beginner and advanced curriculum.
- Deliver workshops, compile feedback and document outcomes (number of sessions, participants, satisfaction, etc).

3. Engaging Active STEM Education Through Aquaponics (ends April 2015)

\$7,436

Lake Superior State University, Sault St. Marie

The project aims to provide our local alternative high schools with the necessary equipment and curricular support to learn about aquaponics. This field addresses many areas of STEM education and has the potential to engage disenfranchised youth with an exciting learning model. Students will have the opportunity to learn not only the STEM-related content material but also to actively design a new system.

Aquaponics is a growing field and requires a skill set that is increasingly marketable. This project will give the students both exposure to the essential science and technology and valuable skills to enter this growing market sector.

4. Leading Career STEM Tours for High School Students (ends April 2015)

\$5,112

Michigan Tech Center for Science and Environmental Outreach, Houghton

This project will introduce 300 high school students in Houghton, Baraga, Gogebic, and Ontonagon Counties in learning about STEM career opportunities in earth, life, and physical science, as well as engineering and technology. Ten all-day STEM career tours at Michigan Tech University will be conducted for 30 students per school district that will excite students about the many possible careers within their reach. Students will have the opportunity to interact with presenters and be required to ask questions and record their thoughts after each presentation. This program enriches classroom learning, along with stimulating students' desire to go to college and choose a STEM major.

Presenters will include Michigan Tech faculty and graduate students and guest presenters from consulting firms, government agencies, and industry.

5. Generation of Energy (ends April 2015)

\$5,836

Western UP Michigan Works, Hancock

This program is a collaborative effort between Horizons Alternative High School, New Power Tour, and ETEC and gives students classroom education and hands-on experience in conducting energy efficiency audits and winterizing homes, providing them with insight into the STEM world and experience they can use to strengthen college and job applications. This project is unique because it brings together and benefits three diverse populations - at-risk youth, university engineering students, and low-income (primarily elderly) individuals and families.

6. Rethinking Technology Use for STEM Education (ends April 2015)

\$16,000

**Digital Learning Design Laboratory, Seaborg Center,
Northern Michigan University**

This project will serve approx 2000 students and up to 20 teachers in the UP. Teachers will design a re-imagined curricular unit (technologies embedded) that will be implemented in classrooms during month 5.

BAY HUB

Round 1

1. Summer Mathematics and Science Camp (SuMO Camp) (ends September 2014)

\$7,500

Saginaw Valley State University

The camp will provide 60 under-represented Saginaw County middle school students who are academically and socio-economically challenged with 160 hours of instruction and enrichment activities to increase their academic competencies and interest in mathematics and science.

2. STEM Healthcare Project-Based Learning (ends September 2014)

\$6,100

MI TECH+

To make K-12 STEM education more relevant, real, and engaging through development and implementation of bio-medical and healthcare based projects to teach science, technology, engineering, and math, these funds will be used to support

educators to develop projects in cancer, obesity, and genetics in the Saginaw, Bay, and Midland counties integrating the expertise and talent development needs of regional businesses.

3. The Middle School Manufacturing Experience (MSME) (ends September 2014)

\$4,500

Delta College

Through partnership with local businesses, this project will provide an opportunity for 20 middle school science teachers to become part of a modern manufacturing environment by completing a two week internship experience during summer 2014. Teachers will develop teaching modules based on their manufacturing experience and the experiences of their classmates through enrollment in EDU 214 (The Middle School Manufacturing Experience course at Delta College). In addition, teachers co-teach a lesson with a Delta College instructor in their middle school classroom next fall as part of their coursework.

Round 2

1. Curious Crew (with Rob Stephenson, Teacher of the Year) (first season ends April 2015)

\$25,000

WKAR (Lansing)

WKAR, the Lansing area PBS affiliate will develop 8 TV and on-line shows at the Impression 5 Science Center in Lansing, featuring Rob and MI 3rd-8th grade students. Online instructions for teachers to replicate experiments and activities will also be available.

2. Providing Shelter for Bats, Bluebirds and Wood Ducks (ends September 2014)

\$3,515.80

Au Gres-Sims ROV 4-H club

The 4-H club will work within Saginaw Basin Land Preserves to construct homes for wildlife.

3. A World In Motion (AWIM) (ends April 2015)

\$20,000

Society of Automotive Engineers (SAE)

The award-winning A World In Motion® program aligns to both the Next Generation Science and Common Core Standards. The A World In Motion® (AWIM) program

curriculum joins together teachers, students, and industry volunteers in an exploration of physical science while addressing essential mathematic and scientific concepts and skills. Each of the AWIM program activities incorporates the laws of physics, motion, flight and electronics into age-appropriate hands on activities that reinforce classroom STEM curriculum. Industry volunteers play an essential role in motivating the next generation to pursue careers in science, technology, engineering and math by bringing their everyday experiences into a classroom - right in their community. This grant will involve 800 students in the Bay hub.

4. Hands On Science Kits for the Classroom (ends April 2015)

\$2,400

Linwood Elementary

Students K-5 will engage in experiments with scientific experts from the community leading hands-on activities and in highly engaging field trips through collaboration with community partners.

5. Mother Nature's Classroom (ends April 2015)

\$4,085

Huron ISD

This is a hands-on outdoor education program for 4-5th grade students who will navigate through a series of learning stations using GPS technology.

6. Girls and Mechanical Engineering (ends April 2015)

\$3,700

Bay-Arenac ISD

This 2-day summer camp is designed to promote careers in engineering to females. This grant will supplement a grant from SVSU to allow up to 30 girls to experience 2D and 3D computer modeling, CNC machining, welding, electrical wiring, green screen technology and computer programming.

7. After-School Underwater Robotics Program (ends April 2015)

\$2,475

Williamston High School

Modeled after the program at Stockbridge high school, this program will provide STEM learning opportunities for 25-40 students in grades 9-12 through the construction and modification of underwater ROVs.

8. Engineering Fun in the Science Classroom (ends April 2015)

\$1,440

Bay City Public Schools

Approximately 3,600 students in grades K-5 will engage in *Engineering is Elementary* units, and in collaboration with the SVSU Mathematics and Science Center, all 150 teachers in Bay City will be trained in utilizing the units and implementing them in the classroom.

STRAITS HUB

Round 1

1. STEM Enrichment Through Underwater ROVs (ends September 2014)

\$7,500

Alcona 4-H Student Steward Clubs

Participants: NOAA Thunder Bay National Marine Sanctuary, AMA/Iosco Math Science Center, Northeast Michigan great lakes Stewardship Initiative, regional 4-H and Alpena Community College (ACC) Marine Technology Program

The program will increase STEM awareness among 75 students through the summer and ongoing with after-school activities with underwater ROVs. ACC faculty and marine sanctuary personnel will work with the students on the design, development, and use of the ROVs.

2. Robotics in Early College (ends April 2015)

\$27,989.50

West Shore Educational Service District

This project will:

- Incorporate and institutionalize robotics into the 5th year math curriculum at ASM Early College to increase STEM offerings in the college.
- Create awareness of STEM careers through outreach to elementary children across the region. Local engineers will serve as mentors during summer camps.

Approximately 100 Early College students will be involved in designing, constructing, and demonstrating robots at Friday Night Live community booths, through the MindTrekking event, and shows at Sandcastles Museum to reach about 500 elementary school children. Early College students will complete a robotics video for sharing with businesses across the region, and with the Partnership.

- Increase STEM partnerships across a 4-county region.

3. Rusty Raiders (ends September 2014)

\$7,347.74

Alpena Public Schools / Ella White Elementary & Thunder Bay River Watershed Project

The Robot Factory 4-H Club, an afterschool component of the Thunder Bay project currently serves 60 actively participating members (80 members total) who are engaged in research and mapping of invasive species using underwater robots. This project will allow students to continue and expand their work through the summer, and to participate in the Michigan's Youth Watershed Summit. All students in the Robot Factory 4-H Club are required to participate in the Great Lakes Regional Underwater Robotics Competition.

Round 2

1. Elementary Hands-On Science (ends April 2015)

\$37,562.50

Mason-Lake Oceana Mathematics and Science Center

This project will make Battle Creek Science Kits and project-based science learning available to all elementary school teachers and students in the west shore region as a foundation for permanent inclusion in school budgets in the future.

2. Girls in STEM (ends December 2014)

\$8,470.75

Wexford-Missaukee Technical Center

8th grade girls will attend the Sea Perch camp where they will participate in project-based design and learning activities to construct the *Sea Perch*.

In the fall, these (now) freshmen girls will be challenged to build a wind turbine as part of the Wind Energy camp. This will include a Fab-Lab design experience.

3. LEGO Project (on-going)

\$5,650.17

Wexford-Missaukee Technical Center

These funds will be used to augment remaining funds in the hub to update materials that are now obsolete and to maintain this existing program for 4-7th grade students in 7 school districts.

4. Introducing Students to STEM Careers and Academic Programs

\$7,500

Ferris State University/Char-Em ISD

Through a Professional Careers day, this project will introduce high school students from Char-Em to STEM careers, college STEM programs, role models working in professional STEM careers, current college students in STEM programs, and faculty teaching in those areas. Competitive scholarships will be available to students to attend residential STEM camps offered at Ferris State during the summer, followed by the chance to compete for job shadowing opportunities with industry partners, and to win transportation and tool scholarships.

5. Thunder BOTS & ROBO Cats (ends April 2015)

\$7,500

Alpena Public Schools

The Thunder BOTS are a high school FIRST robotics team who will mentor a new VEX robotics team, the ROBO Cats, at the middle school. The ROBO Cats will also be mentored by local engineers.

6. Cardinal Agriscience (ends April 2015)

\$7,007.60

Mason County Eastern Middle/High Schools

In this program, students will design and build a greenhouse to learn more about STEM approaches to agriscience. The local career and technical education center will be a partner during the building phase. As students use the greenhouse, community food pantries will be supplied with the food as the product of the students' work. Local farmers and farm companies in the area are partners in the learning process for students, offering to be guest speakers and providing site tours in the farming industry for students.

LAKE MICHIGAN HUB

Round 1

1. Build a STEM Foundation (ends September 2014)

\$7,500

Battle Creek Area Mathematics and Science Center

The 'Build a STEM Foundation' project is a series of one-week summer camps held on

the Battle Creek Area Mathematics and Science Center campus for middle school students interested in pursuing an in-depth STEM experience. The four strands offered include: VEX IQ Robotics, Product Development, Renewable Energy, and Biotechnology/Crime Scene Investigation.

2. Middle School STEM Extension Program (ends September 2014)

\$5,425

Hope College Center for STEM Inquiry, Step Up

The Middle School STEM Extension Program will build on Hope College's successful summer science and engineering programming to create STEM focused learning modules for middle school grades. The program will support classroom and outside-the-classroom educators who wish to supplement their students' science and math learning with real world experiences.

Round 2

1. Increasing Student Engagement through Maker Spaces (ends April 2015)

\$17,481

Allegan Area Educational Service Agency

a) Allegan County 4th-8th graders in summer science-themed reading programs will engage in project-based STEAM activities (read-then-do model, aimed at encouraging boys and girls to read) based on the Nick and Tesla mystery books.

b) Instructional staff at the Allegan County Area Technical & Education center (ACATEC) will work with 11th-12th graders to create a portable Maker Space that will be used by students, staff and the community.

2. Exploring STEM with Unmanned Aerial Vehicles (ends April 2015)

\$5,578.97

Kent Intermediate School District

A train-the-trainer model will be used to integrate UAVs in the K-12 STEM curriculum in Kent ISD. Students will be used as co-teachers and an on-line library of STEM lessons will be created.

3. First Lego League – F. C. Reed Middle School (ends April 2015)

\$4,100

Bridgman Public Schools

A robotic program for fifth and sixth grade students at F.C. Reed Middle School will

be formed to excite children about science and technology. Students will work in teams to program robots based on a scenario assigned at the beginning of the school year.

4. STREAM...Connecting Students, Classrooms and Nature (ends December 2014)

\$4,000

Outdoor Discovery Center Macatawa Greenway

STREAM is a multi-discipline program focused on providing project-based learning for students who may be challenged in traditional classrooms. The Outdoor Discovery Center will partner with Hamilton Middle School to engage students in practical environmental problems that confront their community, requiring the students to work on real world issues that affect them directly.

5. LEGO Lab (ends April 2015)

\$7,500

Otsego Public Schools

Otsego will create an engaging LEGO Lab environment to use with students in preschool through eighth grade during the school day and in after-school LEGO Robotics teams. Through the use of the lab, Otsego will increase the opportunity for students to experience hands-on, inquiry approaches to science, math, scientific literacy and engineering concept including computer programming.

6. Math-Team-Matics (ends February 2015)

\$3,608

Grand Valley State University

The Math-Team-Matics competition's main purpose is to engage West Michigan students in mathematics through collaborative work. The students must think critically, work well together, problem-solve, and sometimes even think creatively to compete at a high level. A secondary purpose is to gather math enthusiasts in one place so these like-minded students can meet each other.

SAINT CLAIR HUB

Round 2

1. A World In Motion (AWIM) (ends April 2015)

\$25,000

Society of Automotive Engineers (SAE)

The award-winning A World In Motion® program aligns to both the Next Generation

Science and Common Core Standards. The A World In Motion® (AWIM) program curriculum joins together teachers, students, and industry volunteers in an exploration of physical science while addressing essential mathematic and scientific concepts and skills. Each of the AWIM program activities incorporates the laws of physics, motion, flight and electronics into age-appropriate hands on activities that reinforce classroom STEM curriculum. Industry volunteers play an essential role in motivating the next generation to pursue careers in science, technology, engineering and math by bringing their everyday experiences into a classroom - right in their community. This program will include 1000 students in the St. Clair hub.

2. A Mathematics Teacher's Circle (ends April 2015)

\$26,300

Wayne RESA

Middle school math teachers from all 33 school districts in Wayne County will form a learning/supportive circle to improve math teaching by focusing on the 8 Standards for Mathematical Practices. Approximately 40 classroom teachers will learn how to present math in a project-based, applied way to make learning relevant to middle school students. They will learn from UM professors and personnel from Wayne RESA as well as from each other over the course of the next school year.

3. Exploring the Use of Spectrophotometers in Soil and Water Sampling

(ends April 2015)

\$4,526.00

Beacon Day Treatment

Students in a high school chemistry class at a day treatment center for students with severe emotional impairments will conduct chemical analysis of soil and water, focusing on the area around the school building, for the purpose of assessing pollution in the larger community, and potential harmful impacts of environmental contaminants that may be affecting them every day. Due to their disabilities and school history, these students have had limited opportunity to learn science from anything but a textbook. Yet despite their inexperience with laboratory science, these students demonstrate curiosity, critical thinking and respect for equipment and materials when engaged with hands-on experiences, especially when the experiences are relevant to them personally.

4. Tools of the Trade (ends April 2015)

\$7,270.60

Detroit Public Schools: East English Village

This is a chemistry project that will bring 21st Century lab equipment to students at East English Village Preparatory Academy, a school within Detroit Public Schools. The materials will provide new lab experiences that meet state objectives in STEM areas as well as scientific inquiry, energy and heat, properties of matter and changes of matter, that currently do not have project-based activities associated with learning concepts.

Lab activities allow students to conduct simulated real world practices while providing skills to better prepare them to pursue careers in science and technology fields. Students that do not have an opportunity to engage in hands on lab activities generally do not pursue STEM based careers in the future. Additionally, lab activities allow the teacher to act as the coach, with learning focused on the student. The project will run from September 2014 - March 2015 and will resume each fall.