

The Glenn T. Seaborg Center for Teaching and Learning Science and Mathematics

**FIVE YEAR STRATEGIC PLAN INCORPORATING QUALITY INDICATORS
2013-14 to 2018-2019**

Performance Effectiveness Indicator for LEADERSHIP:

Centers assess needs, leverage resources, and promote collaboration in improving mathematics and science education

Identified Leadership Needs Based on a Current Comprehensive Needs Assessment:

- Continue to develop and strengthen the connections between K-12 education, Marquette-Alger Regional Educational Service Agency (MARESA), linking the Marquette-Alger education community with Northern Michigan University (NMU) faculty and NMU students from the mathematics, education, and science departments providing professional development, student programming and community programming throughout Marquette and Alger counties.
- Advocate for science, technology, engineering, and mathematics resources, both human and physical, to develop the Center to enable Marquette-Alger educators' resources for "best practices" for the teaching and learning of STEM topics through various activities.
- Develop math/science school building leaders to cultivate community, increase leadership, and foster communication in the schools and the community. There is a need for local building teachers to share local, regional, State, and National initiatives and important curriculum, professional development, and student services information with building teachers.

Center Five Year Goals for Leadership:

- L1. Build the leadership infrastructure for promoting science and mathematics education throughout Marquette and Alger Counties
- L2. Provide local leadership for mathematics and science education and inform constituents about local, regional, State and National initiatives and information
- L3. Provide outreach coordination of programming and dissemination of information about Seaborg Center programs and services available to mathematics and science educators
- L4. Pursue innovation and resource development through grant writing, NMU Foundation funding, and community engagement.

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FOCUS OF PROGRAMMING YEAR ONE —LEADERSHIP

L1. Build the leadership infrastructure for promoting science and mathematics education throughout Marquette and Alger Counties;		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
L1.1 Work with the other four U.P. mathematics-science centers to share programs	1. Did Centers meet to plan shared professional development?	1. Meeting notes, professional development flyers, agendas and rosters demonstrating shared P.D.
L1.2 Coordinate efforts with the Marquette-Alger Regional Educational Service Agency, Michigan STEM Partnership, and the NMU School of Education, Leadership and Public Service to support programs	2. Were grants, professional development, and facilities utilized in coordination with MARESA, the Michigan STEM Partnership, and the School of Education?	2. Grants, professional development, and resources produced in coordination with MARESA, the Michigan STEM Partnership, and the School of Education
L2. Provide local leadership for mathematics and science education and inform constituents about local, regional, State and National initiatives and information		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
L2.1. Seaborg representative will participate on Michigan Science Olympiad Board and attend state-level meetings and trainings.	1. Was there Seaborg representation at the state-level for Mi. Science Olympiad?	1. Minutes, travel records, attendance records
L2.2 Seaborg Center Staff provides updates and information for Marquette-Alger schools about current standards.	2. Were constituents informed about local, regional, state and national Initiatives?	2. Science & Mathematics Update reports, reports of learning team workshops and meetings, and electronic records
L3. Provide outreach coordination of programming and dissemination of information about programs and services available to mathematics and science educators;		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
L3.1 Use website, list-serves, and site visits to perform outreach and disseminate information.	1. Were services and program information delivered to science and mathematics educators?	1. Agendas, rosters, session evaluations, SAMPI data records
		2. Science & Mathematics Update reports, website analytics, electronic records, and calendar appointments (records of visits)

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L4. Pursue innovation and resource development through grant writing, NMU Foundation funding, and community engagement.		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
L4.1. Work with the Northern Michigan University foundation to raise funds for ongoing endowment for Seaborg Center.	1. Were community commitments obtained to support the Center?	1. Meeting logs w/ NMU Foundation personnel, financial commitments, informational flyers, and records of visits to potential supporters.
L4.2 Support innovation and resource development by writing grants that support programs.	2. Were grants obtained to support innovation and build resources?	2. Grant awards and submissions, budget transactions, physical evidence such as room use and resource lists and their use.

Performance Effectiveness Indicator for PROFESSIONAL DEVELOPMENT:

Educators who participate in Center Professional Development reflect best instructional practices in their own settings.

Identified Professional Development Needs Based on a Current Comprehensive Needs Assessment:

- Surveys of the Marquette-Alger mathematics & science teachers, ranked the following topics as important for professional development, how to use inquiry-based instructional strategies in the science and mathematics classrooms, how to use technology effectively in science and mathematics classrooms, and how to improve the effectiveness of cooperative learning groups in science and mathematics classrooms.
- A need for building a community of learners, educators that share a desire to teach mathematics and science and learn from each other across the grade levels mutually providing and receiving high quality professional development opportunities through the Seaborg Center and NMU faculty partnerships.

Center Five Year Goals for Professional Development:

PD1. Provide long-term professional development programs for mathematics and science teachers;

PD2. Provide workshops, conferences and other programs on-site, in the schools, and with distance-learning technologies;

PD3. Promote and demonstrate contemporary technologies and their uses in the classroom.

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FOCUS OF PROGRAMMING YEAR ONE—PROFESSIONAL DEVELOPMENT

PD1. Provide long-term professional development programs for mathematics and science teachers;		
<p>List of planned programs for Year One:</p> <p>MSP – Greater Proficiency in Mathematics</p> <p>PD1.1 Hold a 15-day series of training for teams of teachers from local elementary and middle-schools to reinforce teacher understanding of math concepts and then look at student work and pedagogy.</p> <p>PD1.2 Begin grade level teacher leader training on engineering practices and cross-cutting concepts in the Michigan’s Career and College Readiness Standards.</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <ol style="list-style-type: none"> 1. Were activities conducted to address each of the planned programs and did teachers participate in the sessions? 2. Were activities conducted to address each of the planned programs and did teachers participate in the sessions? 	<p>References for data gathering:</p> <ol style="list-style-type: none"> 1. Agendas, rosters, session evaluations, SAMPI data records, school visits 2. SEC work on-line 3. Lesson observations of inquiry-based mathematics and science instructional strategies
PD2. Provide workshops, conferences and other programs on-site, in the schools, and with distance-learning technologies;		
<p>List of planned programs for Year One:</p> <p>PD2.1 Provide professional development in mathematics to all grade levels through grants programs.</p> <p>PD2.2 Provide professional development in science to certain grade levels through Seaborg Center sponsored programs.</p> <p>PD2.3 Provide program support in mathematics and science at the Fall Conference for Educators</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <ol style="list-style-type: none"> 1. Were activities conducted to address each of the planned programs? 2. What mathematics grant funded PD did the teachers engage in? 3. Did teachers participate in Seaborg Sponsored Science professional development? 	<p>References for data gathering:</p> <ol style="list-style-type: none"> 1. Agendas, rosters, session evaluations, SAMPI data records 2. Programs for Fall Conference for Educators 3. Calendar of Seaborg Center PD

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PD3. Promote and demonstrate contemporary technologies and their uses in the classroom.		
<p>List of planned programs for Year One:</p> <p>PD3.1 Provide professional development using technology for a variety of grade levels.</p> <p>PD3.2 Provide support for educators to learn new educational technologies.</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <p>1. Were activities conducted to address technology use and application in the classroom.</p>	<p>References for data gathering:</p> <p>1. Agendas, rosters, session evaluations, SAMPI data records concerning PD with a technology component.</p>

Performance Effectiveness Indicators for STUDENT SERVICES:

Students impacted (directly and indirectly) by Center programs demonstrate progress toward mathematics and science literacy

Students will elect to participate in mathematics and science opportunities in greater numbers

Identified Student Service Needs Based on a Current Comprehensive Needs Assessment:

- The Center's capacity to serve increasing numbers of students in our student programs will require increasing staff and funding proportionally.
- Expansion of other K-12 student programs requiring NMU faculty participation is limited since NMU faculty are already participating in other Seaborg Center student programs (e.g., NMU faculty participation in Science Olympiad and First Lego League Robotics Tournament).
- There is a need to encourage under-represented students to pursue mathematics and science.
- There is a need to expand Science, Technology, Engineering, and Mathematics (STEM) career exposure to preK-12 students.

Center Five Year Goals for Student Services:

- SS1. Provide opportunities for pre-college students to experience science, technology, engineering, and mathematics (STEM) in environments that convey the nature of contemporary science and mathematics and that motivate students to pursue the study of STEM fields;
- SS2. Offer challenging enrichment programs that meet the needs of various student populations including gifted and talented students and under-represented and under-served students (minorities, females, low-income, and students from small rural schools);
- SS3. Create an awareness of career opportunities in science, technology, engineering, and mathematics (STEM) for students and their families.

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FOCUS OF PROGRAMMING YEAR ONE—STUDENT SERVICES

<p>SS1. Provide opportunities for pre-college students to experience science, technology, engineering, and mathematics (STEM) in environments that convey the nature of contemporary science and mathematics and that motivate students to pursue the study of STEM fields;</p>		
<p>List of planned programs for Year One:</p> <p>SS1.1 Organize a series of Saturday programs (College for Kids) for grades K-8, conducted by pre-service students at Northern Michigan University;</p> <p>SS1.2 Support Lego® Robotics programs for K-12 with Marquette-Alger schools</p> <p>SS1.3 Provide week-long programs for Grades K-8 in Summer College for Kids – outdoors & technology components</p> <p>SS1.4 Provide STEM Partnership activities/programs for K-12.</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <ol style="list-style-type: none"> 1. Were programs relevant and stimulating to students? 2. Did sufficient numbers of student attend programs? 3. Did students enroll in more than one of our programs – repeat enrollment? 	<p>References for data gathering:</p> <ol style="list-style-type: none"> 1. Student evaluations, pre and post test data, and enrollment data. 2. SAMPI database records 3. Qualitative and anecdotal feedback

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SS2. Offer challenging enrichment programs that meet the needs of various student populations including gifted and talented students and under-represented and under-served students (minorities, females, low-income, and students from small rural schools);		
<p>List of planned programs for Year One:</p> <p>SS2.1 Host the U.P. FIRST Lego® League Tournament (ages 9-14)</p> <p>SS1.2 Sponsor the 2014 Region I U.P. Science Olympiad Tournament (MS & HS);</p> <p>SS2.3 Provide scholarships for College for Kids through Child and Family Services, Big-Brothers, Big-Sisters and other community organizations</p> <p>SS2.4 Host the bi-annual Young Women in Mathematics, Science and Technology Conference – May 2014.</p> <p>SS2.5 Host the Upward Bound Math and Science program</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <ol style="list-style-type: none"> 1. Did we host FIRST Lego® Tournament and U.P. Region 1 Science Olympiad Tournament? 2. Did we provide opportunities for low-income and/or underrepresented populations through scholarships, etc. 	<p>References for data gathering:</p> <ol style="list-style-type: none"> 1. Enrollment data; program descriptions & SAMPI data base records 2. Contacts with representatives from low-income housing, Family Services, Pathways, Native American Youth programs, etc. to document outreach with these groups.

SS3. Create an awareness of career opportunities in science, technology, engineering, and mathematics (STEM) for students and their families.		
<p>List of planned programs for Year One:</p> <p>SS3.1 Young Women in Mathematics, Science and Technology Conference.</p> <p>SS3.2 Host Family Engineering Night activities for K-5 students in the Marquette-Alger counties.</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <ol style="list-style-type: none"> 1. Were programs offered, and were they effective in attracting participation from the target student population? 	<p>References for data gathering:</p> <ol style="list-style-type: none"> 1. Enrollment data; program descriptions & SAMPI data base records 2. Qualitative and anecdotal feedback. 3. Record of STEM professionals involved in activities/conferences

Performance Effectiveness Indicator for CURRICULUM SUPPORT:

Districts will develop and implement aligned curricula in mathematics and science classrooms

Identified Curriculum Support Needs Based on a Current Comprehensive Needs Assessment:

- Concern and a need for training with the implementation and assessment of Michigan's Career and College Readiness Standards.
- There is a need to provide mathematics and science educators with leadership in curricula program areas at the State and National levels.

Center Five Year Goals for Curriculum Support:

- CS1 Provide teachers and administrators with a clear vision of the National and State standards for mathematics and science education; including the Michigan Career and College Readiness Standards.
- CS2 Assist schools and teachers in the process of effectively aligning their curricula with National and State standards;
- CS3 Offer assistance with technology training and the materials required for the implementation of mathematics and science curricula.

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FOCUS OF PROGRAMMING YEAR ONE—CURRICULUM SUPPORT

CS1 Provide teachers and administrators with a clear vision of the National and State standards for mathematics and science education; including the Michigan Career and College Readiness Standards.		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
<p>CS1.1 Host informational sessions on the career and college readiness standards in math and science.</p> <p>CS1.2 Provide PD centered around understanding changes in the state's content standards.</p>	<ol style="list-style-type: none"> 1. Were informational sessions and curriculum workshops conducted? 2. Are curriculum alignment activities taking place in the area schools? 	<ol style="list-style-type: none"> 1. Rosters, agendas, SAMPI database 2. Workshops agendas, Math & Science grade level alignment documents, curriculum documents

CS2: Assist schools and teachers in the process of effectively aligning their curricula with National and State standards;		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
<p>CS2.1 Work with Marquette-Alger RESA to help schools analyze MEAP data to identify areas of weakness in their curriculum.</p> <p>CS2.2 Hold Math and/or Science grade level team meetings with teacher-representative from each district to examine areas of weakness in the curriculum and make recommendations for professional development.</p>	<ol style="list-style-type: none"> 1. Were data-analysis sessions conducted? 2. Were Math and Science grade level team meetings conducted? 3. Did these teams produce recommendations for professional development? 	<ol style="list-style-type: none"> 1. Records of professional development sessions rosters, agendas, SAMPI database 2. Recommendations for professional development and curriculum alignment (documents)

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CS3 Offer assistance with technology training and the materials required for the implementation of mathematics and science curricula.		
<p>List of planned programs for Year One:</p> <p>CS3.1 Work with Marquette-Alger RESA to help schools analyze needs using online assessment technology.</p> <p>CS3.2 Hold Math and Science workshops where technology training and online assessment creation are a part of the agenda.</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <ol style="list-style-type: none"> 1. Were data-analysis sessions conducted with MARESA? 2. Were Math and Science grade level team meetings conducted and was technology a part of the training? 	<p>References for data gathering:</p> <ol style="list-style-type: none"> 1. Records of professional development sessions rosters, agendas, SAMPI database 2. Recommendations for technology use (documents)

Performance Effectiveness Indicator for COMMUNITY INVOLVEMENT:

Individuals and groups from the community understand and support the goals and activities of the Center

Identified Community Involvement Needs Based on a Current Comprehensive Needs Assessment:

- There is a need for programming that will engage families in mathematics and science and a parental component added to all Seaborg Center events.
- The Community and non-educators lack awareness about the Seaborg Center and strategies need to be increased that will improve the visibility of the Center in the region.
- There is a need to partner with community agencies and businesses to support programming in the areas of science, technology, engineering, and mathematics (STEM).

Center Five Year Goals for Community Involvement:

- CI1 Offer programs of interest to adults as well as to children, adding moments or components to certain Seaborg programs, to invite parental involvement.
- CI2 Work cooperatively with educational agencies and the community to raise awareness of educational programs involving science, technology, engineering, and mathematics in our community and at the Center.
- CI3 Seek community partnerships, involvement and support in advancing science, technology, engineering, and mathematics education.

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FOCUS OF PROGRAMMING YEAR ONE—COMMUNITY INVOLVEMENT

CI1 Offer programs of interest to adults as well as to children, adding moments or components to certain Seaborg programs, to invite parental involvement.		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
CI1.1 Support the annual Kaleidoscope Kids Fair with Planetarium presentations for adults and children	1. Were activities performed, and did they involve adults as well as children?	1. Community announcements, publicity, and activities entered under "Other" for the SAMPI database. 2. Photos, documents of event, email correspondences
CI1.2 Support Harbor Fest with STEM exploration stations for children and adults		
CI1.3 Hold Family Engineering Nights at local schools for students and their parents to explore STEM topics		
CI1.4 Host presentation from the xSci Africa participants for adults and children to attend?		

CI2 Work cooperatively with educational agencies and the community to raise awareness of educational programs involving science, technology, engineering, and mathematics in our community and at the Center.		
List of planned programs for Year One:	Assessment Questions for Center Performance Effectiveness	References for data gathering:
CI2.1 Use the Center website to post educational programs	1. Were programs and activities performed and advertised through multiple venues?	1. Community announcements, publicity, and activities entered under "Other" for the SAMPI database. 2. Photos, documents of event advertisements/brochures, email correspondences 3. Use Website analytics to track use
CI2.2 Use signage and banners to promote opportunities		
CI2.3 Work with NMU resources and the Superior STEM Hub to promote educational programs		

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CI3 Seek community partnerships, involvement and support in advancing science, technology, engineering, and mathematics education.		
<p>List of planned programs for Year One:</p> <p>CI3.1 Use the Superior STEM Hub to help organize Harbor Fest event</p> <p>CI3.2 Reach out to community agencies to support (financially and with in-kind) opportunities in Robotics programs</p>	<p>Assessment Questions for Center Performance Effectiveness</p> <ol style="list-style-type: none"> 1. Did the Seaborg Center use the Superior STEM Hub to help create community partnerships that supported STEM education events? 2. Was support gained for STEM programs, including robotics programs? 	<p>References for data gathering:</p> <ol style="list-style-type: none"> 1. Community announcements, publicity, and activities entered under "Other" for the SAMPI database. 2. Photos, documents of event, email correspondences

Performance Effectiveness Indicator for RESOURCE CLEARINGHOUSE:

Resources provided by Centers are used to support best practices in mathematics/science education

Identified Resource Needs Based on a Current Comprehensive Needs Assessment:

- There is a need is to find virtual technologies that are effective and simple to use.
- There is a need to maintain a web presence of digital resources for educators, students, and parents.
- There is a need to publicize the availability of Seaborg Center resources, professional development and student programs.

Center Five Year Goals for Resource Clearinghouse:

RC1 Maintain a resource center available to teachers in Marquette and Alger Counties;

RC2 Maintain electronic information-dissemination and communication systems for Marquette-Alger educators

RC3 Promote the effective use of technology in the Upper Peninsula in mathematics and science education and serve as a clearinghouse for on-line accessible resource information.

RC4 Establish greater awareness and utilization of the resources available through the Seaborg Center.

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FOCUS OF PROGRAMMING YEAR ONE —RESOURCE CLEARINGHOUSE

RC1: Maintain a resource center available to teachers in Marquette and Alger Counties;		
List of planned programs for Year One: RC1.1 Post a list of equipment that may be loaned to area teachers, inventory and track equipment: graphing calculators, GPS units, etc. RC1.2 Promote NASA ERC during teacher workshops/professional development	Assessment Questions for Center Performance Effectiveness 1. Was equipment list posted/updated as needed on the Web? 2. Did teachers borrow equipment? 3. Did teachers receive NASA educational materials?	References for data gathering: 1. Check-out records documenting use 2. Web-site analytics for Resource page 3. NASA Weekly Activity Reports
RC2 Develop electronic information-dissemination and communication systems for Marquette-Alger educators		
List of planned programs for Year One: RC2.1 Maintain email lists for Mathematics and Science teachers for updates and information distribution throughout each district RC2.2 Explore social media outlets for information distribution	Assessment Questions for Center Performance Effectiveness 1. Were points of contact updated? 2. Are email-lists maintained and current 3. Are updates and information forwarded to all districts?	References for data gathering: 1. Lists of points of contacts for each school 2. E-mail lists and evidence that information is effectively disseminated.
RC3 Promote the effective use of technology in the Upper Peninsula in mathematics and science education and serve as a clearinghouse for on-line accessible resource information		
List of planned programs for Year One: RC3.1 Work with NMU technology Departments for on-line support to set up technologies to update the department	Assessment Questions for Center Performance Effectiveness 1. Was the Web site maintained with current information?	References for data gathering: 1. Web site appearance and information 2. Applications, emails, technologies available

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RC4: Establish greater awareness and utilization of the resources available through the Seaborg Center;		
List of planned programs for Year One: RC4.1 Update the Seaborg Center Web site with current lists of resources, professional development, and student programs	Assessment Questions for Center Performance Effectiveness 1. Was the Web site maintained with current information?	References for data gathering: 1. Web site appearance and information 2. Web site analytics