

The Glenn T. Seaborg Mathematics and Science Center 2006-2007 Annual Report

The mission of the Glenn T. Seaborg Center is to enrich the knowledge and understanding of science and mathematics in students and teachers of the Upper Peninsula (Pre-K through College). The Seaborg Center's primary service area encompasses Marquette and Alger counties in the Upper Peninsula of Michigan, including 13 public school districts, several private and charter schools, and pre-service and in-service teachers enrolled at Northern Michigan University.

Overview of the Year's Accomplishments

Professional Development:

- Mathematics-Science Partnership Grant "Building Bridges" for middle and high school mathematics teachers: This was the second year of the Mathematics-Science Partnership (MSP) grant between the five Upper Peninsula mathematics and science centers, Lake Superior State University, Michigan Technological University, and Northern Michigan University. Nineteen area teachers continued their sustained professional development through lesson study, sharing sessions, and training in mathematics content.
- Fall Conference for Educators: Held on October 13, 2006, this conference was organized in cooperation with Marquette-Alger RESA, with an attendance of over 1000 participants. Four hundred teachers and administrators attended mathematics and science sessions sponsored by the Seaborg Center, including roll-out sessions for the new High School Course Content Expectations.

Student Programs – Regional Events:

- AGES (Summer healthcare internships for high school students): The Seaborg Center worked jointly with the Northern Area Health Care Education Center and Marquette General Hospital to host a 3-day residential program in geriatric healthcare for 38 high school students who were participating in internships at regional healthcare facilities.
- Lake Superior Youth Symposium: The Center coordinated this symposium for students in 8th – 12th grades from throughout the Lake Superior basin, including schools in Canada. This 4-day residential program served 137 students and teachers who participated in events dealing with the science, environment, and culture of the Lake Superior region.
- Science Olympiad Tournament & Coaches workshop: This was the 20th year that the Seaborg Center has sponsored the Upper Peninsula Science Olympiad Tournament for over 300 middle and high school students. The Center also hosted a Science Olympiad Coaches Workshop in the fall in order to help recruit teams and new coaches.

Student Programs – Center Events:

- College for Kids & After-school LEGOS®: The Center conducts a series of weekend and summer enrichment classes called "College for Kids" for student in grades K-8. This year's programs had 500 students in 42 different classes. For the first time, the Center sponsored a series of 5-week after school programs in "Simple Machines with LEGOS®" and "NXT Robotics." These programs were held on-site at eight elementary and two middle schools for a total of 50 sessions, serving 162 students.

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 in the entire service area. In addition, there will be a narrative targeting work done with underachieving 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?

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

Table 1: Participants Receiving Professional Development

Participants			Reported Gender**		Position					
			M	F	Admin	Math Tchr	Sci Tchr	Tech	Comb Subj	Other or Unknown*
Pre-School	2	14	0	2	0	0	0	0	1	1
Elementary	219	1880.5	31	187	11	2	1	3	197	5
Middle/Jr. High	80	1221	32	46	4	15	20	12	13	16
High School	100	1775.5	54	45	4	30	32	22	9	3
K-12 Mixed Levels	51	750	24	27	15	4	13	6	6	7
Other*	9	72.5	5	4	0	0	0	0	1	8
Total	461	5713.5	146	311	34	51	66	43	227	40

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

** Gender was not reported by all individuals.

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 (each building on the previous 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 12.4 hours on mathematics, science, or technology professional development.

Table 2: Professional Development Activities

		Math	Science	Technology	Total
Elementary	Events	1	0	0	1
	Hours	2	0	0	2
	# Participants	6	0	0	6
Elementary & Middle School/Jr. High	Events	2	6	1	9
	Hours	7	28.5	10	45.5
	# Participants	19	53	16	88
Middle School/Jr. High	Events	5	1	0	6
	Hours	27	2	0	29
	# Participants	32	11	0	43
Jr. High & High School	Events	11	6	0	17
	Hours	79	32.5	0	111.5
	# Participants	154	77	0	231
High School	Events	5	0	0	5
	Hours	22	0	0	22
	# Participants	26	0	0	26
K-12 Mixed Levels	Events	5	5	0	10
	Hours	22.5	20	0	42.5
	# Participants	488	93	0	581
Total	Events	29	18	1	48
	Hours	159.5	83	10	252.5
	# Participants	725	234	16	975

Spotlight on Partnerships

The Seaborg Center has a sustained partnership with Northern Michigan University (NMU), which furnishes our facilities and funds a portion of our base budget. In return, the Center conducts professional development activities that link K-12 teachers with faculty members from the mathematics, education and science departments. NMU's elementary education students conduct our weekend College for Kids programs under the supervision of Center staff. The Center also participates in university committees and on-campus activities.

The Seaborg Center partnered with the Northern Area Health Education Center and Marquette General Hospital to host a three-day residential program for 37 high school students participating in the AGES Program (Area Geriatric Education Scholars). These talented students were selected to receive paid summer internships at approximately 15 regional geriatric care facilities throughout the Upper Peninsula. In their three days on campus, students learned about healthcare professions from faculty and staff at Marquette General Hospital, Northern Michigan University, and Wayne State University. They visited Marquette General Hospital and a local geriatric care facility, and they received six hours of training in CPR. A major goal of this program is to interest Upper Peninsula students in careers in healthcare. Our region has a shortage of healthcare workers and students who live in the area are good recruits.

This year, the Seaborg Center coordinated the 2007 Biennial Lake Superior Youth Symposium, held in Big Bay, Michigan on May 10-13. The symposium brought together 137 students in grades 8-12 from Michigan, Wisconsin and Ontario to focus on the shared environmental concerns of the Lake Superior Basin. Activities included hands-on explorations, field trips, watershed research, speakers, and interactive problem-solving sessions. Throughout the symposium, participants worked to develop a project to implement when they return home to improve and/or protect the quality of life in the Lake Superior basin. The Center partnered with the following agencies to provide financial and in-kind support for the symposium: Alger Conservation District, COSEE Great Lakes – Centers for Ocean Sciences Education Excellence (NOAA/NSF), Great Lakes Center for Youth Development, Hiawatha National Forest (USDA Forest Service), Lake Superior Bi-National Forum, Marquette Area Public Schools, Michigan Department of Natural Resources, Michigan Sea Grant Program, Michigan State University's Extension Program in Alger County, Michigan Technological University, Moosewood Nature Center, Northern Michigan University's Center for Native American Studies, Pictured Rocks National Lakeshore (National Park Service), Superior Watershed Partnership, US Fish and Wildlife Service, and the Western Upper Peninsula Center for Science, Mathematics and Environmental Education.

Spotlight on Professional Development

Mathematics-Science Partnership (MSP) Grant "Building Bridges": Middle and High School Mathematics:

This was the second year of this grant for Upper Peninsula middle and high school mathematics teachers. The grant is a regional effort with participation from approximately 100 teachers, all five U.P. mathematics and science centers, and the area's three universities. Only one teacher of the Seaborg Center's original group of 22 declined to participate in year two of the grant, while two others were laid off due to staff reductions. The remaining 19 teachers continued to explore "best practices" through lesson study and increase their content-knowledge through summer workshops or courses. Due to the new high school course content expectations for mathematics, teachers expressed increased concern about Algebra instruction for all students. This was a major focus of lesson study, as well as the topic of Northern Michigan University's summer institute.

Although the grant ended in August 2007, most of the participating teachers would like to continue their involvement with lesson study activities. The grant has helped to form leadership alliances and learning communities that will last into the future. Participating teachers have presented their lesson study activities at the 2006 Fall Conference for Educators, as well as at other workshops, and they have attended other professional development conferences, such as the Michigan Council of Teachers of Mathematics (MCTM).

Michigan Environmental Education Supplements (MEECS):

Local teachers have been extremely enthusiastic about the quality of materials provided by these curriculum supplements. Due to their popularity, the Seaborg Center sponsored a final set of workshops in the fall of 2006 on each of the units: Water Quality, Air Quality, Ecosystems and Biodiversity, Land Use, and Energy. Sixty teachers attended these five sessions, as well as an additional nine teachers who attended a two-day Ecosystems course this summer. Environmental education is a strong point of our local districts, as well as an area of emphasis at the Seaborg Center and Marquette-Alger RESA.

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:

- ❖ After-school and summer enrichment and support programs: after-school Legos® and Robotics, Weekend College for Kids, Summer College for Kids
- ❖ Organization of science and mathematics fairs and academic competitions: Kaleidoscope Kids Fair, Region I Science Olympiad Tournament, Upper Peninsula FIRST Lego® Robotics Tournament

Needs-based scholarships are available for the Seaborg Center's College for Kids program through referrals from a social agency, Big Brothers or Big Sisters, or a school administrator.

Table 3: Student Services Activities Provided in 2006-2007

		Math	Science	Technology	Total
Elementary	Events	0	37	9	46
	Hours	0	239	105	344
	# Participants	0	510	151	661
Elementary & Middle School/Jr. High	Events	0	8	4	12
	Hours	0	53	40	93
	# Participants	0	135	54	189
Middle School/Jr. High	Events	0	2	1	3
	Hours	0	16	15	31
	# Participants	0	27	16	43
Middle School/Jr. High & High School	Events	0	2	0	2
	Hours	0	150	0	150
	# Participants	0	145	0	145
High School	Events	0	1	0	1
	Hours	0	30	0	30
	# Participants	0	38	0	38
Total	Events	0	50	14	64
	Hours	0	488	160	648
	# Participants	0	855	221	1076

What was the impact of the Glenn T. Seaborg Mathematics and Science Center?

Impact on Students

- Mathematics-Science Partnership Mathematics Grant (MSP): Middle school students whose teachers participated in the grant increased their scores on pre- and post-tests by an average of 8%, compared to 0.6% for control teachers.
- Forty-two sessions of College for Kids served approximately 500 students in 25 schools.
- LEGOs® and NXT Robotics were held on-site at 10 schools, serving 162 students.
- U.P. Region 1 Science Olympiad: 300 students participated in the 2007 event. Participation increased by one additional high school from 2006.
- The AGES program (Area Geriatric Education Scholars) provided 38 high school students with three days of on-campus training in geriatric health care.
- The Lake Superior Youth Symposium brought together 137 participants from throughout the Lake Superior basin.

Impact on Teachers

- Mathematics-Science Partnership Mathematics Grant (MSP): Lesson observations by evaluators indicated that 58% of grant teachers designed lessons that developed conceptual understanding, compared to 25% of the control group.
- MMLA sessions targeted new Grade Level Content Expectations.
- HS MASS: In pre- and post- surveys, teachers reported statistically significant improvements in 1) their familiarity with the MME test and 2) their ability to design lessons consistent with the new Michigan content expectations.
- Learning teams were formed for science and mathematics, allowing teachers to share ideas about curriculum requirements across grade levels. Team participation increased by about 30%.
- Six workshops were offered on the Michigan Environmental Education Curriculum Supplements (MEECS), serving 69 teachers.

Impact on Schools

- Schools received help in aligning curriculum to match the new content expectations in mathematics and science.
- Thirteen schools in eight districts had teams of teachers participating in the MSP mathematics grant.
- Schools have access to equipment from the Seaborg Center, such as graphing calculators, physics equipment and GPS units.

Impact on Communities

- Local businesses supported this year's Science Olympiad Tournament with contributions of \$5000, allowing students to attend the event at no cost.
- The Seaborg Center provided portable planetarium presentations to approximately 300 students and parents at the annual community-wide Kaleidoscope Kids Fair.
- The Center cooperated with the local Audubon Society to host a community program for adults and children.

Director's 2006-2007 Budget Discussion

The Seaborg Center sponsored 47 professional development activities this year. Attendance was high because the Center was able to pay substitute teacher costs for most events. Money for substitutes and materials was available through grants for the HS-MASS workshops and for the MSP mathematics grant "Building Bridges." We were also able to offer five workshops on the Michigan Environmental Education Curriculum Supplements (MEECS) in the fall of 2006 because the presenter fees and supplies were funded by a grant.

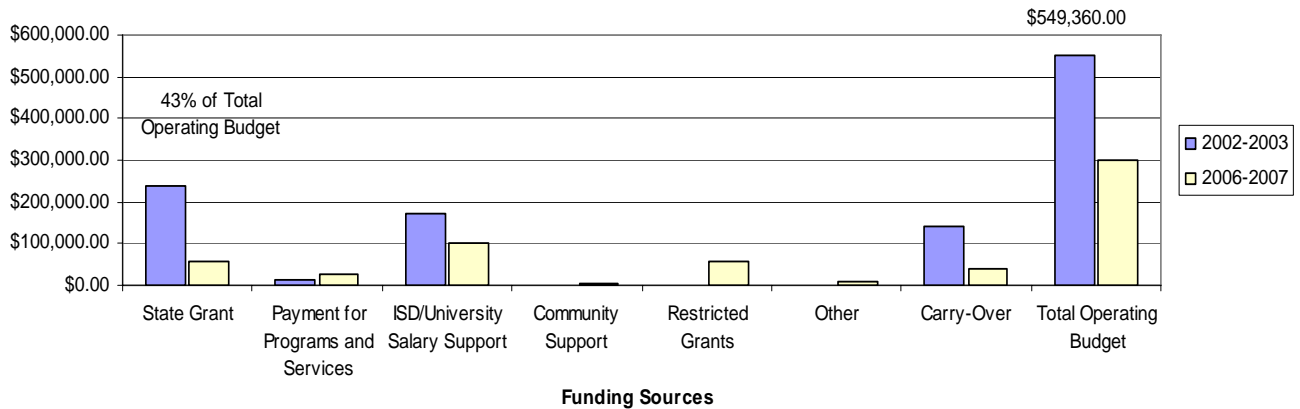
The Center has developed the following strategies to respond to the budget cuts:

- **Enhanced cooperation with Marquette-Alger RESA (MARESA):** The Seaborg Center director meets monthly with consultants from MARESA to plan joint professional development schedules and share presenters. For the second year, the Seaborg Center and MARESA have sponsored mathematics and science learning-teams, where district representatives from all grade levels meet to share concerns, updates and activities.
- **Grant funding for more activities:** The Seaborg Center is currently cooperating with Marquette-Alger RESA on several shared grants in both mathematics and science education. Funds supplied by initiatives of the Mathematics and Science Centers' Network are also helpful in sponsoring and guiding our professional development, for example the HS-MASS project in 2006-2007.
- **Sponsorships for student tournaments and regional events:** We are continuing our work with Northern Michigan University's Foundation to raise donations for our Upper Peninsula *FIRST* Lego® League Tournament. Local businesses have pledged \$5000 to help support the U.P. Region 1 Science Olympiad tournament.
- **Staffing for Weekend College for Kids:** Teaching of weekend College for Kids is now done by teams of NMU education students, under the supervision of Seaborg Center staff. This offers experience for the students and reduces the cost of offering these programs.

Projections for the future:

Most of our professional development activities have been funded by grants that have terminated at the end of the 2006-2007 school year. Our current state funding is not sufficient to pay substitute teachers or workshop expenses. We will continue to seek grant funding for professional development.

Changes in the Seaborg Center's Financial Support



Director's Summary 2006-2007

This year the Seaborg Center sponsored a number of sustained professional development activities. We expanded our partnerships with educational, governmental and community agencies through sponsorship of regional student events. We also expanded our K-8 student programs by offering on-site after school programs in “Simple Machines with LEGOS ®” and “NXT Robotics” at eight elementary and two middle schools.

Sustained Professional Development:

- Teachers in the Upper Peninsula MSP grant for middle and high school mathematics (“Building Bridges”) attended five content courses and twelve lesson study sessions at the Seaborg Center. Teachers have asked to continue working together even though the grant is completed.
- The Center sponsored six workshops for the HS-MASS project (three in science and three in mathematics). These workshops acquainted teachers with the new High School Content Expectations (HSCE), the Michigan Merit Exam (MME), and strategies to help students with charts and graphs that appear on the MME exam. In pre- and post-surveys, teachers reported statistically significant improvements in 1) their familiarity with the MME test and 2) their ability to design lessons consistent with the new Michigan content expectations.
- The Seaborg Center and Marquette-Alger RESA sponsored mathematics and science learning teams this year. Districts sent representatives from elementary, middle, and high school levels, fostering discussion about curriculum continuity across grade levels and across districts.

Partnerships for Student Programs:

We partnered with community and governmental agencies to sponsor two regional programs for high school students: the Lake Superior Youth Symposium and the AGES (Area Geriatric Education Scholars). We also celebrated the 20th anniversary of the Upper Peninsula Region I Science Olympiad tournament. Two local businesses support the tournament through donations to Northern Michigan University's Foundation. Finally, we worked with local schools to bring after school programs on-site with 5-week sessions of "Simple Machines with LEGOS ®" and "NXT Robotics."

Plans for the Future:

We are currently working with Marquette-Alger RESA on several grants in mathematics and science education. This will allow us to continue offering sustained professional development as the MSP (Building Bridges) grant ends. The mathematics and science learning teams will also meet bi-monthly during the upcoming school year.

Our new after school student programs were in high demand, and we will continue to offer both LEGO® and robotics classes next year. We are sponsoring Upper Peninsula regional tournaments for FIRST Lego® Robotics (November 10, 2007) and Region I Science Olympiad Tournament (February 9, 2008).

We look forward to a strong series of professional development activities and student programs in 2007-2008.