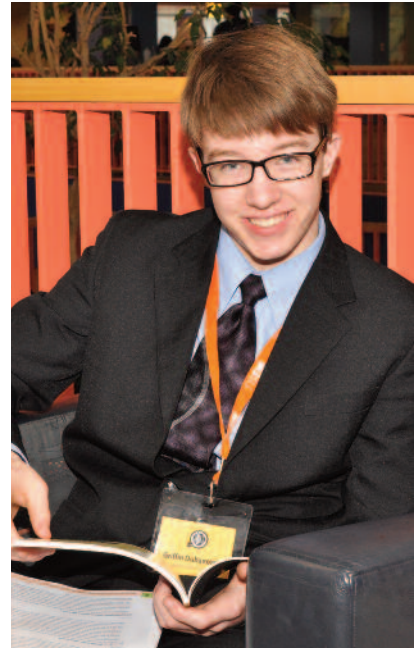


Connections

Communication

Collaboration



2012

Annual Report



Northwest Ohio Center for
Excellence in STEM Education

Fiscal Year 2012
(July 1, 2011-June 30, 2012)

www.nwocenter.org

FY 2012 NWO Staff

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NWO Mission

The Center's mission is to advance science, technology, engineering, and mathematics (STEM) education for people of all ages.

NWO Vision

The Northwest Ohio Center of Excellence aims to advance science, technology, engineering, and mathematics (STEM) education for people of all ages. Our purpose is to work with community partners to (a) generate new knowledge about the science of teaching and learning, (b) apply this knowledge by developing the expertise of K-12 educators and higher education faculty, (c) increase public support for, and understanding of, the STEM subject areas, and (d) stimulate the interest of young people, especially those in underrepresented groups, in these rewarding fields of study and career opportunities.

Dear Friends of NWO,

NWO saw many changes this year, but the most influential was the growth of our partnership with the Ohio STEM Learning Network (OSLN), which is funded in part by the Battelle Foundation. In FY 2012 NWO was named the Northwest Ohio Hub for OSLN and charged with advancing STEM education in northwest Ohio through two main programs (1) the formation of a STEM Training Center housed at the Toledo Technology Academy and (2) working on the Literacy Design Collaborative's College Ready Tools program with Perkins Local Schools. The OSLN funding also supported many FY 2013 activities including the NWO Symposium, NWO Inquiry Series, and STEM in the Park.

In FY 2012 NWO was the lead on a large National Science Foundation: Math and Science Partnership (NSF MSP) grant. We are pleased to announce that this \$7.28 million, 5-year grant was awarded in September 2012. NWO, along with BGSU, Perkins Local Schools, Sandusky City Schools, and several local community partners, will be working together to enhance grades 3-8 education across the curriculum, using citizen science as a base for promoting student mastery of the Ohio Learning Standards.

As we move forward to FY 2013 we have many things to look forward to, including several new grant projects from state and national organizations and support from foundations and businesses for our existing programs. Two new staff members will be joining the team in the new year which will bring new ideas and experiences which can only enhance the efforts of NWO. Our COSMOS Team continues to be a strong and influential group at Bowling Green State University (BGSU) and played a major role in the awarding of the NSF MSP grant and the success of many activities, most especially STEM in the Park. These two activities have also specifically enhanced our status at BGSU and brought many new people into our fold allowing us to do even more in FY 2013.

I hope this annual report gives you a glimpse into the efforts of the NWO Staff and Team and heightens your awareness of our efforts in the many areas of STEM education.

Sincerely,
W. Robert Midden, NWO Director

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NWO Goals and Corresponding Activities

Goal 1: Develop the expertise of pre-service and in-service teachers in STEM and STEM education disciplines.

NWO Activities

- NWO Inquiry Series
- NWO Symposium on STEM Teaching (NWO Symposium)
- Undergraduate and graduate teacher preparation courses or program modification

Affiliated Activities

- Grant projects
- Undergraduate professional organizations (BGCTM, BGSECO, etc.)
- Community Resources Workshop
- Continued support of the MAT degree programs

Goal 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

NWO Activities

- Ohio Junior Science and Humanities Symposium (OJSHS)
- STEM in the Park
- Grant Projects (GRAMS, BOSEF, etc.)

Affiliated Activities

- Grant projects (ACTION, etc.)
- You Be the Chemist Challenge
- Support and assist with other university recruiting activities

Goal 3: Conduct and communicate collaborative research in STEM and STEM education disciplines.

NWO Activities

- COSMOS Research Learning Community
- Faculty presentations at NWO Symposium
- Submitting manuscripts for publication
- Faculty/staff research and participation in NWO

Affiliated Activities

- Faculty/staff research and participation in NWO
- Continued support of the development of the Learning Sciences PhD program
- Grant projects

Goal 4: Develop and sustain a regional collaborative alliance including university, school, informal education, and business partners through a shared vision and collaborative spirit for tackling current STEM education issues.

NWO Activities

- STEM Consortium Advisory Board & Leadership Team
- NWO website and STEM Resource Center Website
- "NWO STEM Connection" Print and E-Newsletters
- Ohio STEM Learning Network Hub Activities
- Evaluation and Marketing Services for NWO Partners

Affiliated Activities

- Community Resources Workshop
- Business and community partnerships on grant projects

Goal 5: Support higher education faculty and future faculty in pursuit of the best practices in STEM and STEM education disciplines to enhance undergraduate and graduate education.

NWO Activities

- Professional development for higher education faculty at NWO Symposium and NWO Inquiry Series
- COSMOS Research Learning Community
- Support for faculty development and administration of STEM education research and innovation grant projects

Affiliated Activities

- Continued support of the development of the Learning Sciences PhD program

Educator Professional Development and Outreach

NWO Activities

Community Resources Workshop (CRW)

Brief Description

This weeklong K-12 teacher professional development workshop began in 1998 through a partnership with The Toledo Museum of Art, The Blade, WGTE Public Media, The University of Toledo, and Bowling Green State University. The 40-hour Monday-Friday summer workshop, currently sponsored in part by NWO, features visits to area organizations that focus on inquiry-based, hands-on learning in both formal and informal settings. Teachers may earn 2 graduate credits from Lourdes University and enjoy meeting education specialists from exciting places such as The Toledo Zoo, Toledo Area Metroparks, Challenger Learning Center, and Toledo Lucas County Library on whom they can call for lesson plans, activities, hands-on resources, and school programming.

Meets NWO Goals: 1 & 4

FY 2012 Activity Information

In 2012, 50 teachers took part in the Community Resources Workshop (CRW) with activities delivered by Lourdes University, Toledo Area Metroparks, The Blade, The Mudhens, Challenger Learning Center, Toledo Museum of Art, Imagination Station, Toledo Lucas County Public Library, Toledo Zoo, WGTE Public Media and several guest speakers. Highlights included a visit to the Toledo Zoo, and a walking tour of downtown Toledo, the Valentine Theater and The Blade. The 50 spots available for the CRW filled up in only a matter of weeks, making it clear that this is a valued professional development program that is well received by teachers in the region.

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Evaluation Summary

The 2012 Community Resources Workshop was evaluated using a paper survey that was administered to 47 participants on the last day of the workshop. The results of the survey demonstrate that participants perceived the workshop to be of high quality and highly valuable. The findings also indicate that as a result of attending the CRW, participants were significantly more aware of community resources, held more positive attitudes regarding the use of community resources in their classroom, and planned to increase their use of community resources in their classroom. The most prominent outcome was the participants' self-reported change regarding their awareness of community resources, particularly low cost alternatives to field trips. Overall, comments given by participants regarding the CRW were extremely positive. Many of the teachers specifically wrote positive comments regarding the organization of the workshop and the value and applicability of the resources to their classroom. The 2012 Community Resources Evaluation Report offers a more thorough account of the implementation and impact of the workshop, and can be found at www.nwocenter.org/reports.

Literacy Design Collaborative's College Ready Tools

Brief Description

The Ohio STEM Learning Network is coordinating the adoption and dissemination of the Literacy Design Collaborative's College Ready Tools (LDC - CRT) throughout school districts in the State. One STEM school in each region is serving as the first adoption site. At each of those schools, four teacher leaders have been trained in the use of LDC-CRT and are teaching the other teachers in their school to also use these tools. Each of the regional STEM Hubs are supporting this development. When the first schools have fully adopted LDC-CRT they will then train three other schools. Those schools will each train three others and eventually LDC-CRT are expected to be used throughout the state. CRT is a system of learning for all of the core academic disciplines including English language arts, social sciences, natural sciences, and mathematics. CRT focuses on development of literacy skills within each of these primary domains with the aim of improving student mastery of the common core standards. The goal is to establish an aligned system for teaching college-ready literacy in all subject areas with a well-defined methodology and a clean, understandable structure. As a result, students will engage in more intense literacy practices than they now generally experience, integrated throughout all of the core disciplines, to deepen their learning and improve their critical thinking and communications skills. **Meets NWO Goals: 1, 2, & 4**

FY 2012 Activity Information

In northwest Ohio, Perkins Local Schools is serving as the first school to adopt LDC-CRT, thus providing inspiration and support for adoption in other schools throughout the region. In April and June a team of four teachers from Perkins Local Schools, one in each of the four core academic disciplines, participated in LDC training initiated through the Ohio STEM Learning Network in conjunction with Battelle and the Gates Foundation. These four teachers are piloting the use of CRT modules in their classes and will train all of the other core discipline teachers in Perkins High School. Later, Perkins will help train three other schools in northwest Ohio and those schools will in turn train others to spread LDC - CRT throughout the region.

“NWO STEM Connection” Print and E-Newsletters

Brief Description

The NWO STEM e-newsletter and STEM Connection newsletter are focused on bringing attention to new programs and events happening in STEM K-16 education. Monthly e-newsletters feature stories about area K-12 schools focusing on STEM learning. Each month also includes a community partner feature story revealing how business and non-profit organizations are working with K-12 schools to enhance STEM teaching and learning. The STEM Connection newsletter is published quarterly. Both newsletters feature a hands-on, inquiry-based STEM activity for easy use in K-16 classrooms, upcoming teacher professional development and student opportunities, and STEM resource announcements. **Meets NWO Goals: 1, 2, & 4**

FY 2012 Activity Information

In 2011-2012, NWO continued the STEM e-newsletters format that was designed the previous year. The new design focused on new graphics and a hands-on learning lesson. During the 2011-2012 school year, NWO published and emailed twelve e-newsletters to 7,000+ STEM educators, administrators, partners and stakeholders. One “NWO STEM Connection” print newsletter was written and mailed in August 2011 to more than 5,500 STEM educators, administrators, partners and stakeholders in Ohio. The e-newsletters and print newsletter published during FY 2012 can be found at www.nwocenter.org. Plans are currently in place to print two “NWO STEM Connection” newsletters in FY 13. NWO will also continue to publish the monthly STEM e-newsletters, capitalizing on recent funding to increase the number of STEM educators receiving the newsletters.

NWO STEM Education Inquiry Series

Brief Description

Sustained professional development is offered by NWO throughout the academic year in the NWO Inquiry Series. The Inquiry Series is a series of STEM professional development workshops that continues to be highly popular with educators in the region. It also functions as a monthly platform for affiliated NWO grant projects and regional educators to come together for project-specific professional development. The Inquiry Series is open to in-service and pre-service teachers, higher education faculty, and business/community partners in the region. Participants can opt to attend only one event or all the Inquiry Series events. **Meets NWO Goal: 1**

FY 2012 Activity Information

The 2011-12 NWO STEM Education Inquiry Series was held (for the third year) at Rossford High School on the following Thursday nights: Sept. 22, 2011, Oct. 20, 2011, Dec. 1, 2011, Jan. 19, 2012, Feb. 16, 2012, and Mar. 25, 2012. A \$15/night fee was charged for all attendees (undergraduates were charged \$10). The fee did not seem to reduce the number of attendees, but did provide for a reduction in the no-show rate for registration/attendance. On the next page is a list of the STEM opportunities offered at each monthly meeting and the overall attendance data. 2011-12 offered a new format for the Inquiry Series, which only offered one open session per night. All of the events were funded entirely by registration fees. Two grant projects also met at the Inquiry Series; the information on these grants is listed under USE-IT III and Project pi²Two.

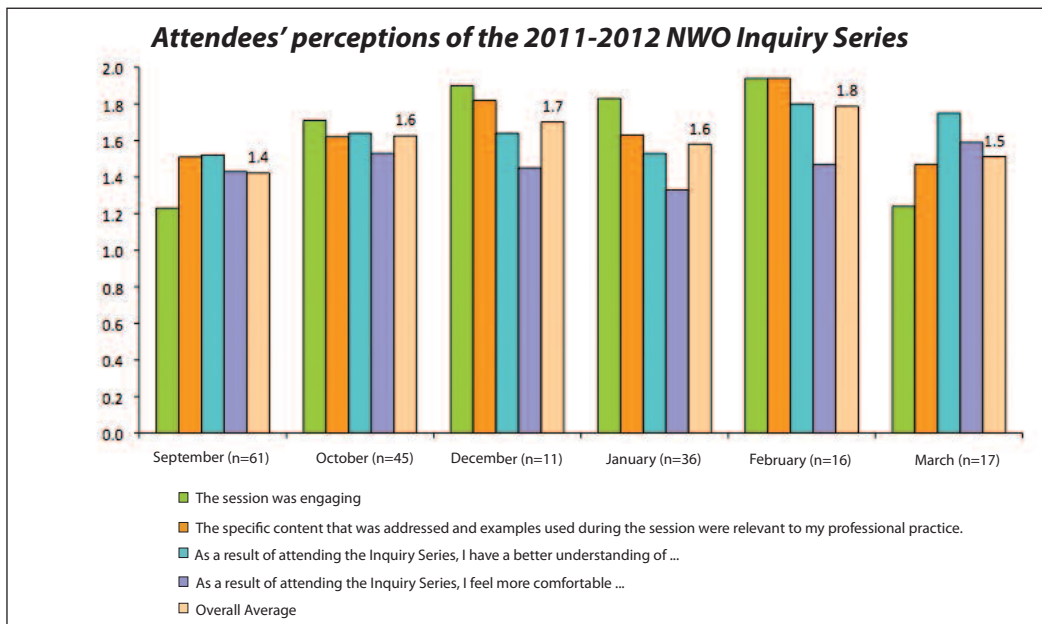
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Date	Session Title	Session Description	Presenter(s)	Total Attendance
Sept. 22	Understanding the Newly Revised State Standards in Math & Science	An in-depth look at the newly revised Ohio standards for math and science. Learn what has changed, what is staying the same, how to interpret the new standards, and what things you should be doing now to prepare yourself and your students for the upcoming change.	Diane Burtchin & Michelle Shafer, Rossford Schools	89
Oct. 20	Formative Assessment and Understanding the Newly Revised State Standards in Math and Science	Learn new and innovative ways of assessing student understanding in your classroom.	Debra Gallagher, Ohio Northern University	63
Dec. 1	What Is Inquiry and How Do I Use It in My Classroom?	Tips and tools for incorporating inquiry teaching methods into your classroom with a focus on how to use the inquiry method to teach the newly revised state standards in math and science.	Diane Burtchin & Michelle Shafer, Rossford Schools	34
Jan. 19	Motivating Students for Success	Discover ways to help keep your students motivated and excited about learning.	Jodi Haney, BGSU	53
Feb. 16	Teaching and Learning for ALL Students	Tools for helping all your students learn, including the new 6E Model (an updated 5E including targeted formative assessment activities) and ways to differentiate instruction.	Emilio Duran, BGSU	22
Mar. 15	Virtual Field Trips and Technology Tools for Your Classroom	Explore ways to connect with regional, state, national, and international resources without ever leaving the classroom. Simple and cost-effective steps using Skype to involve students in live interactions with exciting places, programs, and experts in STEM fields.	Bob Midden, BGSU/NWO	22

Participant Group	Total Attendance for 2011-12 (Unique Visitors)	Total Attendance for 2011-12
Pre-Service Educators	23	27
K-12 Educators	137	225
K-12 Administrators	12	14
Higher Ed Faculty	5	5
Community/Business Partners	5	8
NWO Center Staff/Facilitators	15	58
TOTAL	197	337

Evaluation Summary

The 2011-2012 Inquiry Series was evaluated using an online survey that was administered after each Inquiry Series event (data were collected from six surveys). The average number of survey responses each month was 33 with an average response rate of 72%. The survey required respondents to rate certain aspects of the Inquiry Series (e.g., engagement, value of information) as well as provide written comments regarding their experience. In general, the results demonstrate that attendees perceived the Inquiry Series to be engaging, valuable, informative, applicable, and motivating. The figure below illustrates the attendees’ responses regarding each Inquiry Series session.



Note: The mean scores reflect all of the responses collected for each session during the Inquiry Series.

The attendees’ written comments were mostly positive and further emphasized the value of the Inquiry Series. Attendees frequently reported using (or their plans to use) the knowledge and resources gained at the Inquiry Series in their classroom. Furthermore, the comments indicate that attendees perceived the Inquiry Series to be a high quality event, with many attendees positively commenting about the hands-on nature of the Inquiry Series sessions and the expertise of the session facilitators.

NWO STEM Resource Center Website

Brief Description

The NWO STEM Resource Center website was created as part of the STEM Consortium grant received by NWO in January 2011 from the Ohio STEM committee, the Ohio Board of Regents, and the Ohio Department of Education in collaboration with the Ohio STEM Learning Network. The website is designed to be the premier website to visit when looking for STEM teaching resources in northwest Ohio. It is designed mainly to assist preK-12 educators in locating and using STEM resources in the area. Many of the resources are available in other places on the internet, but the STEM Resource Center is designed to put all the information in one searchable database where visitors can narrow their search by many filters including geographical area, grade level(s), subject area(s), type of resources, and many more. **Meets NWO Goal: 4**

FY 2012 Activity Information

The STEM Resource Center website was created in 2011 with funds provided by the Ohio STEM Learning Center hub grant. A beta version was launched in May 2011 for testing by the members of the NWO STEM Advisory Board. The data from this test was then used to make changes to the website and the full version launched in August 2011 for the general public. To date the website currently has 200 posts showcasing regional STEM resources and lists 318 school districts that are located in northwest Ohio. The site has a total of 78 subscribers and is viewed by hundreds more throughout the year. The STEM Resource Center can be viewed at <http://nwostemresources.org>.

NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching

Brief Description

Over the past eight years, the NWO Symposium has brought together hundreds of participants to exchange effective strategies for teaching STEM. This popular event has provided the Center with huge visibility in the community, attracting educators to our long-term professional development opportunities and giving all participants resources and ideas they can use immediately in their classroom or setting. **Meets NWO Goals: 1 & 5**

FY 2012 Activity Information

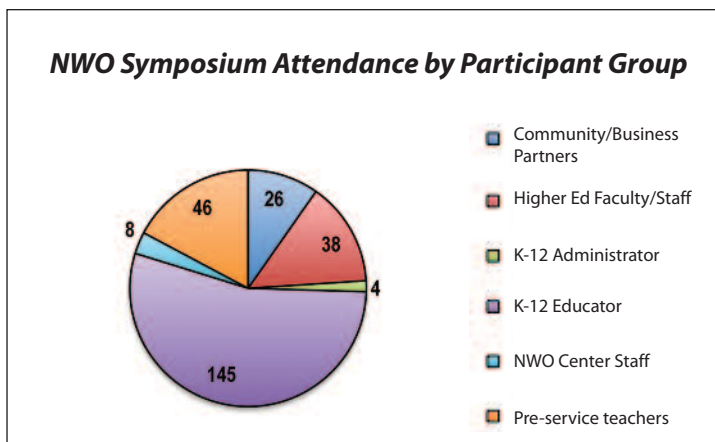
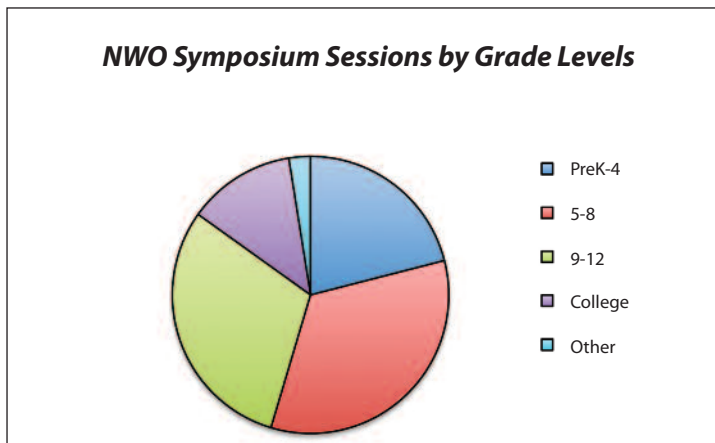
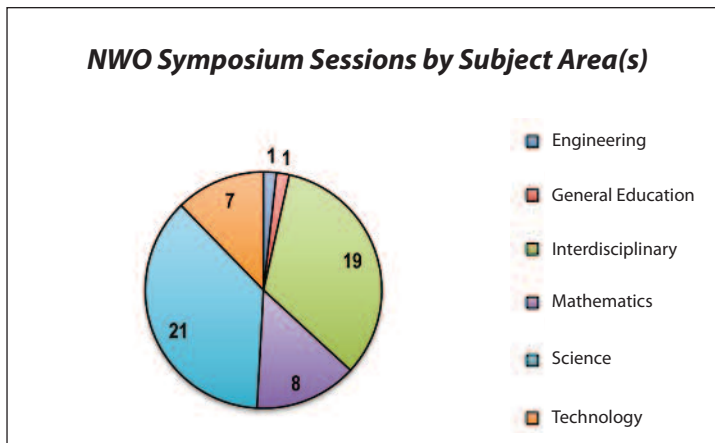
The 2011 NWO Symposium was held on Saturday, November 5 at the Penta Career Center for the third year. In an effort to further our partnership with Penta, we asked their Culinary Arts Program to cater the event for the second year. A registration fee was charged for all attendees (\$35 for educators and \$20 for undergraduate students). Presenters remained free, but for-profit vendors were charged \$100. The total attendance at the 2011 NWO Symposium was 17% lower than the attendance at the 2010 Symposium. However, the decrease in total attendance is solely due to the significantly lower number of presenters and vendors. There were 42% fewer presenters and vendors at the 2011 Symposium than were at the 2010 Symposium. This decrease was intentional, as far fewer sessions were offered in 2011 than in past years, which therefore required fewer presenters to participate. Nevertheless, while the number of presenters and vendors decreased in 2011, the

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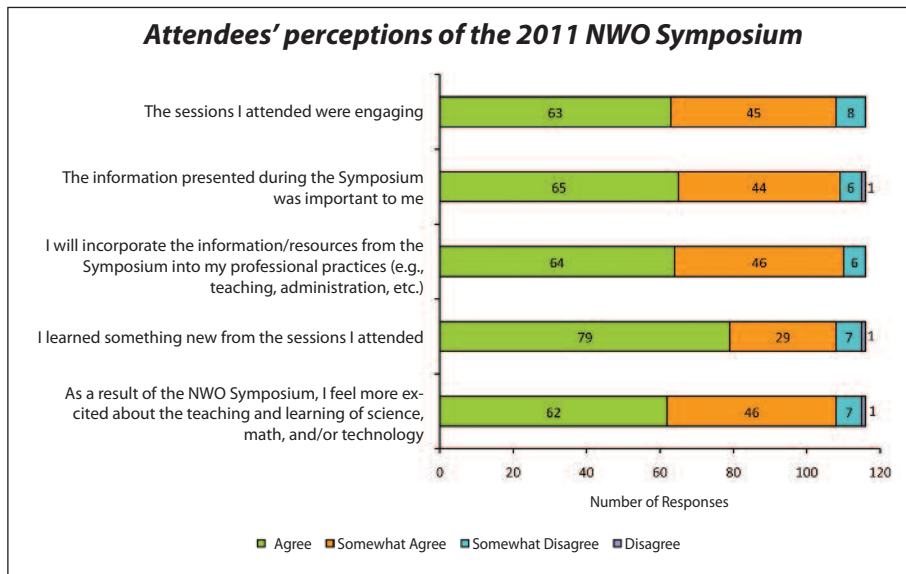
number of attendees slightly increased from 168 total attendees in 2010 to 174 total attendees in 2011. A total of 49 sessions and a keynote address by Dr. Gene Poor were offered during the 2011 NWO Symposium, with about 12 sessions being offered every hour. The charts to the right show a breakdown of the sessions offered by subject area(s) (57), grade levels (many sessions were offered for multiple grade ranges), and the overall attendance (322).

Evaluation Summary

The 2011 NWO Symposium was evaluated using session evaluation surveys (attendees completed a paper survey for each session they attended) and two online surveys (one for attendees and another for presenters/vendors). The results of the session evaluation surveys indicated that attendees perceived the Symposium sessions to be engaging, valuable, informative, and beneficial to the educational community. The results of the attendee online survey echoed the results of the session evaluation surveys, with 78% of attendees ranking the NWO Symposium overall as either Good (50%) or Excellent (28%). Overall however, the attendees ranked the various components of the NWO Symposium (i.e., food, venue, program book, vendor exhibits) lower than in previous years. These findings might be explained in part by changes in the Symposium timeline (e.g., two hours were given for lunch/vendor browsing; keynote was offered in the afternoon) made in 2011. Many attendees commented that the lunch/vendor break was too long, and could have been used to provide another session, or decrease the overall length of the Symposium. Despite the lower rankings, many of the comments revealed that the 2011 Symposium was a valuable learning experience that provided applicable information and resources for those who attended. Several attendees positively commented that the presenters were well prepared, enthusiastic, and knowledgeable, and several others commented on the wide variety of sessions that were available to choose from. The figure on the next page illustrates the attendees’ responses to five questions on the attendee survey.



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The results of the presenter/vendor online survey indicated that most presenters/vendors perceived that their participation in the Symposium was worthwhile due to the number and receptivity of the attendees at their session/exhibit. Most of the attendees (80%) and almost all of the presenters/vendors (93%) reported that it was moderately or very likely that they would attend or participate in the 2012 NWO Symposium. The recommendations for the 2012 NWO Symposium are to 1) Reorganize the timeline of the Symposium, 2) Offer different food choices than what was offered for the 2011 NWO Symposium, and 3) Offer more mathematics and technology sessions, as well as sessions that focus on the new Ohio standards. The 2011 NWO Symposium Evaluation Report offers a more thorough account of the implementation and impact of the 2011 NWO Symposium, and can be found at www.nwocenter.org/reports.

Rural STEM Learning Platform

Brief Description

The new STEM learning platform is intended to provide a model for rural schools that struggle with the challenge of offering a rich array of stimulating and engaging STEM courses based on problem-based learning, hands-on inquiry, and partnerships with STEM businesses due to low enrollments and lack of resources. This is being overcome in part by sharing courses among multiple school districts via distance learning, video conferencing, shared staff, and inter-school visits. The new model is being developed among the nine public school districts of Putnam County, coordinated by the Putnam County Educational Service Center. This effort is based on the impressive record of achievement of these schools in their highly effective STEM programs. It will involve creating 18 new, innovative STEM courses that will be shared among all nine school districts and made available to all students throughout the county via multiple modes of distance learning. **Meets NWO Goal: 4**

FY 2012 Activity Information

Putnam County School Updates

In addition to the achievements listed below, many of the schools will be purchasing iPads for high school students to further their education and familiarity with technology.

Columbus Grove:

Currently offering four years of High School of Business, Bio Medical Classes, AP courses in Calculus, Statistics, English Literature, and U.S. History. A Columbus Grove teacher was awarded the Governor's Thomas Edison Award for Excellence in STEM Education.

Continental:

Currently offering courses in Microsoft Office, Flash, Adobe Photoshop, and Vocational Agriculture. Continental students participated in the Putnam County Youth Advisory Board Video Challenge. Two teachers were awarded the Governor's Thomas Edison Award for Excellence in STEM Education.

Ft. Jennings:

Currently offering an Environment Science Course for preK-12 students.

Kalida:

Currently offering both Project Lead The Way: Engineering and Biomedical classes.

Leipsic:

Currently offering High School of Business and Vocational Agriculture programs.

Miller City:

Currently offering Vocational Agriculture courses and Project Lead The Way: Engineering and Biomedical courses. One teacher was awarded the Governor's Thomas Edison Award for Excellence in STEM Education. Currently a finalist in the America's Farmers Grow Rural Education competitive grant sponsored by the Monsanto Fund.

Ottawa – Glandorf:

Currently offering Project Lead the Way: Introduction to Engineering, Principles of Engineering, Digital Electronics, and Principles of Biomedical Sciences.

Ottoville:

Currently offering a locally designed Principles of Engineering Course and an Environmental Science course. Beginning at the middle school level, the district offers several robotics classes.

Pandora – Gilboa:

Currently offering Project Lead the Way: Principles of Biomedical Sciences, Human Body Systems, and Medical Interventions.

STEM Training Center at the Toledo Technology Academy

Brief Description

The Ohio STEM Learning Network is coordinating the development of seven STEM Training Centers throughout the State of Ohio. Each training center will serve the schools in its region by providing a variety of resources to encourage and support the adoption of best practices in teaching and learning in STEM subject areas.

Services provided will include:

- Professional development sessions for teachers
- Visits of teacher leaders to schools to demonstrate use of best practices in classrooms and to discuss STEM education with teachers and administrators
- Hosting visits of teachers and administrators at the training center to watch best practices in use in the classroom
- Providing access to video recorded classroom sessions that demonstrate exemplary practices
- Providing access to live video streaming of classroom activity

Each training center will specialize in certain aspects of STEM education. The Toledo Technology Academy is serving as the Training Center for northwest Ohio.

Housed at the former DeVilbiss High School on Upton Avenue, the Toledo Technology Academy (TTA) is a success story for Toledo Public Schools. TTA, one of two Toledo Public magnet high schools, scores in the top academic tier of schools in Ohio. The academy is transforming the way students learn and develop 21st century skills by offering real world experiences and classes not found in a more traditional high school curriculum. Because TTA is working so well, administrators are looking into developing a K-12 STEMM focused campus, including a new K-8 building, devoted to a science, technology, engineering, math, and medicine (STEMM) curriculum. This concept is a popular trend in education; and school leaders argue that programs focused on those disciplines prepare students for growing industries with available, well-paying jobs. The concept is also amenable to project-based learning and tends to be popular with parents.

The topics that TTA will offer includes:

- Practices for developing and strengthening partnerships with businesses
- Senior capstone projects using problem-based learning
- Leadership training
- Integrating project and problem-based learning across the curriculum

Development of TTA's Training Center functions began in May of 2012. TTA plans to be ready to start offering these services by the beginning of spring term, 2013. **Meets NWO Goals: 1, 2, & 4**

NWO Grant Projects

History Lab

Brief Description

History Lab is a professional development project funded by the Ohio Humanities Council that aims to (1) increase teachers' knowledge of traditional American history and science content (2) improve their ability, with the aid of humanities scholars, education faculty and informal educators, to translate this knowledge to students to improve acquisition and retention, (3) raise teachers' awareness of and knowledge about regional historical sites, (4) increase student knowledge of local history and science content and 5) to improve the attitudes of students toward history, science, and culture through inquiry-based, hand-on activities. **Meets NWO Goal: 1**

FY 2012 Activity Information

History Lab engaged ten northwest Ohio teachers in a three-day summer workshop focused on improving teachers' knowledge of American history and the instructional resources and strategies most effective in teaching American history. Teachers will continue their participation in History Lab during FY 2013 with two professional development meetings during the school year.

Evaluation Summary

The History Lab summer workshop was evaluated using a content knowledge assessment and a focus group interview. The results of the content knowledge assessment demonstrated that teachers significantly increased their knowledge about American history, specifically regarding the War of 1812, features of Fort Meigs, and Native American-European relations. In addition, the focus group interviews indicated that teachers perceived the workshop to be valuable and effective in improving their knowledge about history as well as their instructional practices for teaching history.

Project pi r² two (Partners in Inquiry Resources and Research two)

Brief Description

Project pi r² unites the resources of NWO and BGSU in conjunction with principal partner Toledo Public Schools, a high-need local educational agency, and additional partners Toledo Catholic Diocese, Challenger Center of Lake Erie West, Imagination Station, Sauder Village, Seven Eagles Environmental Education Center, Toledo Botanical Garden, The Toledo Zoo, Toledo Area Metroparks, and the Educational Service Center of Lake Erie West for a new model in professional development. The Principal Investigator on the project is Dr. Emilio Duran of Bowling Green State University's School of Teaching and Learning. The program's overall objectives are to (a) help retain and support teachers in science and technology; (b) expose teachers to effective models in science instruction; (c) integrate educational resources in the region's classrooms to model inquiry and increase class time spent on STEM subject areas; (d) improve student inquiry science process skills and science achievement; and (e) promote the use of research-based best practices in science teaching in northwest Ohio classrooms consistent with local, state, and national standards. **Meets NWO Goal: 1**

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FY 2012 Activity Information

Project pi r² two was funded by a \$108,030 Ohio Board of Regents Improving Teacher Quality grant that spanned across FY 2011 and FY 2012. This project provided 30 K-6 teachers with 100 hours of thorough and sustained professional development and reached over 1,200 students in high needs schools with state-of-the-art inquiry science education. The teachers who participated in the project represented seventeen different schools from northwest Ohio, twelve of which were public. Teachers started the project in June 2011 with a weeklong professional development opportunity called the Community Resources Workshop (see the description of the Workshop in this annual report). Teachers continued with the project through the 2011-2012 school year by attending professional development as part of the NWO Inquiry Series. A STEM faculty member from BGSU, a veteran classroom teacher, and an informal science educator facilitated these monthly professional development sessions, which focused on improving teachers' content knowledge in life, earth, and physical science, as well their knowledge and use of inquiry-based instructional practices. Also during the school year, each teacher received six free inquiry-based science classroom programs from area partnering outreach providers. Each classroom was also visited by a scientist from an NWO-partnering institution of higher education (e.g., The University of Toledo, Lourdes University, the University of Findlay, as well as BGSU), who talked to students about what it is like to be a scientist.

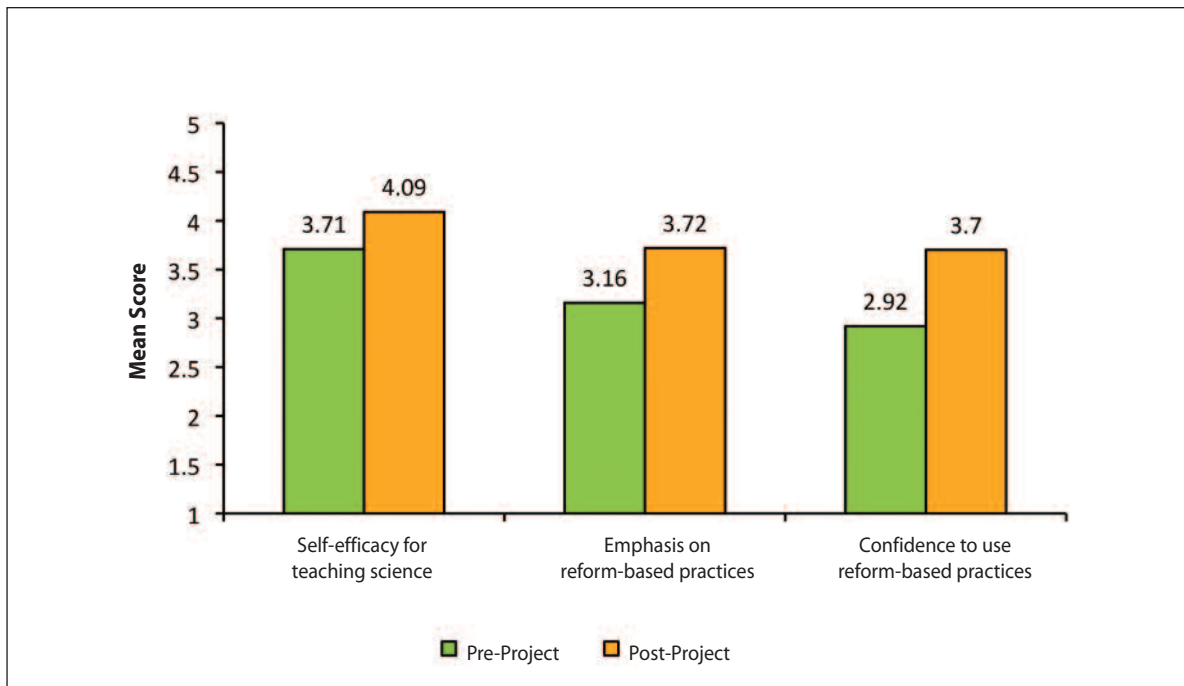
Evaluation Summary

Project pi r² was evaluated using both qualitative and quantitative methods in order to more accurately evaluate the implementation and impact of the project. The evaluation findings demonstrated that the professional development activities (i.e., Community Resources Workshop, monthly sessions, outreach programs) were of high quality and modeled reform-based instruction. Teachers also perceived the activities to be valuable. The evaluation findings also demonstrated that the project positively impacted teachers' science content knowledge as well as their beliefs and behaviors regarding science teaching. As a result of participating in the project, teachers' content knowledge significantly improved. In addition, teachers felt significantly more confident in using reform-based instructional practices, and emphasized these practices to a significantly greater extent after participating in the project. One teacher wrote,

Project pi r² has rekindled my confidence about teaching science! It has been inspirational! Through its many facets (professional development sessions, outreach programs, formative assessment, the scientist visits) it has enlarged and broadened my science knowledge base and help me re-visit, re-energize, and re-attach to the excitement I have for teaching science.

Project pi r² also contributed to gains in student learning during the school year. Although the quantitative data could not definitively demonstrate that student gains were attributable to the project, teachers' reflections supported this view. Many of the teachers' reflections suggested that the project positively impacted students' retention of information. Many others commented about the value of the visiting scientists in relation to the impact those visits had on students' interest in science and science careers. The Project pi r² two Evaluation Report offers a more thorough account of the implementation and impact of the project, and can be found at www.nwocenter.org/reports. The figure on the next page demonstrates the impact of the project on teachers' science teaching beliefs and behavior.

Continued on page 15



USE-IT III (Uniting Science, Education, Inquiry, and Technology III)

Brief Description

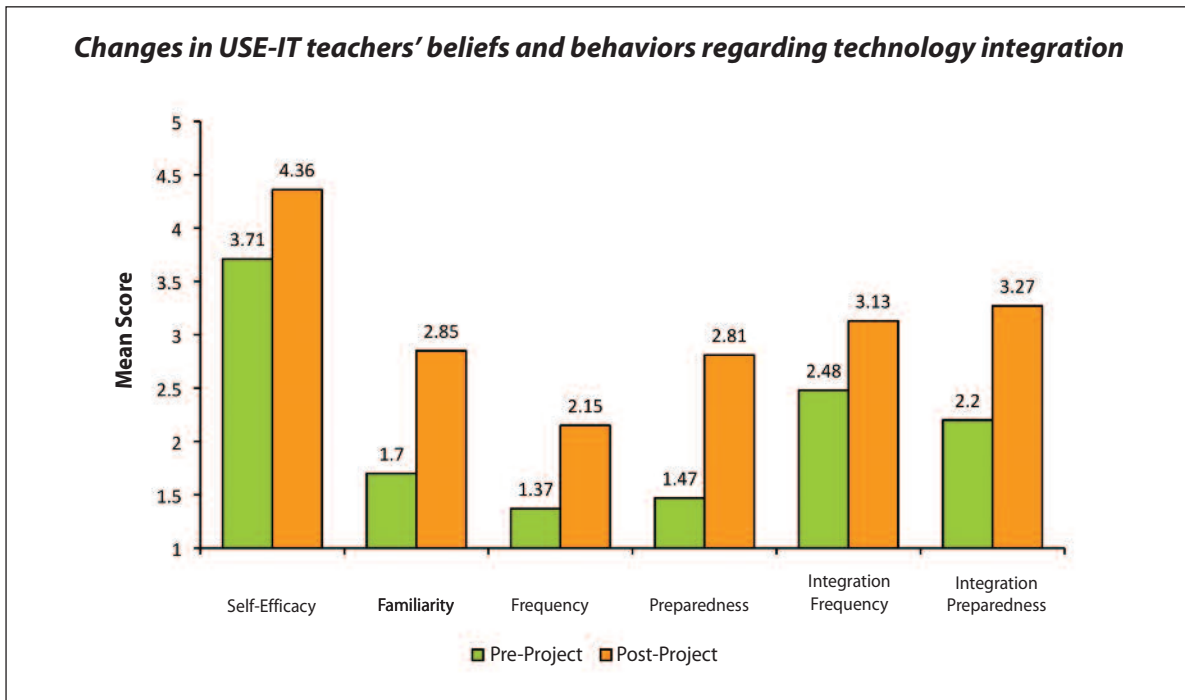
Project USE-IT III is a partnership grant with WGTE Public Media from the Martha Holden Jennings Foundation for K-8 educators interested in infusing more technology and inquiry-based pedagogy into their science lessons. The Principal Investigator is Dr. W. Robert Midden of NWO. The project is aimed at helping teachers (1) gain confidence and proficiency in teaching science content using technology; (2) gain new tools to use with already existing classroom technology; and (3) increase their comfort level with science teaching and using technology to meet the diverse needs of their students. K-8 students benefit from this project through the availability of (a) new technology tools in the classrooms that allow students to utilize technology to its fullest potential; (b) hands-on, minds-on science lessons and activities; and (c) proficient teachers who encourage critical thinking, as well as instill enthusiasm for the study of science and technology in the 21st century classroom. Teachers receive contact hours, science infused technology training, and hands-on technology to take back to their classrooms for completing the program. **Meets NWO Goal: 1**

FY 2012 Activity Information

USE-IT III provided 24 northwest Ohio educators with over 20 hours of professional development regarding the use of several instructional technologies, such as Google Earth, Glogster, VoiceThread, and screencasting. Teachers attended seven monthly professional development sessions from September 2011 to April 2012.

Evaluation Summary

USE-IT III was evaluated using several data sources, including professional development observations and three online surveys that measured the participating teachers' perceptions of the professional development, beliefs and behaviors regarding science teaching, and beliefs and behaviors regarding technology integration. The observational and survey data indicated that the sessions were high in quality, with facilitators using an inquiry-based hands-on approach to address content which teachers perceived to be valuable and applicable to their classroom. Furthermore, the teachers' survey responses indicated that the introduction of knowledge and resources from USE-IT III resulted in classroom lessons that were more interactive and student-centered. The results of the science teaching survey demonstrate that USE-IT III positively influenced teachers' beliefs about science teaching. After USE-IT III, teachers reportedly placed a greater emphasis on reform-based strategies, and felt more confident in using those strategies than before the project. The results of the technology integration survey were more dramatic, demonstrating statistically significant improvements in every belief and behavior that was measured. After USE-IT III, teachers 1) felt more self-efficacious about integrating technology in their classroom, 2) were more familiar with the technology addressed during the project, 3) used the technology addressed during the project with greater frequency, 4) felt more prepared to use the technology addressed during the project, 5) used technology integration and 21st century learning strategies with greater frequency, and 6) felt more prepared to use technology integration and 21st century learning strategies. The figure below illustrates the changes in the teachers' beliefs and behaviors regarding technology integration, as a result of participating in USE-IT III. The USE-IT III Evaluation Report offers a more thorough account of the implementation and impact of the project, and can be found at www.nwocenter.org/reports.



Faculty Professional Development and Collaborative Education Research

COSMOS Research Learning Community

Brief Description

Faculty with a common interest in the science of STEM teaching and learning come together throughout the academic year to critique and discuss research articles, participate in action research, and design, conduct, and present collaborative research projects related to NWO/COSMOS goals and activities. **Meets NWO Goals: 3 & 5**

FY 2012 Activity Information

The 2011-12 faculty learning community “STEM Classroom Assessment and Course Evaluation” had a primary goal that each member develop rigorous and valid assessments for at least one college course that they teach. Another goal was for participants to learn how to use assessment results to guide their choice of teaching strategies and design of learning environments (action research) and to use an assessment they develop as an evaluation instrument for a research project aimed at determining the effectiveness of a pedagogical technique used in that course.

Article prepared for peer review:

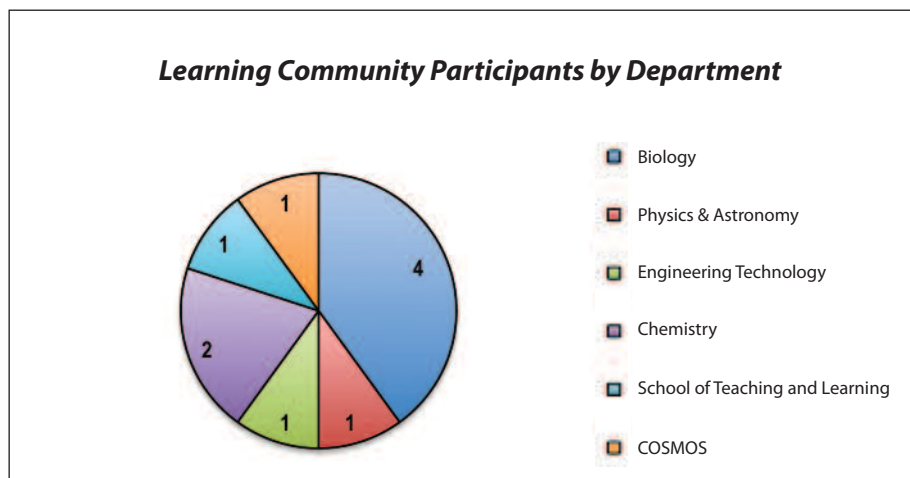
Title: Yes I Can: The Contributions of Motivation and Attitudes on Course Performance among Biology Non-majors.

Authors: Matthew L. Partin, ; Haney, J. J.; Worch, E. A.; Underwood, E.; Nurnberger-Haag, J.; Scheuermann, A.; Midden, W. R.

Participation in the COSMOS Research Learning Community shows a diverse group of faculty participants from 6 university departments and 2 corresponding colleges (Arts and Sciences and Education). The community consisted of 10 regular attendees and met twice a month throughout the academic year.

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Evaluation Summary

The COSMOS Research Learning Community (RLC) was evaluated using an online survey that was completed by the members of all learning communities campus wide. (Only the responses of the members of the COSMOS RLC were analyzed for this report.) Only three members of the COSMOS RLC completed the survey, so it is difficult to draw any definitive conclusions from the survey responses. However, the survey respondents did unanimously agree that the COSMOS RLC contributed to improvements in their teaching practices. All three respondents agreed or strongly agreed that their participation in the RLC resulted in the use of new pedagogies and learning strategies in their classes and that the RLC resulted in an increase in the number of learner-centered activities in their classes. In addition, all of the respondents predicted that would likely participate (as either a member or facilitator) in a learning community next year.

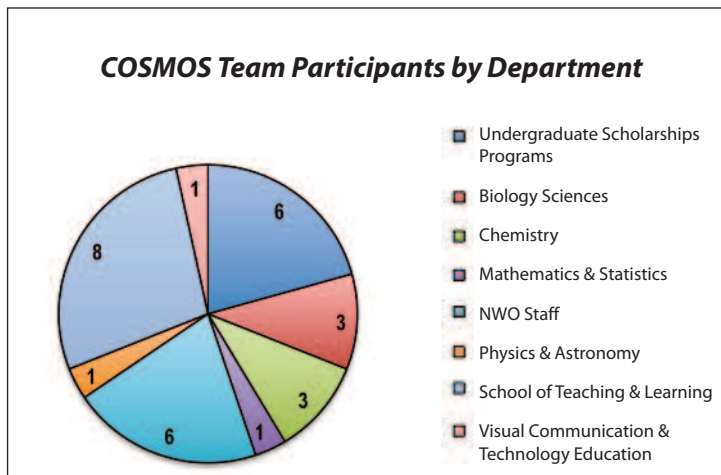
COSMOS Team and Research Dissemination

Brief Description

The Center Of Excellence in Science and Mathematics Education: Opportunities for Success (COSMOS), the BGSU branch of NWO, hosts the COSMOS Team meeting for BGSU faculty and administrators to work with NWO staff to communicate, collaborate, and champion STEM initiatives at BGSU and throughout the northwest Ohio region. This enthusiastic and supportive group has been meeting as a formal group for over 9 years and is committed to advancing STEM education for people of all ages. **Meets NWO Goal: 3**

FY 2012 Activity Information

Participation in the COSMOS Team shows a diverse group of faculty & staff participants from 6 university departments and 3 corresponding colleges (Arts and Sciences, Education, and Technology). Representatives from 5 unique undergraduate scholarship programs were also in attendance and brought new insight to the group regarding the university student experience at BGSU. The team consisted of 29 total attendees and met twice a month in the fall and once a month in the spring. This change in format reflected the growing responsibilities of the team members to their respective departments and colleges; as well as a preference to use more electronic communication throughout the year and have fewer and shorter in person meetings.



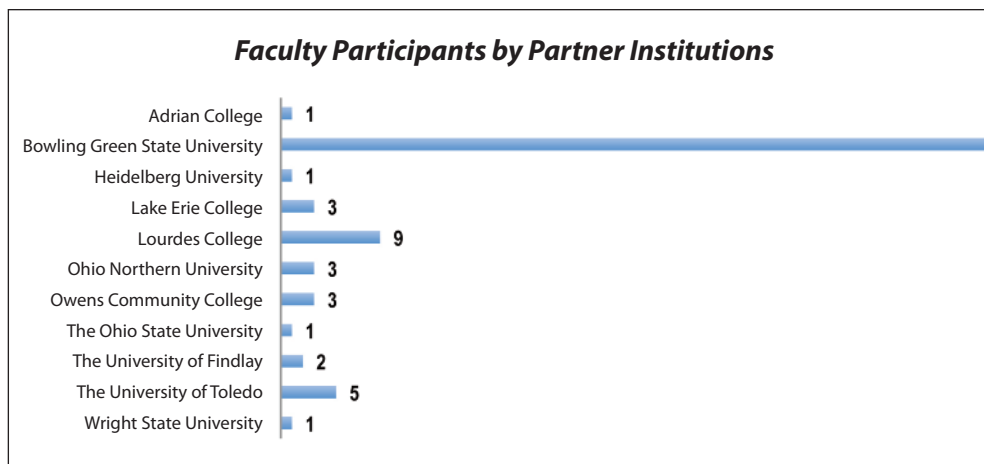
A total of 23 refereed publications and 19 refereed presentations focusing on STEM education were accomplished during FY 2012 by COSMOS Team members. A full list of presentation and publications is available in Appendix E.

NWO Faculty Participants

Brief Description

NWO has partners in colleges and universities all over northwest Ohio and southeast Michigan. These faculty assist NWO in many ways, including participating in and/or presenting at the following NWO events: (a) NWO STEM Education Inquiry Series, (b) NWO Symposium, (c) STEM in the Park, (d) OJSHS, (e) STEM Consortium Advisory Board, (f) COSMOS Research Learning Community, and (g) COSMOS Team. **Meets NWO Goals: 3 & 5**

FY 2012 Activity Information





K-12 School, Business, and Community Activities

Business and Community Partners

Brief Description

NWO impacts and works with collaborative partners all over northwest Ohio. Many institutions have become formal partners. Below is a list of some of our most active partners during FY 2012. A complete list of partners as well as the application to become an NWO partner is available at www.nwocenter.org/partners. **Meets NWO Goal: 4**

FY 2011 Activity Information

School Districts

These are the main district collaborations, as cited in our current grant projects; however, we recruit/disseminate to 29 counties.

- Bowling Green City Schools
- Findlay City Schools
- Fort Recovery Local Schools
- Four County Career Center
- Lima City Schools
- Maumee City Schools
- New Bremen Local Schools
- Penta Career Center
- Perkins Local Schools
- Perrysburg Exempted School District
- Putnam County Schools (9 School Districts)
- Rossford Exempted Village School District
- Springfield Local Schools
- St. Henry Consolidated Local Schools
- Sylvania Local Schools
- Toledo Public Schools
- Toledo Technology Academy
- Vanguard-Sentinel Career Center
- Sandusky City Schools

Businesses

- Ball Corporation
- BP-Husky, LLC
- Carolina Biological Supply
- Delta Education
- Educaching
- Libbey Glass
- Mother Hubbard's Learning Cupboard
- Perstorp Polyols, Inc.
- Sheridan Worldwide
- Texas Instruments
- Toledo Zoo
- Time Warner Cable
- Tony Packo's
- Walmart

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Educational Service Centers	Community & Non-Profit Organizations
<ul style="list-style-type: none"> • Hancock County • Lake Erie West • Mid-Ohio • North Central Ohio • Northwest Ohio • Putnam County • Shelby County • Wood County 	<ul style="list-style-type: none"> • Armstrong Air and Space Museum • Challenger Learning Center of Lake Erie West • Fort Meigs: Ohio's War of 1812 Battlefield • Imagination Station • Lucas County Soil and Water Conservation District • Northwest Ohio Educational Technology (NWOET) • Sauder Historical Village • Toledo Area Metroparks • Toledo Blade • Toledo Botanical Gardens • Toledo Museum of Art • WGTE Public Media
State Support Teams	
<ul style="list-style-type: none"> • Region 1 • Region 6 • Region 7 	

Ohio Junior Science and Humanities Symposium (OJSHS)

Brief Description

OJSHS brings the best and brightest students from Ohio middle and high schools together for a competition to highlight and judge the quality of their research projects in the sciences and humanities. This event is an excellent opportunity for the recruitment of the next generation of scientists, mathematicians, engineers, and teachers. OJSHS is co-sponsored by NWO and a grant from the Academy of Applied Science. Paper and poster presentations by these students demonstrate a level of achievement that would rival some of the very best junior and senior undergraduate students with some even approaching what is expected of beginning graduate students. Past Ohio winners have gone on to win the top award at the National competition, demonstrating the extraordinary talent and achievement of these students. **Meets NWO Goal: 2**

FY 2012 Activity Information

Bowling Green State University hosted the 3-day, 2012 event for the fourth year in a row from March 21-23. OJSHS participants were once again charged a \$25 registration fee. This fee was recommended by parents and teachers to help cover the costs of running the symposium. The keynote address was Dr. Peg Yacobucci, a Professor in the Department of Geology at BGSU. There were 25 paper presentations and over 76 poster presentations. Christopher Ellis from Sylvania Southview High School was the 1st place winner for paper presentations with his project titled "Role of Glutamate Transporter 1 Activation on Chronic Alcohol Consumption in Wistar Rats". Christopher, along with 4 other OJSHS winners traveled to the National JSHS in Bethesda, Maryland in April 2012. A complete program and other information about the 2012 OJSHS can be found at www.ojshs.org. On the next page is a break-down of attendance data for the 2012 Symposium.

Participant Group	Total Attendance for 2012
High School and Middle School Students	105
K-12 Educators	10
Higher Education Faculty (Poster & Paper Judges)	27
Staff and Volunteers	30
Parents and Guests	24
TOTAL	196

Evaluation Summary

The 2012 OJSHS was evaluated using an online survey, which was completed by participating students, teachers, parents, paper and poster judges, and OJSHS staff and volunteers. The total number of survey responses was 76 for students and 40 for non-students. The results of the survey demonstrate that both students and non-students perceived the 2012 OJSHS as a high-quality worthwhile event. Most of the participants (88%) rated the 2012 OJSHS overall as either good or excellent. Furthermore, most OJSHS components (e.g., evening activities, paper and poster judges, awards ceremony) were rated as good or excellent by more than 75% of participants. The survey results also indicate that the 2012 OJSHS increased student interest in STEM research and careers and provided students with opportunities to network with other students and STEM professionals. And although it is likely that most of the participating students were already interested in STEM, many non-student participants suggested that the OJSHS provided students with motivation to continue learning and conducting research about STEM. The recommendations for the 2013 OJSHS event are to 1) provide students with a rubric for poster judging prior to OJSHS, 2) reinstate a competitive ranking system for poster projects, and 3) continue to offer ice skating, curling, and add other activities. The 2012 OJSHS Evaluation Report offers a more thorough account of the implementation and impact of the event, and can be found at www.nwocenter.org/reports.

STEM Consortium Advisory Board

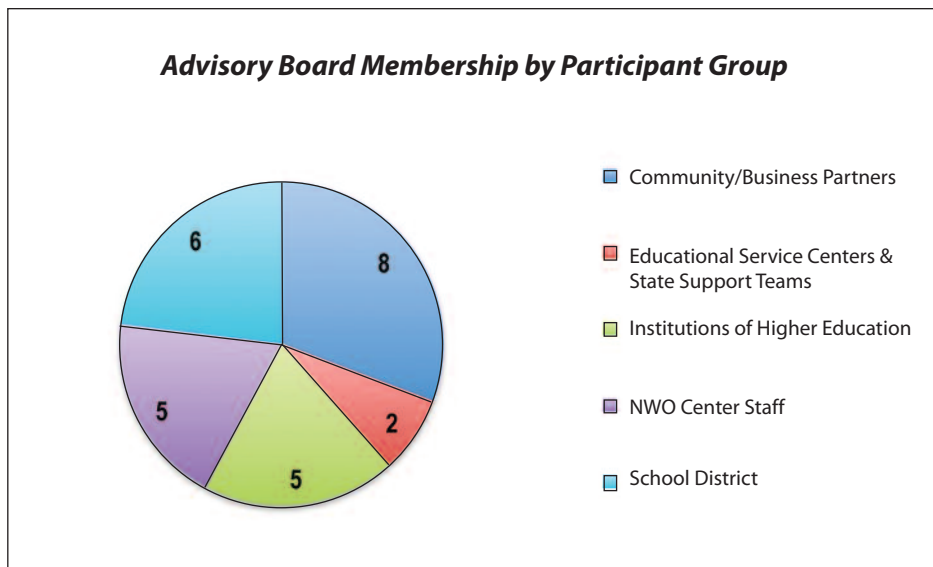
Brief Description

The NWO STEM Consortium Advisory Board was created as part of the STEM Consortium grant that NWO received from the Ohio STEM committee, Ohio Board of Regents, and Ohio Department of Education in association with the Ohio STEM Learning Network. **Meets NWO Goal: 4**

FY 2012 Activity Information

The Advisory Board advised and guided the organization, implementation, and assessment of the NWO STEM Hub ensuring that the voices of all STEM education stakeholders of northwest Ohio are heard and regional needs are met. The Advisory Board included members from several different participants groups in order to have adequate representation of all STEM constituencies in northwest Ohio.

The Advisory Board met periodically to generate ideas, provide advice regarding direction and strategies, raise awareness of opportunities, foster collaboration, form new partnerships and strengthen existing partnerships, recruit resources for new initiatives, and help to ensure that the Hub is serving the greater good of the entire region. Attendance information by participant group is available below.



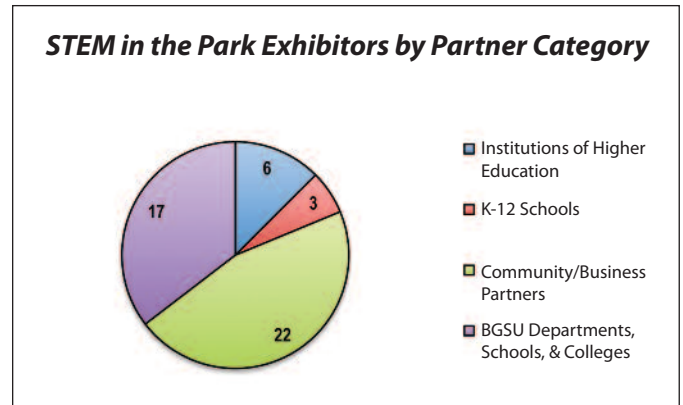
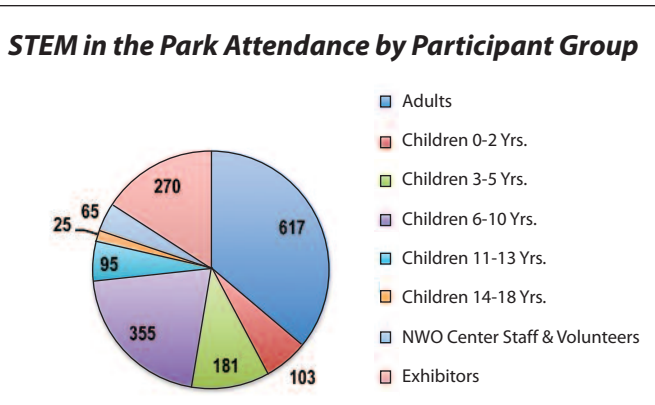
STEM in the Park

Brief Description

STEM in the Park is a free NWO event for all northwest Ohio families and the entire community to stimulate public interest and encourage learning in science, technology, engineering, and mathematics (STEM). Held on the campus of Bowling Green State University, the event features three hours of engaging hands-on STEM activities from over 50 area businesses, schools, and organizations along with take-home STEM activity cards for parents and children to continue STEM exploration at home. By increasing awareness in STEM facilities, programs and activities in the area, STEM in the Park is an opportunity for businesses, universities, K-12 schools, and non-profit organizations to showcase innovation, educational opportunities, and careers and to promote positive attitudes toward STEM teaching and learning. **Meets NWO Goal: 2**

FY 2012 Activity Information

The September 10, 2011 event provided free lunch from Tony Packo's for all participants. Over 50 exhibitors were involved in STEM in the Park including many NWO community and business partners and university departments. Almost half (41%) of the activity stations included make-and-take activities that resulted in products attendees could take with them. Some of the make-and-take products included a soda bottle terrarium, "flubber", ice cream, muskets (made from paper and gum balls), and hand-dipped candles. In addition, almost half of the stations provided attendees with take home activity cards (which could also be accessed online after the event). Sponsors for the event included BGSU, NWO, BP-Husky, Coca-Cola, Tony Packo's, and The Andersons. Attendees at STEM in the Park 2011 (who completed the evaluation survey) came from sixteen different counties in northwest Ohio and southeast Michigan. Most of the attendees were from Bowling Green and the greater Toledo Area, but the event also attracted families from other cities and towns in northwest Ohio and southeast Michigan. Below is attendance data as well as a breakdown of the types of exhibitors at the event. A complete list of exhibitors is available at <http://nwocenter.org/STEMinPark>.



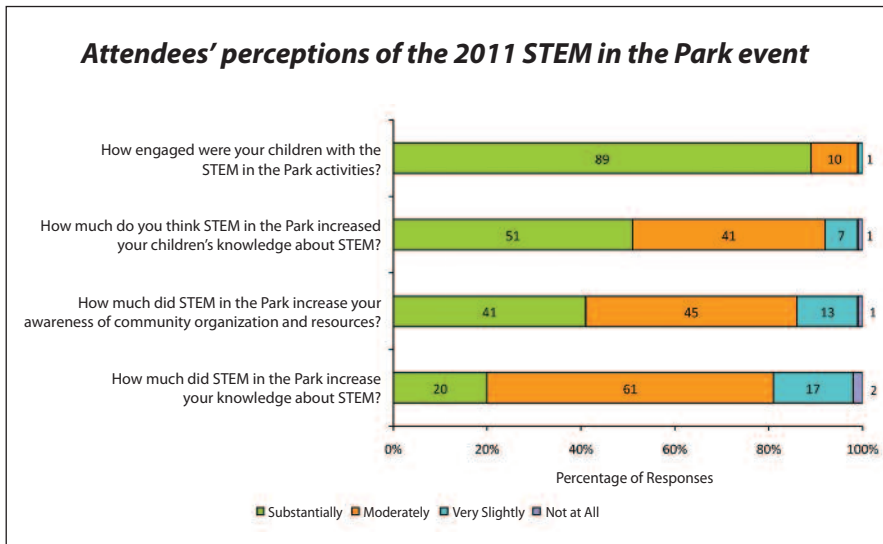
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Evaluation Summary

The 2011 STEM in the Park event was evaluated using two online surveys (one for attendees and another for exhibitors). The total number of responses to the attendee and exhibitor surveys was 170 and 31, respectively. Most of the attendees reported staying at STEM in the Park for 2 hours and visiting 11 to 20 activity stations. And while only half of the attendees reported doing the take home activities that were handed out during the event, 87% reported that they would probably or definitely do some of the activities in the future. In response to the question, “What were your family’s favorite activity stations?,” all but four stations were listed by at least one respondent, and several respondents wrote that they liked all of the activity stations. This finding indicates that the activity stations were high in quality and appealed to the preferences of many different people. The results of the attendee survey demonstrated that STEM in that Park was successful in engaging attendees in STEM activities, as well as increasing their knowledge and awareness of STEM. Two attendees wrote:

- *I want to say THANK YOU for putting on such an amazing event. I’m always trying to find educational but fun activities for my kids (ages 2, 4, 6), but couldn’t come up with many ideas until now. I really enjoyed the event and my kids did too!*
- *It’s hard to find free/inexpensive things do to with children and this was the jackpot! Highly recommend it!*

In addition, a majority of the attendees reported that after coming to STEM in the Park, their children were much more interested in STEM and their family was much more likely to do activities related to STEM. The results of the exhibitor survey mirrored those of the attendee survey – most of the exhibitors reported that the children and parents that visited their station were substantially engaged with the STEM activities. In addition, almost all of the exhibitors reported that STEM in the Park was a worthwhile experience, and most reported that being an exhibitor was beneficial for their organization. The recommendations for the 2012 STEM in the Park event are to: 1) consider making STEM in the Park longer than three hours, 2) regardless of the weather, consider holding STEM in the Park indoors again, 3) maintain the number of volunteers that worked at STEM in the Park 2011. The figure to the right illustrates the attendees’ responses to four of the questions on the attendee survey. The 2011 STEM in the Park Evaluation Report offers a more thorough account of the implementation and impact of the event, and can be found at www.nwocenter.org/reports.



You Be the Chemist Challenge

Brief Description

The You Be the Chemist (YBTC) Challenge is a fun and innovative academic competition that engages 5th-8th grade students in learning about important chemistry concepts, discoveries, and chemical safety. Challenge competitions are exciting events that take place across the country, encouraging the collaboration of community organizations, schools, and the chemical industry, as together they educate students about the benefits and value of chemistry. Ohio schools take part in local challenges within their school districts, and winners attend a state competition held in northwest Ohio to qualify for the YBTC National Challenge.

Meets NWO Goal: 2

FY 2012 Activity Information

The Ohio YBTC Challenge competition was held May 2, 2012 at the Imagination Station in downtown Toledo. Area sponsors included NWO, PVS, ACS Chemistry for Life, and Imagination Station. Robert Mendenhall, Science Director for Toledo Public Schools, chaired the event. The Ohio winner, Michael Allen, a sixth grader from the Franciscan Academy in Sylvania, Ohio went on to place second at the national completion in Philadelphia, PA on June 25, 2012.

NWO Role in YBTC in FY 2012

- Staffing support provided for event organization and planning
- Funding for student awards and certificates of participation
- Advertisement/recruitment via Constant Contact to ~ 7,000 regional K-12 contacts

Affiliated Grant Projects

Science and Math Education in ACTION (ACTION)

Brief Description

BGSU, in collaboration with three regional community colleges and The University of Findlay, received \$3,000,000 in funding from the Ohio Board of Regents through the Choose Ohio First program to recruit and train undergraduates to become Ohio mathematics and science teachers. ACTION focuses on the use of innovative strategies for preparing highly effective science and mathematics teachers for grades 5-12. Students involved in the project participate in: (a) a 5-week summer bridge program preceding the first regular semester of college; (b) a collaborative science or mathematics research team that addresses a real community problem or concern; (c) a co-op or internship work experience in a regional science or mathematics related business or industry; (d) early teaching experiences in a regional school; and (e) the creation of a capstone project that involves applying research techniques to determining the best teaching practices that advance the students' learning. **Meets NWO Goal: 2**

NWO Role in ACTION in FY 2012

- Assistance with the undergraduate research component of the project
- Assistance and advice for project activities and logistics

Building Ohio's Sustainable Energy Future (BOSEF)

Brief Description

BOSEF is a scholarship project funded by the Choose Ohio First program of the state of Ohio. BOSEF increases the recruitment, training, and graduation of STEM students to supply the growing job markets in renewable energy and sustainable environment technologies. Northwest Ohio has a growing reputation for research, development, and manufacturing in the high technology, renewable energy fields of photovoltaics (PV) and wind. In addition, northwest Ohio has major research and development strengths in environmental analysis and remediation technologies. The University of Toledo (UT), Bowling Green State University (BGSU), and the community colleges of Owens, Terra, and Northwest State work together to leverage the enormous public interest and burgeoning job markets in these fields to recruit,

Continued on page 28



educate, and retain the best and brightest of Ohio's students to support these rapidly developing high tech professions. Student success is enhanced through a cooperative summer bridge program focused on mathematics, undergraduate research experiences for all, and integration with the Wright Center for PV Innovation and Commercialization, the Lake Erie Research Center, Center of Photochemical Sciences, and the Environmental Remediation and Restoration Experimental Park. It prepares students for scientific and technical careers by providing internships with business, industry, agencies, and non-profits in renewable energy and environmental sustainability fields. Although the primary program focus is on the undergraduate STEM pipeline, it will include PhD students and in-service high school teachers working toward MS degrees. The participating institutions have a comprehensive and vertically integrated approach to STEM education that maximizes student success and provides skilled professionals in these crucial STEM areas. **Meets NWO Goal: 2**

NWO Role in BOSEF in FY 2012

- Oversight and management of the grant project including financial management of the grant budget
- Direct recruitment of students through AIMS and the chemistry and physics depts. at recruiting events
- Advertisement/recruitment to ~ 4,300 regional K-12 contacts
- Advertisement/recruitment at NWO Inquiry Series
- Management of scholarship awards and renewals
- Student advising

Granting Access to Mathematics and Science (GRAMS)

Brief Description

GRAMS (Granting Access to Mathematics & Science) is a scholarship program supported by two 5-year grants totaling \$1,200,000 from the National Science Foundation. In this project, Bowling Green State University collaborates with two regional community colleges, Owens and Terra, to increase the number of highly qualified and capable students who are able to complete degrees in STEM majors by providing approximately 20-30 need-based scholarships and a proven support program to foster student success. Student persistence and success will be fostered with two major projects: (a) our NSF-funded STEP grant project Science, Engineering, and Technology Gateway Ohio (SETGO) and (b) the BGSU Academic Investment in Mathematics and Science (AIMS). These programs include a 5-week summer bridge for entering students, to prepare them for the rigors of college science and math courses; a tiered system of mentoring by peers and faculty; learning communities with monthly events that draw students and faculty together by merging academics and social networking; and summer research opportunities. These strategies have been proven in BGSU's AIMS program to increase student persistence and success, particularly of under-represented minority students majoring in science and math disciplines and are based on research that has identified the factors that most account for student attrition from these disciplines. **Meets NWO Goals: 2 & 3**

NWO Role in GRAMS in FY 2012

- Oversight and management of the grant projects including financial management of the grant budgets
- Direct recruitment of students through AIMS and SETGO at recruiting events
- Advertisement/recruitment to ~ 4,300 regional K-12 contacts
- Advertisement/recruitment at NWO Inquiry Series
- Management of scholarship awards and renewals
- Student advising

FY 2012 NWO Budget

Category	Total Expenditures	FY 2012 Income Sources				TOTAL INCOME
		BGSU*	Grant Programs	Activity Revenue & Sponsorships	Carryover	
Personnel (Salaries and Fringes)**	\$410,859.13	\$226,704.00	\$121,749.23		\$11,030	\$359,483.23
General NWO Activity						
Communications	\$2,712.25		\$2,898.00			\$2,898.00
Equipment & Consultants	\$14,025.77		\$15,909.77			\$15,909.77
Indirect Costs Recovered	\$8,684.97		\$8,902.00			\$8,902.00
Maintenance & Repairs	\$68.00					\$0.00
Misc.	\$74,400.00	\$6,000.00	\$74,400.00		\$29,846.78 ^	\$110,246.78
Student Scholarships	\$212,269.58		\$331,328.00			\$331,328.00
Supplies	\$19,863.52	\$8,000.00	\$16,539.38		\$93,807.50	\$118,346.88
Travel & Entertainment	\$5,052.80		\$2,693.56			\$2,693.56
Core NWO Programs						
Community Resources Workshop	\$7,680.82			\$7,820.00		\$7,820.00
NWO Inquiry Series	\$5,471.69			\$6,070.00		\$6,070.00
NWO Symposium	\$6,962.12			\$5,750.00		\$5,750.00
OJSHS	\$17,386.35		\$17,000.00	\$3,830.00		\$20,830.00
Partner Projects w/ NWO	\$453.98			\$3,907.64		\$3,907.64
STEM in the Park	\$13,769.94			\$15,860.00		\$15,860.00
TOTAL	\$799,660.92	\$240,704.00	\$591,419.94	\$43,237.64	\$134,684.28	\$1,010,045.86

* Includes grant cost share dollars.

^ BOSEF Carryover from FY 2011.

** Personnel includes NWO Staff, faculty, and students.

NOTE: Budget does not reflect funds from the ACTION grant.

Continued on page 30



The table below shows funding sources that supported FY 2012 NWO Activities.

BGSU FUNDS		
Agency: Program	Description	Award Amount
Bowling Green State University Fiscal Support for NWO/COSMOS	<ul style="list-style-type: none"> • Director • Secretary • Fringes • Assistant Directors • Faculty Associates • Operating Budget 	\$192,750.00
BGSU Cost Share	BOSEF: Building Ohio's Sustainable Energy Future - BGSU portion (Year 3 of 5)	\$47,954.00
Carryover	COSMOS Carryover from FY 2005– 2011 Funds	\$104,837.50
	BOSEF Carryover from FY 2011 Funds	\$29,846.78
BGSU FUNDS TOTAL		\$375,388.28
ACTIVITY REVENUE AND SPONSORSHIPS		
Agency: Program	Description	Award Amount
Community Resources Workshop	Revenue from Registrations	\$7,820.00
NWO Inquiry Series	Revenue from Registrations	\$6,070.00
	Rossford Schools (Inquiry Series Host)	In-Kind
NWO Symposium	Revenue from Registrations	\$5,750.00
	Penta Career Center (NWO Symposium Host)	In-Kind
OJSHS	BGSU Department Sponsorships	\$1,000.00
	Revenue from Registrations	\$2,830.00
Partner Projects w/ NWO	Best of the Outdoors Page Workshop Registrations	\$760.00
	Parking Fees for Common Core for Reasoning and Sense Making: Secondary Grant Program	\$176.00
	Misc.	\$2,971.64
2011 STEM in the Park Sponsor	BGSU Colleges & Departments	\$3,800.00
	Time Warner Cable	\$2,500.00
2012 STEM in the Park Sponsors	Sponsors (Total Donation)	Used in FY 2012
	BGSU Colleges & Departments (\$9,050)	\$9,560.00
	Bowling Green Community Foundation (\$1,500)	
	BP-Husky (\$5,000)	
	Time Warner Cable (\$2,500)	
	Walmart (\$2,500)	
ACTIVITY REVENUE AND SPONSORSHIPS TOTAL		\$43,237.64

GRANT PROGRAMS		
Agency: Program	Description	Award Amount
Academy of Applied Science	Ohio Junior Science & Humanities Symposium	\$20,000.00
Ohio Humanities Council	History Lab	\$892.30
OSLN/Battelle Foundation	Ohio Race to the Top	\$51,826.41
	Gates Foundation Subaward	\$4,715.44
	OSLN Hub Grant	\$2,833.39
Ohio Board of Regents: ITQ Program	Project pi r ² two	\$108,030.00
Martha Holden Jennings Foundation	USE-IT III	\$20,990.00
National Science Foundation: S – STEM	GRAMS (Year 3 of 5) & GRAMS II (Year 2 of 5)	\$232,285.00
Ohio Board of Regents: Choose Ohio First Program	BOSEF (Year 3 of 5)	\$127,650.00
Ohio Environmental Education Fund	Energy Explorations (Imagination Station subaward for Evaluation Services)	\$4,000.00
Toledo Community Foundation	SPACE 2011 (Lucas County ESC subaward for Evaluation Services)	\$2,101.35
Ohio Board of Regents: ITQ Program	Science Teaching Advancement through Modeling Physical Science (STAMPS II) (BGSU Subaward for Evaluation Services)	\$7,096.05
eTech Ohio	STeM 2 STEM (Ohio Northern University subaward for Evaluation Services)	\$9,000.00
GRANT PROGRAMS TOTAL		\$591,456.59
TOTAL INCOME FOR FY 2012		\$1,010,045.86
GRANTS SUBMITTED IN 2012		
Agency: Program	Description	Award Amount
BGSU Foundation	2012 STEM in the Park (Awarded)	\$4,000.00
Kroger	2012 STEM in the Park (Awarded)	\$15,000.00
National Science Foundation: MSP/Targeted Awards	iEvolve with STEM (5 years) (Awarded)	\$7,277,347.00
Ohio Board of Regents: ITQ Program	Partners in Inquiry Resources & Research (Project pi r ² <i>three</i>) (Denied)	\$122,739.00
Ohio Board of Regents: ITQ Program	Guiding Educators through Content Knowledge to create Opportunities for Success (GECKOS) (Denied)	\$131,931.00




Appendices

- A. Community Resources Workshop Recruitment Email
- B. Faculty and Student Recognition
- C. "NWO STEM Connection" Print and E-Newsletters
- D. NWO STEM Education Inquiry Series Advertising
- E. NWO Publications and Presentations
- F. NWO Symposium Advertising
- G. OJSHS Recruitment Email
- H. STEM in the Park Advertising
- I. USE-IT III Recruitment Email

Appendix A: Community Resources Workshop Recruitment Email

REGISTRATION NOW OPEN!



**2012 Community Resources Workshop
for Educators**
June 18-22, 2012

**Spend a Week of Your Summer Vacation on a Fun-Filled Field Trip
for Educators While You Earn College Credit or 40 Contact Hours!**

You'll visit some of northwest Ohio's best informal and formal education institutions as well as learn about hidden gems to energize classroom instruction!

Here's what some participants had to say about last year's workshop:

"...an awesome opportunity to become aware of endless resources..."

"This workshop should be a requirement for all teachers!"

"This workshop was excellent. I was unaware of the resources available and the willingness and funds for making these services available. I will share this info with my colleagues."

"This was one of the best workshops that I've ever attended."

This opportunity is open to all educators, administrators and pre-service teachers. We welcome homeschooling educators.

This workshop is recommended for preK-8 teachers but all educators are welcome and encourage to attend.

Join us for an exciting week packed with activities addressing the new Common Core Standards, STEM learning and 21st Century Skills.


See <http://www.nwocenter.org/CRW/CRWhome.htm> for details.

Register and pay the registration fee online at <http://www.nwocenter.org/CRW/RegInfo.htm>

Additional Payment Information:
After online registration is completed, you may also pay by check or school purchase order are also accepted. Title I Part A Funds and Title III Funds may be used for this workshop. Register online, then please send checks or purchase orders to:
NWO/Community Resources Workshop
241 Math Science Bldg, BGSU
Bowling Green, OH 43403

Special on graduate credit!
In addition, Lourdes University is offering 2 graduate credit hours for the one week course at a special discounted rate of just \$200 per credit hour. That means you can receive two graduate credits for only \$400! Plans are also in the works for a three credit hour option. Contact Robin Kratzer for information at: rkratzer@lourdes.edu
*The graduate credit fee is on top of the \$150 registration fee and can be easily arranged through Robin Kratzer at Lourdes University.

Your Community Resource Partners are:



Appendix B: Faculty & Student Recognition



A PERIODICAL PUBLICATION FOR THE BGSU COMMUNITY



Celebrating Nature's Neighborhood's national recognition are (left to right) Curator of Education Mitch Magdich; Emily Woodard and her father, Rick Worch; Jodi Haney and Steve Oswanski, Nature's Neighborhood manager.

BGSU faculty make good Toledo Zoo neighbors

From barnyard goats to exotic birds, kids can explore and learn in Nature's Neighborhood at the Toledo Zoo.

Three BGSU faculty members helped make it an engaging experience for children, and now have helped Nature's Neighborhood gain national recognition. The Association of Zoos and Aquariums (AZA) recently presented Nature's Neighborhood Top Honors in exhibit design. The 2011 AZA Exhibit Award recognizes excellence in the area of live animal display and exhibit design by an AZA-accredited institution or related facility member.

"The AZA Exhibit Award recognizes the Toledo Zoo as a real leader in educating and inspiring children," said AZA president and CEO Jim Maddy. "Nature's Neighborhood, with its innovative approach to exhibit design, animal care and conservation education, demonstrates how the Toledo Zoo, and all AZA-accredited zoos and aquariums, are more important than ever to children, families and their communities."

Drs. Jodi Haney, who has a joint appointment to the School of Teaching and Learning and the environment and sustainability department; Rick Worch, School of Teaching and Learning, and Amy Scheuermann, formerly with the School of Intervention Services, worked with the Toledo Zoo education team on the design and development of Nature's Neighborhood beginning in 2007.

"This was an extension of what COSMOS as well as many of our earlier science education initiatives advocate: experiential learning," Haney said.

She and Worch recently conducted an extensive internal evaluation of Nature's Neighborhood play spaces. One assessment technique employed behavior mapping, a process utilizing GIS software to construct maps of the play spaces in order to examine where pertinent behavioral observations data (such as type of science learning, type of play, and level of physical activity) took place in those spaces.

On learning of the award, Mitch Magdich, Toledo Zoo education curator, said he thought that "the summative evaluation piece had a big impact. What made our application so outstanding was the science and analysis that went with the quantitative part, particularly behavior mapping."

"The Toledo Zoo is proud to accept the 2011 Exhibit Award for Nature's Neighborhood and looks forward to inspiring young minds for generations to come," said Toledo Zoo CEO and Executive Director Dr. Anne Baker.

October 25, 2011

toledoBlade.com



Austin Winer, left, and Cody Hagen work on wireless circuits at Toledo Technology Academy. THE BLADE/DAVID ZAPOTODSKY

Published 4/12/12 Updated 12 hours ago

TPS aims to beef up its magnet program

BY ACLAIR ROSENKRANS
BLADE STAFF WRITER

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The light glowed dimly, at least in the room, but served as a beacon for big plans and past ideas. Cody Hagen and Austin Winer, both 18, inspired by Nikola Tesla and working with a team from the Massachusetts Institute of Technology, are developing ways to transmit electricity without wires.

So far, they've made their wireless currents light up objects a couple of inches away; the MIT team is up to seven feet, they said. Still, they correspond frequently, with the Massachusetts side offering tips through email.

PHOTOS: STEM galaxy

"They're all really cool people out there," Cody said.

The two centers at Toledo Technology Academy weren't told to work with the MIT team — they sought it out themselves.

Housed at the former DeVilbiss High School on Upton Avenue, the Toledo Technology Academy is a success story for Toledo Public Schools. The academy, along with the Toledo Early College High School, are the district's two magnet high schools. Both score in the top academic tier of schools in Ohio.

Much of Toledo Public Schools' transformation plan's first year has been built on investments in the district's lowest-performing schools, with new teachers, programs, and strategies added in an attempt to boost test scores and foster perceptions that TPS is an effective system. Big changes are still to come, and some are likely to involve the two magnet schools. Administrators want to develop a K-12 campus devoted to science, technology, engineering, math, and medicine (STEMM) curriculum by building off the two magnet schools.

Expanding the benefits of educational choice may not be the most popular of acts in a school system that has benefited the impact of charter schools and voucher programs. But for the technology academy's director, Gary Thompson, it's too late to worry about lighting off educational choice.

"Take a cold, hard look at the facts," he said. "People are making choices. It really doesn't matter if I like it or not." And so the STEMM campus is the district's greatest choice salvo in the transformation plan, and it builds from the magnet schools' already strong bases.

The STEMM concept is a popular trend in education, and school leaders argue that programs focused on those disciplines prepare students for growing industries with available, well-paying jobs. The concept is also amenable to project-based learning and tends to be popular with parents.

Bob Midden, director of the Northwest Ohio Center for Excellence in STEM Education and a Bowling Green State University professor, said that most jobs now require training in at least some of the math and STEMM fields. Even in factories, many jobs require employees to program machines, not physically operate them.

"These are the areas right now where you have some of the most numerous jobs openings," he said.

The concept continues to grow. M. Midden said, with at least a dozen STEMM-focused schools opened in northwest Ohio in the past five years, by his estimate. Toledo has one of the best, he said, and a K-8 program that acts as a feeder school would help strengthen the existing schools.

The Toledo Technology Academy focuses on technological and engineering skills with project-based learning. Each student must complete a capstone course, and seniors all complete internships. Students also can earn college credits. They also are required to get mentors, said Robert Gordon, senior instructor, which is how the relationship among Cody, Austin, and the MIT team started.

Meanwhile, Toledo's Early College High School allows students to take 60 credits of college courses through the University of Toledo while in high school. The program is housed at UT's Scott Park campus. When students complete the program, they graduate with a high school diploma but can enter college as juniors.

Both schools have proved successful. When Ohio recently ranked all public high schools by test scores, Toledo Early College ranked 17th in the state and was the top-ranked school in the Toledo metro area. The technology academy ranked 12th out of about 3,500 schools that were ranked.

Although other TPS schools' enrollment strains, the two magnet schools grew, although modestly. Enrollment at the early college school went to 326 last year from 152 in the 2004-2007 school year, and the technology academy grew to 168 students from 153.

District administrators are working with both magnet schools' governing boards to develop the STEMM program. The K-8 school would act as a magnet program, where students from throughout the district apply to the school. When they get to high school, they can choose either the technology academy program, with a focus on technology and engineering, or the early college program, with a focus on science or medicine.

The district already has a STEM school at the Chase STEM Academy, although that school pulls students from traditional boundaries such as other elementary schools. Jim Smith, TPS chief academic officer, said the new STEMM school wouldn't affect Chase, which district leaders hope to strengthen, not eliminate. The added fit for medicine is still a new trend in education, after the Chase school was developed.

Several questions still surround the idea, which most likely will mean the initiative won't roll out until 2015.

For instance, TPS officials don't know if the early college school should move to the DeVilbiss campus or remain at Scott Park.

Containing the entire program at one place has advantages, but Mr. Gault said that the early college school's spot at the Scott Park campus is an effective selling point to parents.

"There is some power being on the university," he said.

The potential growth is a significant change of fortune for the magnet schools, one built by their success. The schools' very existence was threatened in recent years during budget cuts as previous administrative teams argued that the programs weren't required by the state.

The STEMM school is not the only focus in building choice programs in the Toledo schools. The transformation plan calls for each of the district's six traditional high schools to develop specialized programs, such as a proposed performing arts school at Bowler.

But many of those changes depend on money. District administrators are aggressively searching for grants to establish the STEMM program. The other high schools are likely to depend on the passage of a way to the fall.

Contact Nola Rosenkrans at nrosenkrans@toledoblade.com or 419-724-8285.

Appendix B: Faculty and Student Recognition cont.



A PERIODICAL PUBLICATION FOR THE BGSU COMMUNITY



President Mary Ellen Mazey chats with junior Keryatta Robinson from Detroit (center), a pre-nursing major, and sophomore Corey Howe from Sylvania, a pre-med major, about their genetic-diversity study.

SETGO students share their original research results

After 10 weeks of intensive research activities, 40 undergraduate students from BGSU and Owens Community College presented the results of their work at the SETGO Summer Research Roundup. Joining them were several students who are working on other grant-funded studies with BGSU faculty. Among the visitors was President Mary Ellen Mazey, who was enthusiastic about the opportunities the program provides. "Undergraduate research is so important. We're in the third year of five years of National Science Foundation funding, and we hope to institutionalize the program at the end of that time," she said.

"Being able to communicate what you do as a scientist to someone who is not a scientist is very important because most funding decisions are made by legislators, who most likely don't have science backgrounds," Dr. Laurie Fathe, Owens dean of arts and sciences, told the students.

Some of the research projects will not end with the conclusion of SETGO but will go on into the fall as the students continue their collaborations with their faculty mentors.

Decision making was the topic of several of the projects, from decisions by African cichlids about which fish against whom to demonstrate aggression, by senior Kamela Stamey, a biology major from Dayton working with Dr. Moira Van Staaden; to decisions by rats about whether to go for more variety or simply the greatest number of treats, in a study by Daniel Powers, a senior from Whitehouse majoring in neuroscience and working with Dr. Casey Cromwell (turns out quantity usually trumps variety).

A project to discover how fish orient themselves in the dark and in differing water currents has drawn the attention of researchers at the University of Maryland who are developing an unmanned underwater explorer. Senior Rohan Bhimani of Bowling Green, a neuroscience/biology major, has been working with Dr. Sheryl Coombs, biological sciences, since last year to design a flow tank for the study and begin the research.

Some of the projects have potential application for serious health issues. Ramadeep Singh Bola, a sophomore from Findlay majoring in biology, is studying with Dr. Roudabeh Jamasbi to find a way to detect cancerous cells in the esophagus.

"This has been a great learning experience. It's my first time doing something as a real research program and it sets up a great base for me. It's doing research on your own but also first doing all the background work and study you need. We reached part of our goals and saw some results," Bola said.

This summer's program included some younger participants than in past years, based on third-year recommendations from the National Science Foundation, which funds the program. SETGO is designed to increase the number of science, math, engineering and technology graduates. In addition to the summer research program, it comprises a bridge program at Owens between high school and college, and participation in the Art of Science Community, which meets regularly throughout the year.



Rohan Bhimani (left) explains his research into fishes' directional orientation methods to biologist Dr. Moira van Staaden.

July 26, 2011



Monday, July 25, 2011

Area teachers receive hands-on STEM education



Marcia Hull and Laura Miller, teachers at Wauseon Primary School, set up a science experiment as part of the Community Resources Workshop.

Last month, 30 kindergarten through sixth-grade teachers got up close and personal with baby elephants, bats and baseball. The group traveled throughout northwest Ohio from June 20-24 as part of the Community Resources Workshop, a summer institute that serves as the first leg of a 100-hour professional program called Project Pi r2.

The summer workshop is an ongoing partnership among local nonprofit organizations and institutions of higher education including the Toledo Zoo, Toledo Mud Hens, Challenger Learning Center, WGTE, Lourdes College and BGSU. It was made possible, in part, through a \$108,000 grant from the Ohio Board of Regents (OBOR). Dr. Emilio Duran, School of Teaching and Learning, is the principal investigator of Project Pi r2.

The goal of the week was to introduce teachers to the number of STEM (science, technology, engineering and mathematics) educational resources available to them in the area. The institute also seeks to provide "teacher as student" field experiences at a variety of sites.

Pi r2 is an acronym for Partners in Inquiry Resources and Research. It was developed at the University through the Northwest Ohio Center for Excellence in STEM Education (NWO) and the Center of Excellence in Science and Mathematics Education: Opportunities for Success (COSMOS) to provide professional development for K-6 teachers to help them excite students about STEM learning. The program is a federally funded Improving Teacher Quality Program Grant administered by OBOR.

Project teachers come from primarily high-need schools in the region. Throughout the academic year they will receive monthly professional development sessions and six free classroom programs provided by some of the education specialists they met during the summer institute.

"Teachers need hands-on materials and resources to make STEM come alive in the classroom, and too few educators are aware of the wealth of resources available to them right in their own backyards," says Michelle Leow Klinger, assistant director of NWO/COSMOS and Pi r2 program manager.

For more information on NWO and regional STEM programming, visit the NWO STEM Resource Center at <http://www.nwostemresources.org>.

BGSU in the news

Polis show bad news for both sides of debt debate
- [The Blade](#)

Soda, shoes and social issues: Can celebrities sway our political opinions?
- [Deseret News](#)

NTSB documents reveal new findings on San Bruno blast
- [San Jose Mercury News and Contra Costa Times](#)

Studies from Bowling Green State University further understanding of pediatrics
- [Pediatrics Week \(Kelly Balistreri, Center for Family and Demographic Research; link unavailable\)](#)

Researchers from Bowling Green State University report recent findings in management science
- [Investment Business Weekly \(link unavailable\)](#)

Call for experts

With the possible default facing the federal government, we anticipate media calls to the University for expert commentators. If you have expertise in any area related to the topic and are willing to speak, please contact Marketing and Communications at 2-2618 or 2-8582.

Zoom News is provided as a service to BGSU faculty and staff.

Appendix B: Faculty and Student Recognition cont.

Wednesday, September 14, 2011

toledoBlade.com

NEWS SPORTS A&E BUSINESS OPINION TODAY'S

Local State Nation World Politics Police & Fire Religion Education Technology Courts Deaths

Home » East



Madison Wilkerson, right, from Has'kins, Ohio, makes cement, while Travis Chapin, left, looks on during a STEM, or science, technology, engineering, math event at Bowling Green University. *THE BLADE/AMY E. VOIGT* [Enlarge](#)

Published: 9/14/2011

BGSU promotes math, science



ST Sentinel-Tribune
Bowling Green, Ohio

HOME NEWS SPORTS LIFESTYLE OBITUARIES PHOTOS REAL ESTATE CLASSIFIED

STEM in the Park will offer hands-on activities for families

WRITTEN BY SENTINEL-TRIBUNE STAFF
WEDNESDAY, 24 AUGUST 2011 07:49

Rockets and earthquakes and snakes, oh my! STEM in the Park will have that and so much more for families and people of all ages on Sept.10, from 10 a.m. to 1 p.m.

More than 50 unique exhibitors will host hands-on STEM activity stations at the event with over 70 tables of activities that kids from 2 to 102 can enjoy.

NWO, the Northwest Ohio Center for Excellence in STEM Education at Bowling Green State University, is organizing this free event on the BGSU campus for the entire Northwest Ohio and Southeast Michigan community.

NWO is a partnership among a number of area universities, K-12 schools and community partners who all come together at this event to showcase innovation and educational opportunities and promote positive attitudes toward STEM teaching and learning. STEM activity station hosts will include Fort Meigs, Challenger Learning Center of Lucas County, PNC Bank, PVS Nolwood Chemicals, University of Toledo, Ohio Northern University, BGSU's Marine Lab, Lourdes College, Penta Career Center, and Imagination Station plus over 40 other institutions and organizations.

Everyone who registers at the event will receive free STEM experiments to take home, an event map and free lunch catered by Tony Packo's. While at STEM in the Park visitors can set off rockets, pet lizards, play with bubbles, create puppets and make ice cream.

STEM in the Park is the brainchild of Drs. Emilio and Lena Ballone Duran, both faculty members at BGSU. Inspired by Literacy in the Park, a spring on-campus event that brings families in for a variety of literacy-boosting activities, STEM in the Park seeks to increase public engagement in STEM (Science, Technology, Engineering and Mathematics).

Last year's event had more than 1,600 people in attendance.

This year's festivities will take place outside the Bowen-Thompson Student Union and parking is free in lots A and G on Wooster Street, or 4, 4A and E on Thurstin Avenue. In the event of inclement weather, STEM in the Park will be held inside Perry Field House.

Visit nwocenter.org/STEMinPark for updates and more information.

STEM in the Park sponsors for 2011 include Time Warner Cable, a variety of BGSU colleges and departments, Tony Packo's, Coca-Cola, The Andersons and BP Husky, LLC.

Appendix B: Faculty and Student Recognition cont.

BGSU

Zoom news

BOWLING GREEN STATE UNIVERSITY NEWS UPDATE

Thursday, November 17, 2011

BGSU welcomes future scientists at Kids' Tech University



Why are tomatoes red? What can fossils tell us about the past and future of our planet? Kids' Tech University at BGSU is designed to let kids explore scientific concepts through hands-on activities as they discover more about the world and nature.

A research program for children ages 9-12, Kids' Tech meets in January, February, March and April. Each day includes a morning interactive session with faculty followed by lunch and an afternoon of related learning activities. An online component continues students' engagement after the campus activities have been completed.

The semester kicks off with Dr. Reinhard Laubenbacher of Virginia Bioinformatics Institute at Virginia Tech University, who originated the Kids' Tech program. He will introduce patterns, from snowflakes to ocean waves.


Dr. Peter Lu, Ohio Eminent Scholar in biology, will discuss proteins and their functions in February. In April, Dr. Peg Yacobucci, geology, will teach about fossils.

Dr. David Francis, horticulture and crop sciences, Ohio State University, leads the March session, on DNA.

Kids' Tech is open to all children who live within an hour of BGSU. There is a \$25 registration fee; scholarships are available.

Online enrollment begins at 6 p.m. Dec. 5 at <http://kids.techuniversity-bgsu.vbi.vt.edu/>

Kids' Tech at BGSU is directed by Dr. Paul Morris, biological sciences, and is funded through a U.S. Department of Agriculture National Institute of Food and Agriculture grant, which calls for participating universities to help prepare the next generation of scientists. (Click [here](#) for more information) Additional support comes from 4H.


Sentinel-Tribune
Bowling Green, Ohio

HOME NEWS SPORTS LIFESTYLE OBITUARIES PHOTOS CLASSIFIEDS DIRECT

Future scientists invited to BGSU's Kids' Tech

WRITTEN BY SENTINEL-TRIBUNE STAFF
 THURSDAY, 17 NOVEMBER 2011 08:55

Why are tomatoes red? What can fossils tell us about the past and future of our planet? Kids' Tech University at Bowling Green State University is designed to let kids explore scientific concepts through hands-on activities as they discover more about the world and nature.

A semester-long research program for children ages 9-12, Kids' Tech is presented by real scientists answering real questions.

Aimed at area families, the program is made up of four sessions, in January, February, March and April.

Each day includes a morning interactive session with faculty followed by lunch and an afternoon of related learning activities. An online component continues students' engagement after the campus activities have been completed.

The semester kicks off in January with Dr. Reinhard Laubenbacher of Virginia Bioinformatics Institute at Virginia Tech University, who originated the Kids' Tech program. He will introduce patterns, from snowflakes to ocean waves, and why they are there.

BGSU faculty members will teach two of the sessions. In February, Dr. Peter Lu, Ohio Eminent Scholar and professor of biology, will discuss proteins and their functions. In April, Dr. Peg Yacobucci, an associate professor of geology, will present fossils and what we can learn from them.

Dr. David Francis, associate professor of horticulture and crop sciences at Ohio State University, leads the March session, on DNA and its role as the building blocks of life.

Kids' Tech is open to all children who are age 12 by September and live within an hour of BGSU. There is a \$25 registration fee to participate; scholarships are available. All students will receive a lunch card and a KTU T-shirt.

Online enrollment begins at 6 p.m. Dec. 5 at <http://kids.techuniversity-bgsu.vbi.vt.edu/>

Now in its fourth year, a primary goal of the program is to prepare the future workforce in science, technology, engineering and mathematics by sparking children's interest in those fields.

Kids' Tech at BGSU is directed by Dr. Paul Morris, an associate professor of biology, and is funded through 4H and a U.S. Department of Agriculture National Institute of Food and Agriculture grant, which calls for participating universities to help prepare the next generation of scientists.

Kids' Tech University at BGSU opens world of science

[f](#) [t](#) [e](#) [+](#) [d](#)

BOWLING GREEN, O.—Following the successful launch of the Kids' Tech University (KTU) program at Bowling Green State University last year, the University has announced the lineup of invited speakers for the 2013 program. Kids' Tech is designed to let kids explore scientific concepts through hands-on activities as they discover more about the world and nature, while nurturing the future workforce in science, technology, engineering and mathematics by sparking children's interest in those fields.

The spring semester event is for kids between the ages of 9 and 12 who live within a one-hour driving distance of BGSU. There is a \$25 registration fee to participate; scholarships are available. All students will receive a lunch card and a KTU T-shirt. The program is held in the same campus lecture halls used by BGSU students.

The morning session features a talk and extended question period with the invited speaker. The afternoon sessions will include a series of hands-on activities relevant to the session topic that the children can participate in with their parents.

Registration will be limited to 150 children, and starts at 6 p.m. on Dec. 10. Register online at http://kids.techuniversity-bgsu.vbi.vt.edu/community_registration.php

Following are the four sessions:

On Feb. 9, Dr. Jennifer Kay of the National Center for Climate Research in Boulder, Colo., will discuss "Bright Blankets and Boating Bonanzas: How Do Clouds and Ice Affect Our Planet?" Her website is <http://www.cgd.ucar.edu/staff/jenkay/>

On Feb. 16, Dr. Craig Zirbel, a BGSU professor of mathematics and statistics, will share "Practical Math for the Digital Age." Learn more about him at <http://www.math.bgsu.edu/>

On April 6, Dr. Brett Tyler, director of the Center for Genome Research and Biocomputing at Oregon State University, will present "Why My Banana Doesn't Get the Flu." His website is <http://agg.oregonstate.edu/tyler>

In the last session, on April 13, Dr. Ron Woodruff, Distinguished Research Professor of biological sciences at BGSU, will speak about "What Can Fossils Tell Us About Human Health and Evolution?" Learn more his work at <http://www.bgsu.edu/departments/biology/people/woodruff.html>

Kids' Tech at BGSU is directed by Dr. Paul Morris, a professor of biology, and is funded through 4H and a U.S. Department of Agriculture National Institute of Food and Agriculture grant, which calls for participating universities to help prepare the next generation of scientists.

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(Posted November 21, 2012)

Appendix C: "NWO STEM Connection" Print and E-Newsletters

VOL 2

ISSUE 1

2012

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You Be The Chemist Challenge... p3

STEM Speaks!... p3

NWO Symposium... p4

STEM News in Brief... p4

STEM in the Park... p5

Hands-On STEM Activity... p7-8



The Northwest Ohio STEM Connection

Creating New Learning Platforms to Advance STEM Learning for All Students

Perkins Local Schools Pilots the Literacy Design Collaborative College Ready Tools

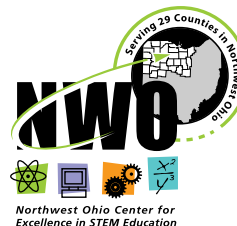


Literacy Design Collaborative College Ready Tools (LDC - CRT) are being adopted in Perkins Local Schools to provide inspiration and support for adoption in other schools throughout Northwest Ohio. CRT is a system of learning for all of the core academic disciplines including English language arts, social sciences, natural sciences, and mathematics. CRT focuses on development of literacy skills within each of these primary domains with the aim of improving student mastery of the common core standards.

CRT instruction is based on teaching modules. At the core of a teaching module is a specific teaching task, which is a writing assignment with a given purpose: narrative, argumentation, or informational/explanatory. These are usually oriented around a big question of some significance. In addition to the teaching task or overall assignment, the module includes mini-tasks that are designed to develop students' ability to successfully complete the teaching task. Modules also include

well-defined rubrics that guide student completion of the assignment and are used by teachers to assess student mastery.

continued on page 2



www.nwocenter.org

Print Newsletter

Appendix C: "NWO STEM Connection" Print and E-Newsletters cont.

E-Newsletter Sample

Advancing science, technology, engineering, and mathematics education for people of all ages.



Vol. 4 Issue #3 March 2012

K-16 STEM in the NEWS

Community STEM in the NEWS

STEM Opportunities

SAVE the Date for STEM in the Park 2012

Mathematics for Every Student

Attend the ASEE North-Central Section Annual Conference

Cleveland State University Call for School Partnerships on NSF Grant

NWO Hands-On STEM Activity

K-16 STEM in the NEWS

Exciting S.T.E.M. Project at Vanguard Tech Center



The Vanguard Tech Center is putting to use as many different aspects of STEM as possible into one large project. It is a sort of STEM clearing house. This past Valentine's Day, the Precision Machining Class took orders from the student body as well as staff. They designed and built key chains, neckties, and bracelets. Using donated materials from local industry in the community, it has been a success educationally as well as professionally.

The areas the machining students covered were in such diverse STEM and 21st Century Skills areas such as:

- **Material Science** - corrosion testing
- **Mathematics** - calculating material cost
- **CAD/CAM** - Computer Aided Drafting and Manufacturing for custom shapes
- **Machinist Cam Programming** - telling the CNC (computer numerically controlled) machine what to do
- **CNC Machining** - precision cutting the parts
- **Laser Cutting** - real world experience taking a field trip to a local company to observe a laser cutting blank sizes out of stainless steel. This process helps increase production as opposed to milling.
- **Language Arts (LA) and Computer Software** - developing marketing strategies and using LA skills and software to design the order form, flyers, pre-order surveys, and surveys. The students designed these pieces using Microsoft Word, Pagemaker, and Excel software.
- **Communications** - practicing good customer service skills by texting students when their orders are ready and problem solving for customers. This helps students see the good and bad side of running a business.
- **Character Building** - through the practice of good sales techniques, students sold products to the student body and staff. [read more](#)

Community STEM in the NEWS

Science in a History Museum? Absolutely!

STEM learning opportunities are all over northwest Ohio and nowhere is that more evident than at our region's local history organizations. NWO is partnering with Sauder Village, Seven Eagles Historical Education and EARTH Center, Fort Meigs: Ohio's War of 1812 Battlefield & Museum and The Wolcott Museum Complex, home of the Maumee Valley Historical Society. These partners have developed exciting new programming that assists K-12 teachers with cross-curricular resources involving hands-on, inquiry-based activities that improve student understanding of social studies as well as science, technology, engineering and mathematics concepts. [read more](#)



STEM Opportunities

Now Available - Rain Garden Sampler Loan Boxes!



The Rain Garden Initiative is pleased to offer educators two loan boxes containing activities and tools to assist them in exploring, designing and installing rain gardens with their students! The loan boxes were designed for use with the Rain Garden Curricular Sampler, a series of lesson plans for students in grades K through 12, developed by the Earth Stewardship for Schools Program of the University of Wisconsin-Madison Arboretum. The boxes are available from the Toledo Zoo Education Department and the Lucas Soil and Water Conservation District. A \$25.00 deposit is required, but \$20.00 of this deposit will be refunded when the materials are returned. The cost per use is only \$5. Contact the Toledo Zoo at 419-385-5721 ext. 2049 or the Lucas SWCD at 419-893-1966 to reserve a loan box. Check out the Rain Garden Curricular Sampler at http://www.arboretum.org/eps/research_sci_classroom_rain_garden_curriculum.php

The Community Resources Workshop Returns

Monday-Friday, June 18-22, 2012

Plan to spend a week of your summer vacation on a fun-filled field trip for educators while you earn college credit or contact hours! This high-quality professional development program offers: standards-aligned and classroom-ready lessons, materials, programs and resources along with 40 contact hours from NWO at BGSU or 2 semester graduate credits through Lourdes University.

Cost: \$150 includes most meals (breakfast and lunch) as well as entrance fees, materials and 40 contact hours (provided by NWO at BGSU). Credit cards, school purchase orders or checks will be accepted as payment. Graduate credit is only an additional \$200 per credit hour. Click here <http://mwocenter.org/CRW/RegInfo.htm> to register and more information.


Summer Teacher Trip from Maumee Valley Historical Society

Join Us for a Trip to the Islands... Lake Erie's Gibraltar Island & South Bass Island... to commemorate the bicentennial of the War of 1812. Tour Gibraltar Island, Cook Castle & the Ohio State University's Stone Lab, tour the newly restored Perry's Monument at beautiful Put-In-Bay on South Bass Island; increase your knowledge of early American history (War of 1812) and science content (geology and environmental science); and earn 7 contact hours.


Who: Educators, administrators, and undergraduate students
Date and Time: July 25, 2012 from 10:00 am-5:00 pm
Location: Meet at Miller Ferry Line, 5174 E. Water St., Port Clinton, OH
Cost: \$50 (cost includes transportation fees, tour and admission fees, materials and contact hour certificates)
Register: Online at <http://www.wolcottehouse.org/Teacher.html>

Project Wingspan Grant FREE nature education programs available for Title I schools

Nature's Nursery, a nonprofit wildlife rehabilitation and conservation education organization located in Whitehouse, OH (natures-nursery.org), recently received grant funding to cover the cost of presenting 35 of its nature education programs to Title I schools and nonprofit organizations that serve low-income children or youth with disabilities. The grant covers programs for the current school year. For more information or to schedule a program, please call Nature's Nursery at 419-877-0060, and tell them you are interested in a "Project Wingspan" program. Programs will be booked on a first-come, first-served basis.



SAVE the Date for STEM in the Park 2012



STEM in the Park 2012 will be held on **Saturday, September 8** from 10 am-1:30 pm on the campus of Bowling Green State University. We expect to host over 50 STEM Activity Stations with a spectrum of NWO partners including Imagination Station, Scrap-Art, BGSU's Herpetology Lab, Challenger Learning Center and Wood County Historical Center. This family-friendly event features loads of hands-on STEM activities, free lunch and take home STEM resources. This is an opportunity to enjoy time with your family while networking with area STEM resource providers and discovering great activities for your classroom! Visit: mwocenter.org/STEMinPark.

Mathematics for Every Student: Responding to Diversity

In an effort to help teachers put the Equity Principle into practice, National Council of Teachers of Mathematics published a series of three books entitled Mathematics for Every Student: Responding to Diversity (Grades Pre-K-5, 6-8, and 9-12). The Ohio Council of Teachers of Mathematics encourage all teachers to order the book in the series that applies to your grade band.

You can purchase the books on the NCTM Website - <http://www.nctm.org/standards/content.aspx?id=18909> or download more information <http://www.ohcnctm.org/Documents/Equity-WebSite.pdf>. If you have a suggestion, question, or desire to be involved in working on the Equity program, please contact **Mark Jaffe** at markjaffe@oberlin.net or **Deb Gallagher**, d-gallagher.2@osu.edu.

Attend the ASEE North-Central Section Annual Conference

Ohio Northern University's T.J. Small College of Engineering will host the 2012 American Society for Engineering Education (ASEE) North-Central Section Annual Conference on Friday and Saturday, March 23 and 24 in Ada, OH. A new component has been added to this year's conference to help promote science, technology, engineering and mathematics (STEM) education at the K-12 level. The conference venue will also offer an opportunity for K-12 STEM educators to network, share best practices, and interface with potential higher education and industry partners.

Online Registration is available at the conference website: <http://www.onu.edu/node/3794>

NASA's Women in STEM High School Aerospace Scholars (WISH) Program

WISH is seeking female high school juniors from across the country to participate in NASA's pilot project, which starts with an on-line curriculum in summer experience at NASA Johnson Space Center (JSC) in Summer 2012. More information is available at: <http://wish.aerospacescholars.org>.


Cleveland State University Call for School Partnerships on NSF Grant

This proposed project will investigate effective ways to transform how computer science is taught in the high school curriculum. If there are teachers, schools, or districts who might be interested in developing an AP Computer Science or an introductory Computer Science course in your high school, please contact Debbie Jackson at CSU as soon as possible to be included in this proposal. The National Science Foundation's goal is to have 10,000 trained computer science teachers in 10,000 schools by 2016.

Debbie Jackson, Assoc. Professor of Teacher Education: Phone - 216.687.3753 or D.JACKSON1@caseohio.edu

NWO Hands-On STEM Activity


Toys and Flight: A SE Model Lesson



Recommended for Grades 2-5

This lesson includes two additional handouts (Handout A & B), which are located at <http://www.nwocenter.org/hands-on.htm>

Engage



Big Idea #1 - Gravity pulls things toward the earth.

Teacher

1. Take a wadded up piece of paper, hold it up, and let it drop.
2. Ask students: Can you describe what happened to the paper?
3. Write on board: gravity, velocity, speed
4. Take the same wadded up paper and a smooth sheet of paper, hold them both up, with the smooth sheet parallel to the ground. Ask the students to predict what will happen, which will hit the ground first. Let them drop.
5. Ask students: What happened? Possible answer - The smooth paper fell slower or at a lower velocity because of air. Define velocity and speed. Speed describes only how fast an object is moving, whereas velocity gives both the speed and direction of the object's motion.
6. Ask students: How do you think the air affects the paper? Possible answer: The air pushes on the paper in the opposite direction from which it is traveling.
7. Write on board: air resistance
8. Show students a rotor copter with one paper clip attached. What do they predict will happen when you let go of the helicopter? Demonstrate it.
9. Ask students: What happened? Possible answer - The helicopter fell toward the earth because of gravity and was slowed by air resistance or drag - especially because of the rotors on the top. Drag can be a useful force for slowing things down. A compact object experiences less drag and falls faster than an object of the same mass that is spread out.

Download a pdf of the complete hands-on activity by [clicking here!](#)


Share Your Story!

Thank you for your support of NWO, our programs, our activities, and our partners. Please send us updates, press releases, and news of STEM happenings at your school, district, or organization. Please submit to nwo@bgsu.edu. We are always looking for great STEM education stories to feature in upcoming newsletters.

Join NWO on Facebook

Appendix D: NWO STEM Education Inquiry Series Advertising

STEM Professional Development Opportunities for preK-12 Teachers & Administrators



2011 – 2012

NWO STEM Education Inquiry Series

Each event runs from 5:00 - 8:00 PM @ Rossford High School • Registration Fee: \$15/Night

Information & Directions for all events available at: <http://nwocenter.org> • Contact Hour Certificates Available for All Events

Sept. 22, 2011 (Registration Open Aug. 22 – Sept. 15)

Understanding the Newly Revised State Standards in Math & Science

An in-depth look at the newly revised Ohio standards for math and science. Learn what has changed, what is staying the same, how to interpret the new standards, and what things you should be doing now to prepare yourself and your students for the upcoming change. **Presented by: Diane Burtchin & Michelle Shafer, Rossford Schools**

Jan. 19, 2012 (Registration Open Dec. 5 – Jan. 12)

Motivating Students for Success

Discover ways to help keep your students motivated and excited about learning. **Presented by: Jodi Haney, BGSU**

Oct. 20, 2011 (Registration Open Sept. 26 – Oct. 13)

Formative Assessment and Understanding the Newly Revised State Standards in Math and Science

Learn new and innovative ways of assessing student understanding in your classroom. **Presented by: Debra Gallagher, Ohio Northern University**

Feb. 16, 2012 (Registration Open Jan. 23 – Feb. 9)

Teaching and Learning for ALL Students

Tools for helping all your students learn, including the new 6E Model (an updated 5E including targeted formative assessment activities) and ways to differentiate instruction. **Presented by: Emilio Duran & Lena Ballone-Duran, BGSU**

8.5 x 11 Prek-12 Flyer

NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching

2011-12 PD Opportunities from NWO

Sept. 22 • Oct. 20 • Dec. 1 • Jan. 19 • Feb. 16 • Mar. 15

Meeting @ Rossford High School from 5:00-8:00 PM

Registration Fee: \$15/Night

NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching

Saturday, November 5, 2011 (8:00 am – 4:00 pm) hosted at the Penta Career Center


This is your opportunity to participate in a high-quality professional conference and interact with other preK-12 educators and administrators. **There will be sessions covering all grade levels and subject areas.** There's something for everyone!

Registration Fee: \$35 (deadline Oct. 21); \$45 Onsite

Multiple Participant Discount (\$30/person) for 5 or more participants from the same school.

Register Online @ www.nwocenter.org

STEM Professional Development Opportunities for preK-12 Teachers & Administrators



2011 – 2012

NWO STEM Education Inquiry Series

Each event runs from 5:00 - 8:00 PM @ Rossford High School • Registration Fee: \$15/Night

Information & Directions for all events available at: <http://nwocenter.org> • Contact Hour Certificates Available for All Events

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Teaching and Learning for ALL Students

Tools for helping all your students learn, including the new 6E Model (an updated 5E including targeted formative assessment activities) and ways to differentiate instruction. **Presented by: Emilio Duran & Lena Ballone-Duran, BGSU**

Dec. 1, 2011 (Registration Open Nov. 6 – Nov. 23)

What Is Inquiry and How Do I Use It in My Classroom?

Tips and tools for incorporating inquiry teaching methods into your classroom with a focus on how to use the inquiry method to teach the newly revised state standards in math and science. **Presented by: Diane Burtchin & Michelle Shafer, Rossford Schools**

Mar. 15, 2012 (Registration Open Feb. 20 – Mar. 8)

Virtual Field Trips and Technology Tools for Your Classroom

Explore ways to connect with regional, state, national, and international resources without ever leaving the classroom. Simple and cost-effective steps using Skype to involve students in live interactions with exciting places, programs, and experts in STEM fields. **Coordinated by: Bob Midden, BGSU/NWO (special guest appearances by local and remote resource providers)**

NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching

2011-12 PD Opportunities from NWO

Sept. 22 • Oct. 20 • Dec. 1 • Jan. 19 • Feb. 16 • Mar. 15

Meeting @ Rossford High School from 5:00-8:00 PM

Registration Fee: \$15/Night

NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching

Saturday, November 5, 2011 (8:00 am – 4:00 pm) hosted at the Penta Career Center

This is your opportunity to participate in a high-quality professional conference and interact with other preK-12 educators and administrators. **There will be sessions covering all grade levels and subject areas.** There's something for everyone!

Registration Fee: \$35 (deadline Oct. 21); \$45 Onsite

Multiple Participant Discount (\$30/person) for 5 or more participants from the same school.

Register Online @ www.nwocenter.org • Contact Hour Certificates Available

8.5 x 11 Pre-service Flyer

Appendix E: NWO Publications and Presentations

Publications

- Bostic, J. (in press). Model-eliciting activities for teaching mathematics. *Mathematics Teaching in the Middle School*.
- Bostic, J., & Jacobbe, T. (2011). Reflecting on teaching: A doctoral student's maturation over an academic year. *International Journal of University Faculty & Teaching Development*, 2(1), 71-80.
- Bostic, J., & Jacobbe, T. (2012). Fostering problem-solving behaviors and positive perceptions by teaching through problem solving. Manuscript submitted for publication.
- Bostic, J. & Matney, G. (2012). Overcoming a common storm: Designing PD for teachers implementing the common core. Manuscript submitted for publication.
- Brahier, D. J. (Ed.) (2011). *Motivation and disposition: Pathways to learning mathematics. 2011 Yearbook of the National Council of Teachers of Mathematics*. Reston, VA: NCTM.
- Brahier, D. J. (2012, in press). *Teaching secondary and middle school mathematics, fourth edition*. Boston, MA: Allyn & Bacon Publishing.
- Burgoon, J., & Duran, E. (2012). Investigating elementary teachers' conceptions of animal classification. Accepted for publication in *School Science and Mathematics*.
- Burgoon, J., Heddle, M., & Duran, E. (2011). Re-examining the similarities between teacher and student conceptions about physical science. *Journal of Science Teacher Education*, 22(2), 101-114.
- Dimling, L. M., Worch, E. A., Murray, M. M., Oldrieve, R., Peet, S., Viramontez Anguilano, R., Straka, L., & Wooldridge, D. G. (2011). Practices and partnerships in preschool literacy. *Delta Kappa Gamma Bulletin: International Journal for Professional Educators*, 77(2), 71-79.
- Duran, E., Ballone Duran, L., Haney, J., & Scheuermann, A. (2011). A Learning cycle for all students: Modifying the 5E instructional model to address the needs of all learners. *The Science Teacher*, 78(3), 56-60.
- Duran, E., Yaussy, D., & Yaussy, L. (2011). Race to the future: Integrating 21st century skills into science instruction. *Science Activities: Classroom Projects and Curriculum Ideas*, 48(3), 98-106.
- Haney, J. J. (2011). *Motivation matters: Designing learning environments to ignite, excite, & engage learners*. Association for Supervision and Curriculum Development (ASCD), Alexandria, VA. Submitted for publication.
- Matney, G., Bostic, J., & Brahier, D. (2012). Overcoming a common storm: Designing the PD teachers need for successful common core implementation. *Proceedings of the 39th Annual meeting of the Research Council on Mathematics Learning*, Charlotte, NC.
- Matney, G., Jackson, J. (2012). Research projects and secondary mathematics preservice teachers' sense of efficacy. Manuscript submitted for publication.
- Matney, G., Jackson, J., & Bostic, J. (2012). Connecting instruction, minute contextual experiences, and a realistic assessment of proportional reasoning. Manuscript submitted for publication.

Appendix E: NWO Publications and Presentations cont.

- Pape, S. J., Irving, K. E., Bell, C. V., Shirley, M., L., Owens, D. T., Owens, S., Bostic, J. D., & Lee, S. C. (2011). Principles of effective pedagogy within the context of connected classroom technology: Implications for teacher knowledge. In R. N. Ronau, C. R. Rakes, & M. L. Niess (Eds), *Educational technology, teacher knowledge, and classroom impact: A research handbook on frameworks and approaches*, pp. 176-199. Hershey, PA: IGI Global.
- Partin, M. L., Haney, J. J., Worch, E. A., Underwood, E., Nurnberger-Haag, J., Scheuermann, A., and Midden, W. R. (2011). Yes I can: The contributions of motivation and attitudes on course performance among biology non-majors. *Journal of College Science Teaching* 20(6), 86-95.
- Partin, M. L., & Worch, E. A. (2011). The virtual tour and implications for synchronous distance education. *International Journal of Instructional Media*, 38(3), 261-271.
- Partin, M. L., Worch, E. A., and Underwood, E.M. (2012). Factors related to college students understanding of the nature of science: comparison of science majors and non-science majors. Accepted for publication in *Journal of College Science Teaching*.
- Snyder, J., & Bostic, J. (2012). Quilting through area and perimeter. Manuscript submitted for publication.
- Worch, E. A. (2012). Play-fighting initiating behaviors and responses in red colobus monkeys. Accepted for publication in *American Journal of Play*.
- Worch, E. A., & Haney, J. J. (2011). Nature's Neighborhood: A children's zoo designed to promote science learning through active play. *Children, Youth and Environments*. 21(2), 382-487.
- Worch, E. A., Li, L., & Herman, T. L. (in press). Preservice early childhood teachers' self-efficacy and outcome expectancy for ICT integration in science instruction. *Education Research and Perspectives*.

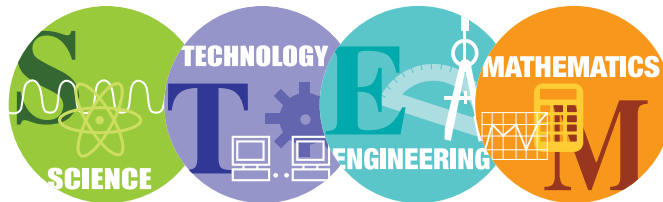
Presentations

- Bostic, J. (2011, September). *Solving and representing my life*. Invited speaker at the Bowling Green Council of Teachers of Mathematics.
- Bostic, J. (2011, November). Expecting to win every time. Bowling Green State University Women in Science, Technology, Engineering, and Math Conference for middle school students.
- Bostic, J. & Matney, G. (2011, November). Teaching and assessing through problem-solving contexts. Northwest Ohio Symposium on Science, Technology, Engineering, and Mathematics Teaching.
- Dellenbusch, K. & Laird, J. (2011, February). Effect of collaborative in-class activities on student learning in introductory astronomy. BGSU Teaching and Learning Fair.
- Duran, E. (2012). What is Inquiry? Workshop presented at the Toledo Metro Parks, Toledo, OH.
- Duran, E. (2012, March). *Science for all: Addressing the needs of all learners*. Workshop presented at the NWO STEM Education Inquiry Series, Rossford, OH.

Appendix E: NWO Publications and Presentations cont.

- Duran, E., Ballone Duran, L., Burgoon, J., & Haney, J. (2012, April). *The 6th E (Express): A tested modification of the 5E instructional model aimed at targeting the needs of all learners*. NSTA National Conference on Science Education, Indianapolis, IN.
- Klinger, M. L., Norris, H., Mitchell, K., Worch, E. A., & Kramp, R. (2011). *Project pi r² teachers: Habitat change*. Northwest Ohio Symposium on STEM Teaching, Rossford, OH.
- Kumar, R., Karabenick, S. A. & Burgoon, J. (2012, April). *Mastery and performance focused instructional practices: Teachers' implicit racial attitudes and the mediating role of respect and personal responsibility for resolving intergroup conflicts*. Paper presented at the American Educational Research Association (AERA) Conference, Vancouver, British Columbia, Canada.
- Kumar, R., Seay, N., Burgoon, J., & Karabenick, S. A. (2011, April). *Mastery and performance-focused instructional practices: Teachers' Cultural frames of reference and cultural responsibility*. Paper presented at the American Educational Research Association (AERA) Conference, New Orleans, LA.
- Matney, G.T. (2011). *Developing number in the early years*. Invited speaker at the Early Childhood Conference, Continuing and Extended Education at BGSU, Bowling Green, OH.
- Matney, G.T. (2011). *Energy: connecting mathematics and science through roller coasters*. Invited speaker at the Women in Science Conference, Continuing and Extended Education at BGSU, Bowling Green, OH.
- Matney, G., Jackson, J. (2011). *Assessment and complexity of non-routine problem solving involving proportion reasoning of middle school students*. 38th Annual meeting of the Research Council on Mathematics Learning, Cincinnati, OH.
- Matney, G., Jackson, J. (2012). *Researching Connections between real-world assessments and student experiences*. 39th Annual meeting of the Research Council on Mathematics Learning, Charlotte NC.
- Matney, G.T. & Panarach, Y. (2011). *Teaching mathematics through games and puzzles*. Invited speaker at the Education Exhibition, Kamphaeng Phet Rajabhat University, Kaphaeng Phet, Thailand.
- Matney, G., Panarach, Y., Matney, T. (2012). *Improving attitude and problem solving through mathematics camps*. The 12th International Congress on Mathematics Education, Seoul, Korea.
- Mott, D. & Worch, E. A. (2012). *Inquiry in mathematics and science classrooms*. 5-day workshop facilitated at Lima City Schools (OH).
- Partin, M. L., Underwood, E., & Midden, W. R. (2011, February). *Validating an instrument to measure motivation, engagement, and attitudes*. Poster presented at the Bowling Green State University 2010 Teaching and Learning Fair in Bowling Green, OH.
- Worch, E. A. & Mott, D. (2011). *Teaching mathematics and science through inquiry in middle and high school classrooms*. 5-day workshop facilitated at Lima City Schools (OH).

Appendix F: NWO Symposium Advertising



Northwest Ohio Symposium on Science, Technology, Engineering, and Mathematics Teaching

NWO Symposium on Science, Technology, Engineering, and Mathematics Teaching

Saturday, November 5, 2011

8:00 AM – 4:00 PM

hosted at the Penta Career Center

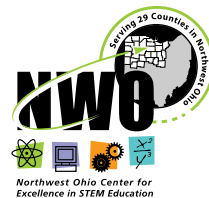
This is your opportunity to participate in a high-quality professional conference and interact with preK-12 educators and administrators. There will be sessions covering all grade levels and subject areas; there's something for everyone!

The 2011 NWO Symposium **features sessions specially designed for pre-service teachers** to help you navigate the interview process and provide tips and tools for managing your first year of teaching.

Registration Fee: \$35 for educators and administrators
and \$15 for undergraduate students (**deadline Oct. 21**)

Information & Directions available at: <http://nwocenter.org>

Contact Hour Certificates Available



Partial funding provided by Ohio STEM Learning Network (OSLN)

8.5 x 11 Flyer

Appendix G: OJSHS Recruitment Email

imagine.design.create



The 49th Annual Ohio Junior Science & Humanities Symposium, hosted by Bowling Green State University



March 21-23, 2012



The National Association of Secondary School Principals has placed this program on the NASSP National Advisory List of Student Contests and Activities for 2011-2012

Call for High School Research Papers and Posters

Sponsored by the Northwest Ohio Center for Excellence in STEM Education (NWO) and The School of Teaching and Learning at Bowling Green State University.

In cooperation with The Academy of Applied Science and with the support of the Departments of the Army, Navy, and Air Force.

Important Deadline ~ February 17, 2012

- Online registration is required for all participants including Paper Presenters, Poster Presenters, Teachers, Student Delegates.
- Registration fee: \$25 per student
- **Poster Presenters** must submit an **Abstract during the registration process.**
- **Paper Presenters** must submit an **Abstract** and a copy of the **Research Paper during the registration process.**

Visit our web site for more information – www.ojshs.org

Appendix H: STEM in the Park Advertising

Free Family Event





STEM
in the **PARK** Science, Technology, Engineering, and Mathematics

Saturday, Sept. 10, 2011
10 am – 1 pm at BGSU
On lawn by Student Union

FREE parking in lots A & G on Wooster or 4, 4A, & E on Thurstin
(Rain site: Perry Field House)




Rockets and Earthquakes and Snakes, oh my!

Join us for a family day of **hands-on fun** at Bowling Green State University (rain or shine) featuring a free lunch, take-home STEM activities, and everything from giant bubbles to giant worms. You won't want to miss it!

STEM in the Park will feature interactive displays created by university departments and community partners to engage children of all ages in science, technology, engineering, and mathematics.

While at STEM in the Park 2011 enjoy activities and information provided by:

Bowling Green State University Bowling Green Early Childhood Center Carolina Biological Supply Company Challenger Learning Center of Lucas County Educaching E.S. Wagner Co. Fort Meigs: Ohio's War of 1812 Battlefield Heidelberg University Imagination Station Kuhlman Corporation Lourdes College & Valentine Theater	Lucas County Soil and Water Conservation District MVHS - Wolcott House Museum Complex Nature's Nursery New York Life Insurance Company NWOET Ohio Northern University Owens Community College – SETGO PNC Bank PVS Nolwood Chemicals Rain Garden Initiative of Toledo - Lucas County Sauder Village	Scrap4Art The Toledo Zoo The University of Findlay Toledo Area Metroparks Toledo Botanical Garden University of Toledo – American Chemical Society West Side Montessori Wood County Historical Center & Museum Wood County Hospital Wood County Park District Wood County Soil and Water Conservation District
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

FREE Lunch catered by Tony Packo's from 11 am - 1 pm (while supplies last)

Sponsored by:








Visit the website for more info at www.nwocenter.org

8.5 x 11 Flyer
 11 x 17 Poster
 4 x 6 Postcard

Free Family Event



Saturday, Sept. 10, 2011
10 am – 1 pm at BGSU

On lawn by Student Union
(Rain site: Perry Field House)



STEM
in the **PARK** Science, Technology, Engineering, and Mathematics

Join us for a family day of **hands-on fun** at Bowling Green State University (rain or shine) featuring a **FREE lunch** catered by Tony Packo's, take-home family STEM activities and materials, and more.

STEM in the Park will feature interactive displays created by regional universities and community partners to engage children of all ages in science, technology, engineering, and mathematics.







www.nwocenter.org/STEMinPark

Newspaper Advertisement: Toledo Parent Magazine Aug. 15, 2011

Appendix I: USE-IT III Recruitment Email



USE-IT

Uniting Science Education, Inquiry and Technology

Attention Educators,

NWO received funding from the Martha Holden Jennings Foundation for a new cohort of USE-IT teachers for the fall 2011-spring 2012 Inquiry Series workshop sessions. **Space is limited to 24 Ohio public school teachers.** See information below to register today.

Gain strategies and classroom-ready resources that model effective applications of science instruction and 21st century skills.

Interact with new technology and/or sharpen your skills with the technology you already have.

Walk away with learning tools and free technology designed for immediate adoption into your classroom.
(All participants receive Webcams, microphones, and more)

Engage in best practice discussions to identify strategies that promote active, process-oriented student learning aligned to revised Ohio Science Standards.

USE-IT III introduces you to the latest trends in educational technologies, promoting creative, cutting-edge learning activities for your classroom. This series is all hands-on so get ready to explore with technology!

WHO:
3rd-8th grade teachers who teach science in an Ohio public school (Limit: 24 teachers)
(*Program funding is limited to Ohio public school teachers)

WHEN:
Attend the following seven Thursday evening professional development events. Contact hours (a total of 22) are provided at the conclusion of the program. Light refreshments are provided during each session.

- September 22, 2011 - 5:00-8:30 PM
- October 20, 2011 - 5:00-8:00 PM
- December 1, 2011 - 5:00-8:00 PM
- January 19, 2012 - 5:00-8:00 PM
- February 16, 2012 - 5:00-8:00 PM
- March 15, 2012 - 5:00-8:00 PM
- April 19, 2012 - 5:00-8:30 PM

*Attend the NWO Symposium on Saturday, November 5, 2011 at Penta Career Center from 8am -4pm for an additional eight contact hours.
For more information visit: <http://www.nwohsymposium.org>

WHERE:
Rossford High School, Rossford, OH (five sessions in conjunction with the NWO Inquiry Series) and two sessions (Jan and Feb at WGTE Public Media on S. Detroit Ave, Toledo, OH.)

HOW MUCH DOES IT COST?:
The seven session evening program is **FREE** for grades 3-8 Ohio public school teachers. There is a charge to attend the NWO Symposium event mentioned above.

If you are interested in USE-IT III and would like to register for this professional development program, please email Michele Leow Klinger at mleow@bgsu.edu or Brittany Parker at brmparker@bgsu.edu with the following information (the program fills up fast, so please contact us soon):

Name of Program: **USE III**

- First and Last Name
- Email Address
- Phone Number (both home and school)
- School Name
- School District
- School Address, City, and Zip
- Subject(s) you currently teach
- Grade(s) you currently teach

For 2011-2012 Thursday night sessions, the registration fee is covered by the USE-IT III grant - so the workshops are **FREE** to all participants. All participants will receive free technology and teaching materials paid for by the grant for taking part in this program.

Of special note: Additional technology sessions will be part of the NWO Symposium on STEM Teaching and Learning on November 5, 2011. The cost of registration for this event is not covered by the grant. The registration fee is \$35 for this event only. Staff Development Funds, Title I Part A or Title III and School Improvement Funds may be used to cover this registration fee. Purchase orders and checks are accepted - ask your school for details. This year we also have an online credit card payment option.

WHAT WILL WE BE DOING AT EACH SESSION?:
For more information on the USE-IT program and a detailed schedule, check out the USE-IT website <http://courses.bgsu.edu/UseIt/index.htm>.

Funding for the USE-IT program is provided by the Martha Holden Jennings Foundation



and the Northwest Ohio Center for Excellence in STEM Education. Professional development for this program is provided by Bowling Green State University and WGTE Public Media.

The Inquiry Series Professional Development Series is brought to you by:



Northwest Ohio Center for Excellence in STEM Education

NWO
241 Math/Sci Bldg.
Bowling Green, Ohio 43403
9320
419-372-2718
www.nwo.org