

Science, Technology, Engineering, and Mathematics

STEM in the Park Evaluation Report November 2010

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This report will summarize the findings from the evaluation of STEM (Science, Technology, Engineering, and Mathematics) in the Park. After a description of the event, the methodology used to evaluate the event will be described, followed by the results of the evaluation and recommendations for future STEM in the Park events.

STEM IN THE PARK OVERVIEW

STEM in the Park was a free outdoor community event coordinated by the Northwest Ohio Center for Excellence in STEM Education (NWO), featuring interactive STEM activities sponsored by several departments at Bowling Green State University, the Bowling Green Community Foundation, BP-Husky Refining, and Square One Education Network (See Appendix A for the STEM in the Park flyer). STEM in the Park was held on Saturday September 11, 2010 from 10 A.M. to 1 P.M. at Bowling Green State University (BGSU) just outside of the Bowen-Thompson Student Union (see Appendix B for a map of the event). Families were asked to register at the event in order for the staff to document the attendance and manage the lunch situation (attendees received meal tickets at the registration table). Most of the attendees were from Bowling Green, but the event also attracted families from many different cities and towns in Northwest Ohio, including Toledo, Findlay, Perrysburg, Weston, Grand Rapids, Napoleon, and Lima. A total of 1,614 people (including staff and exhibitors) attended the event. Detailed attendance numbers are found below.

STEM in the Park Atte	endance
Adults	620
Children 0-2 yrs.	96
Children 3-5 yrs.	201
Children 6-10 yrs.	339
Children 11-13 yrs.	118
Children 14-18 yrs.	31
Total Children (0-18 yrs.)	785
Total Attendees	1405
Volunteers/Staff	32
Exhibitors	177
Total Other	209
Total Attendance	1614

STEM in the Park featured 42 STEM activity stations that were developed and managed by exhibitors (from private businesses, non-profit organizations, K-12 institutions, and

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institutions of higher education) from Northwest Ohio. Observations of the activity stations¹ indicated that 89% (31 stations) of the stations included interactive activities. Many stations including hands-on activities and games, while others provided attendees with opportunities to observe and interact with several kinds artifacts, animals, animal coverings, and animal skeletons. Almost half (43% or 15 stations) of the observed stations included activities that produced a product that attendees could take with them. Some of the products that resulted from these "make-and-take" activities included plaster animal tracks, "flubber", ice cream, muskets (made from paper and gum balls), and fossils. Almost half (43% or 15 stations) of the observed stations provided attendees with take home activity cards. The attendees were free to visit as many stations as they wanted, as well as to participate in a large demonstration at noon, which used the windbags included in the attendees' registration packets to demonstrate Bernoulli's principle.

EVALUATION METHODOLOGY

STEM in the Park was evaluated using observations of the activity stations, an attendee survey, and an exhibitor survey.

The Public Perceptions of STEM in the Park survey was administered online, and included several questions regarding the attendees' perceptions of the event. The survey is included in Appendix C. An e-mail containing a link to the online survey was sent to the 344 adult attendees who provided an e-mail address when registering for STEM in the Park. As an incentive for completing the survey, attendees were entered into a raffle to win a one-year membership to the Imagination Station, Sauder Village, or the Toledo Zoo. A total of 171 responses were collected for the attendee survey, resulting in a response rate of 49.7%.

The Exhibitor Perceptions of STEM in the Park survey was administered online, and included several questions regarding the exhibitors' perceptions of the event, including their perceptions of the attendees' (both children and adult) engagement in the event activities. The survey is included in Appendix D. An e-mail containing a link to the online survey was sent to 53 exhibitors the week following the event. A total of 26 responses were collected for the exhibitor survey, resulting in a response rate of 49.1%.

The closed-ended survey responses were analyzed using frequency analyses to determine the response pattern for each survey question. The open-ended responses were analyzed using ATLAS.ti qualitative data analysis software to identify themes among responses.

¹ Two members of the evaluation staff conducted the observations during the event. The observations provided a description of each activity station, including whether or not the activity 1) was interactive, 2) produced a product that could be taken home by attendees, and 3) provided a separate take home activity card. Observations were conducted for 35 of the 42 activity stations. The other 7 stations were not observed due to time constraints.

RESULTS OF THE STEM IN PARK EVALUATION

This section of the report will summarize the results of the attendee and exhibitor surveys. Response patterns will be illustrated for each closed-ended item, and common themes with illustrative quotes will be given for the open-ended items. The attendees and exhibitors who completed the surveys will be referred to as "respondents".

ATTENDEES' PERCEPTIONS OF STEM IN THE PARK

Most of the respondents reported staying at STEM in the Park for 2 hours and visiting 11 to 20 activity stations. Respondents were almost evenly split regarding whether or not their families did any of the take home activities after the event, and 86% reported that they would probably or definitely do some of the activities in the future. Response patterns are shown below.

Survey Item	Answer Choices	Percentage of Responses
	Less than 1 hour	1.2 %
How long did your family stay	1 hour	8.2%
at STEM in the Park?	2 hours	58.5%
	3 hours	32.2%
	10 or less	15.9%
About how many stations did	11 to 20	50.0%
your family visit?	21 to 30	24.7%
	More than 30	9.4%
Has your family done any of the	Yes	42.9%
take home activities that were handed out during STEM in the	No	47.1%
Park?	We didn't receive any	10.0%
	Definitely Not	0.8%
If not, will your family do some	Probably Not	3.0%
of the take home activities in	Probably	29.5%
the future?	Definitely	56.1%
	We didn't receive any	10.6%

Note: The most common response for each item is shaded green.

In response to the question, "What were your family's favorite activity stations?" respondents listed an average of three different activity stations, with some respondents listing only one station and others listing up to ten different stations. All but three activity

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 most commonly listed activity stations (those given by at least 10% of respondents) are displayed in the table below.

Activity Station	# of Times Mentioned	% of Respondents Who Mentioned the Activity
Reptiles and Amphibians (BGSU Herpetarium)	105	61.4%
Marine Life (BGSU Marine Lab)	64	37.4%
Bubbles*	45	26.3%
Insta-snow Polymer (BGSU School of Teaching and Learning)	31	18.1%
Film Canister Rockets (Challenger Learning Center)	31	18.1%
Isolate your DNA (SETGO)	30	17.5%
Flubber (Imagination Station)	30	17.5%
Hands-on Chemistry-Making ice cream (BGSU Chemistry)	28	16.4%

^{*} There were three different stations involving bubbles, and because respondents did not specify which of the bubble stations was their favorite, they are all grouped together here.

Most of the attendees reported that STEM in the Park *moderately* increased their knowledge of STEM and awareness of STEM community organizations and resources. Most attendees also reported that STEM in the Park *substantially* increased their children's knowledge of STEM, and that their children were *much more* interested in STEM after attending STEM in the Park. Attendees overwhelming reported (82% of responses) that their children were *substantially* engaged at the STEM in the Park activity stations, and that their family was *a little more* or *much more* likely to do activities related to STEM after attending STEM in the Park. Almost all of the attendees (93%) reported that they would be *very likely* to attend STEM in the Park if it were held next year. Only three respondents said they would be somewhat or very unlikely to attend next year. Response patterns are shown below.

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	Responses				
Survey Item	Not at all	Very slightly	Moderately	Substantially	N/A
How much did STEM in the Park increase your knowledge about STEM?	1.8%	12.4%	64.5%	21.3%	-
How much did STEM in the Park increase your awareness of community organization and resources?	2.4%	11.2%	44.4%	42.0%	-
How much do you think STEM in the Park increased your children's knowledge about STEM?	1.2%	6.4%	39.2%	48.5%	4.7%
How engaged were your children with the STEM in the Park activities?	0%	1.2%	12.9%	81.8%	4.1%

Note: The most common response for each item is shaded green.

	Responses						
Survey Item	Much less	A little less	About the same	A little more	Much more	N/A	
Do you think your children are more or less interested in STEM after coming to STEM in the Park?	0%	0%	9.9%	28.1%	58.5%	3.5%	
Is your family more or less likely to do activities related to STEM after coming to STEM in the Park?	0%	0%	17.8%	40.8%	41.4%	ı	

Note: The most common response for each item is shaded green.

The high likelihood of returning to STEM in the Park was also reflected in the respondents' comments. Many of the respondents expressed their hope that STEM in the Park would become an annual event, and asked to be put on the mailing list in the future.

I hope that this event will be put on next year, or even twice a year.

I hope it is one that BG hosts year and year again.

I really hope that you will continue to have this event every year.

Next year I would love to be e-mailed the date so I can set up for our Girl Scout Troop and Cub Scout Den to go!

The responses to the closed-ended survey items demonstrate that STEM in the Park was successful in engaging attendees in STEM activities and improving children's interest in STEM. For example, 82% of respondents reported that their children were substantially engaged with the STEM in the Park activities. This finding was supported by several comments:

My daughter and my nephew had a great time [and] neither of them was ready to leave when it was over.

My daughter and I enjoyed every minute and found ourselves scrambling to get in as many activities as possible before it closed. My daughter was completely engaged and excited the entire time. She can be a tough critic, so that was VERY impressive.

[Our kids] were having so much fun they didn't want to stop for the hot dogs

This was wonderful for all ages – even my teenager who was "dragged along" loved it!

The survey responses also indicate that STEM in the Park had a lasting impact on attendees. For example, many families reported doing some of the STEM in Park activities at home, and more families anticipate doing the activities in the future. Also, many of the respondents' wrote about the lasting impact of STEM in the Park on their children.

My three girls absolutely loved this event. Everyone that they have seen since then they tell them about what they did and learned and show them some of the activities they had made.

My 4 and 7 year old girls were fully engaged, loved every activity, and we did science activities for the remainder of the day as a result. They are still flying their airplanes, and are making preparations to make baking soda rockets later this week.

First time I say my kids so engaged – they simply could not get over their DNA – they carried it all over with them for days!

We have already planted our garden (thanks WBGU!) and look at the seeds every morning to see if they've germinated.

The lasting impact of STEM in the Park, however, was not limited to doing the STEM activities at home. Some of the attendees who came to STEM in the Park were teachers, who mentioned that they plan on using some of the STEM activities in their classrooms.

Overall, the attendees' comments were very positive. Many respondents wrote how impressive the event was, and expressed their gratitude for being able to attend a free community event. Some examples include:

In this day and age it was SO WONDERFUL to go to such a great, organized, and educational program ... for free. Sorry, but most people with kids don't have a lot of extra money. So, thanks! We also took advantage of the lessons to help with our homeschooling science class.

I would really like to thank all the workers and volunteers for making such a great impression on my husband and I and my boys. We also were so impressed with all the activities and fun simple things that got my kids interested in STEM. I really hope you

will continue to have this event every year. Thank you very much for a great Saturday!!!!

I can't say enough great things about this event. I wish all the school kids could have experienced...possibly through a traveling stem event or a field trip to this event. Again great job hope to seem more of this event in our community and would love to see it modeled across the country.

EXHIBITORS' PERCEPTIONS OF STEM IN THE PARK

The 26 exhibitors who completed the survey represented non-profit organizations (n=13), private businesses (n=2), institutions of higher education (n=9), and K-12 institutions (n=2). The first two survey items asked exhibitors to rate the value of their experience at STEM in the Park. 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. Response patterns for these two items are shown below.

	Responses				
Survey Item	Disagree	Somewhat Disagree	Somewhat Agree	Agree	
Being an exhibitor at STEM in the Park was a worthwhile experience.	0%	0%	3.8%	96.2%	
My being an exhibitor at STEM in the Park was beneficial for my organization.	0%	7.7%	11.5%	80.8%	

Note: The most common response for each item is shaded green.

Exhibitors from institutions of higher education rated the second question (i.e., benefits to their organization) lower than the other exhibitors. The benefits may have been more obvious to private businesses and non-profit organizations, who might have considered STEM in the Park as an opportunity to showcase the services and products offered by their organization. Regardless, most of the exhibitors believed that STEM in the Park was a valuable event, and all of the exhibitors indicated that if STEM in the Park were held next year, they would be likely (92% chose very likely and 8% chose somewhat likely) to return as exhibitors.

Most of the exhibitors reported that the children and parents that visited their station were *substantially engaged* with the STEM activities. Response patterns are shown below.

	Responses			
Survey Item	Not at all engaged	Very slightly engaged	Moderately engaged	Substantially engaged
How engaged were the children that visited your table(s)?	0%	0%	11.1%	88.9%
How engaged were the parents/adults that visited your table(s)?	0%	0%	33.3%	66.7%

The exhibitors' comments about the behaviors and reactions of the children and adults help to explain the responses above. Almost all of the exhibitors reported that the children seemed excited and enthusiastic about participating in the activities. Exhibitors wrote:

The children embraced the activity, asked great questions and worked hard to excel. I was pleasantly surprised at the level of participation, and the level of enthusiasm.

The students were very very excited about participating in the hands on activities we presented. The evidence of this was through the smiles and verbal reactions while participating.

Children dragged their parents to the table. Some children kept coming back – one 12 year old spent the entire time "helping" with the demo. Children enjoyed passing the critters on to the other children and telling them what they knew about the critters.

The exhibitors' survey responses indicate that parents were less engaged than the children. This finding is supported by the exhibitors' comments, which demonstrate that while most of the parents were engaged and interested in the activities, others were more passive. Some parents helped their children with the activity and asked the exhibitors questions about the activity, while others stood back and watched. A few of the exhibitors wrote:

Some parents stood back and had no interaction with us at all, others led their kids through the materials and asked them questions about what they were seeing, and some seemed more excited than the kids were, asking us about the fossils, where they might go to find their own, and such.

Parents seemed excited by their children's enthusiasm. They helped read the instruction cards and pinch the alligator clips.

Most parents were eager to learn with their children, but some simply allowed their children to explore by themselves.

The exhibitors reported hearing positive comments from the parents at their activity stations regarding the station and the event in general. Some of the exhibitors wrote:

We heard nothing but positive comments. Many are hoping to do it again, as are we.

Numerous families said the event was great. They thought it was a fun way to introduce their children to the STEM subjects. Quite a few asked if the event would be happening again next year.

Everyone was very positive about their experience. They couldn't believe the number and variety of experiences that were available.

The overall comment was that this was a great family event.

RECOMMENDATIONS FOR FUTURE STEM IN THE PARK EVENTS

This section of the report will include recommendations for future STEM in the Park events based on the comments and suggestions given by the attendees and exhibitors as well as the members of the NWO staff. Based on the comments given by the attendees, it is likely that if STEM in the Park were held in the future, the attendance would be larger than it was this year. This prediction should be taken into consideration when planning for future events.

RECOMMENDATION 1: Consider making STEM in the Park longer than three hours.

Many of the attendees commented that there was not enough time to participate in all of the activities at STEM in the Park. In fact, the only negative comment made by many attendees was that the event did not last long enough. A few exhibitors also suggested that the event be extended. NWO should explore the logistical implications of extending the event to determine if it is a viable option. For example, many of the exhibitors had to bring their own materials to the event, and thus extending the event may result in a higher cost for the exhibitors. Therefore, NWO should also consult the exhibitors about their perceptions of extending the event.

RECOMMENDATION 2: Reorganize the lunch area to shorten the lunch line for attendees and give volunteers and exhibitors easier access to lunch.

Most attendees stood in line for lunch for more than 20 minutes, and many went to eat inside the Student Union to avoid the long line. In addition, many of the exhibitors did not get to eat lunch. The lunch area could be reorganized by creating two serving lines instead of one. Also, a separate serving line could be created for volunteers and exhibitors.

RECOMMENDATION 3: Make it easier for attendees to locate certain activity stations.

Many of the attendees suggested that a map should be distributed that allows the attendees to find certain activity stations. While mapping every specific activity station may be unreasonable, NWO could designate several "zones" in which certain activity stations can be found. A map displaying these zones and the activity stations within them could be distributed to the attendees at the registration table. This will allow attendees to spend less time searching for the activity stations they want to visit.

RECOMMENDATION 4: Recruit more volunteers to facilitate the event.

Several attendees and exhibitors mentioned that the some of the activity stations were crowded. This may have been due to the fact that only one person was facilitating some of the activities. To alleviate the congestion, it is suggested that either 1) exhibitors bring additional staff or 2) NWO recruit more student volunteers to interact with the attendees at the activity station. This would allow for more of the attendees to engage in the activities at the same time. Recruiting more volunteers would also allow the exhibitors to take breaks during the event to explore other activity stations and eat lunch.





Science, Technology, Engineering, and Mathematics

Pet a stingray, hold a lizard, capture the wind, ride in an electric vehicle, discover the universe and much, much more!

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

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 enjoy activities and information provided by:

Bowling Green State University Challenger Learning Center Educaching and Perrysburg Schools Fort Meigs Historical Center Green By Design – Starks Inc. Grand Rapids Elementary Imagination Station Toledo Liberty Center Elementary Lourdes College - Life Lab Lucas Soil and Water Conservation District Montessori Schools –Bowling Green NWOET Ohio Northern University OCC/BGSU – SETGO Program Sauder Village Scrap 4 Art The Blade Toledo Area Metroparks Toledo Botanical Gardens Toledo Humane Society Toledo Mudhens and Walleye Toledo Museum of Art Toledo Zoo University of Findlay University of Toledo WBGU WGTE

FREE Lunch catered by Tony Packo's from 11 am - 1 pm

Sponsored by:

















Appendix C: Public Perception of STEM in the Park Survey

Public Perceptions of STEM in the Park

We Hope You Had a Great Time!!

Thank you for coming to STEM in the Park! We hope that your family had a great time with our STEM (science, technology, engineering, and mathematics) activities!

We would very much appreciate if you could take a few minutes to complete a short survey about your family's experience at STEM in the Park.

To show our appreciation, every family that completes this survey will be entered into a raffle for a year-long family membership to the Toledo Zoo, Imagination Station, or Sauder Village! (How fun!)

So, please carefully read the following questions, and answer them to the best of your knowledge. Thanks so much for your cooperation!



How long did your family stay at STEM in the Park?

- Less than 1 hour
- 1 hour
- a 2 hours
- a 3 hours

Public Perceptions of STEM in the Park There were a total of 42 activity stations at STEM in the Park. About how many stations did your family visit? 10 or less io 11 to 20 21 to 30 More than 30 What were your family's favorite activity stations? Has your family done any of the take home activities that were handed out during STEM in the Park? y Yes No We didn't receive any take home activities If not, will your family do some of the take home activities in the future? Definitely Not Probably Not Probably Definitely We didn't receive any take home activities If you didn't receive any take home activities, would your family do the activities if they were posted online? (Activities available at http://cosmos.bgsu.edu/STEMinPark/activitycards.htm) **Definitely Not** Probably Not Probably Definitely How much did STEM in the Park increase your knowledge about STEM (science, technology, engineering, and mathematics)? Not at all Very slightly **Moderately** Substantially

About the same

This doesn't apply to me

A little more

jo Much more

ıblic	Perceptions of STEM in the Park
	much did STEM in the Park increase your awareness of community STEM organizations and urces?
jo	Not at all
jo	Very slightly
ja	Moderately
jo	Substantially
	much do you think STEM in the Park increased your children's knowledge about STEM? (Please ver even if you brought someone else's children)
jo	Not at all
jo	Very slightly
ja	Moderately
ja	Substantially
jo	This doesn't apply to me
	engaged were your children with the STEM in the Park activities? (Please answer even if you ght someone else's children)
jo	Not at all
jo	Very slightly
jo	Moderately
jo	Substantially
jo	This doesn't apply to me
_	ou think your children are more or less interested in STEM after coming to STEM in the Park? (Please ver even if you brought someone else's children)
jo	Much less
ko	A little less

	or less likely to do activities related to STEM after coming to STEM in the Park?
Much less	
jo A little less	
About the same	
A little more	
j Much more	
How likely is it that	you and your family would attend this event if it was held again next year?
jo Very unlikely	
jo Somewhat unlik	ely
Somewhat likely	
Thank you so much	
Please leave any co Thank you so much be held on Wednese Please be assured t	for your cooperation!! Please enter your contact information for the raffle, which v
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Please leave any co Thank you so much be held on Wednese Please be assured t Name: Address: Address 2: City/Town: State:	for your cooperation!! Please enter your contact information for the raffle, which value and the sequence of the purposes of this raffle.

Appendix D): Exhibitor Percep	otion of STEM ir	n the Park Survey

Exhibitor Perceptions of STEM in the Park

Greetings STEM in the Park Exhibitors

Thank you for making STEM in the Park such a success! We hope you had a positive experience.

We would love to make STEM in the Park an annual event, and in order to do so, we need your input! We would appreciate if you could take a few minutes to complete a short survey about your experience at STEM in the Park.

The futu

e results of this survey will be used to improve the event as well as to procure more funding for ure STEM in the Park events.
1. Which of the following best describes the organization you represented at STEM in the Park?
jo Non profit organization
jn Private business
jn Institution of higher education
j ₀ K-12 institution
j Other (please specify)
2. What is the name of the organization you represented at STEM in the Park?
Please rate your level of agreement/disagreement with the following statements.
3. Being an exhibitor at STEM in the Park was a worthwhile experience.
jn Disagree
j Somewhat Disagree
jo Somewhat Agree
j _o Agree
4. My being an exhibitor at STEM in the Park was beneficial for my organization.
jn Disagree
jo Somewhat Disagree
jo Somewhat Agree
j ₁₀ Agree
You - better than anyone else at the event - were able to observe the behaviors and reactions of the children an

parents/adults that visited your table(s). Reflect on what you observed while you answer the following questions.

Exhibitor Perceptions of STEM in the Park 5. How engaged were the children that visited your table(s)? Not at all engaged Very slightly engaged Moderately engaged Substantially engaged 6. Please describe the children's behaviors and reactions that you observed at your table(s). For example: did the children seem excited, happy, bored - what made you think so? Were they interacting with other children? Were they interacting with their parents? 7. How engaged were the parents/adults that visited your table(s)? Not at all engaged Very slightly engaged Moderately engaged Substantially engaged 8. Please describe the parents'/adults' behaviors and reactions that you observed at your table(s). 9. We've sent a survey to all of the attendees to measure their perceptions of STEM in the Park. However, we know that many attendees may have informally expressed their opinions to you, which may or may not be reflected in their formal survey responses. Please tell us about the feedback/comments that you received from attendees regarding your table and the event in general. 10. We already have many ideas about how to make this event better, one being the creation of a separate food line for volunteers, staff, and exhibitors. What other suggestions do you have that would make this a better event?

Exhibitor Perceptions of STEM in the Park 11. If STEM in the Park is held next year, how likely is it that you would return as an exhibitor? Very unlikely 50 Somewhat unlikely Somewhat likely Very likely 12. What other comments do you have about your experience with STEM in the Park? Thank you so much for taking the time to complete this survey!!