



Process Evaluation of the Diversity, Equity, and Access Working Group's Partnership Pilot Project

Prepared by Amy Grack Nelson, Laura Huerta Migus, Gayra Ostgaard

With NING contributions from Anders Liljeholm, Marilyn Johnson, Preeti Gupta

July 2011

This report was based on work supported by the National Science Foundation under Grant No. ESI-0532536. Any opinions, findings, and conclusions or recommendations expressed in this report are those of the author(s) and do not necessarily reflect the views of the Foundation.



Amy Grack Nelson
Science Museum of Minnesota
120 West Kellogg Boulevard
St. Paul, MN 55102
agnelson[at]smm[dot]org
(651) 221-4575



Table of Contents

Introduction	4
About the Boys & Girls Clubs of America	4
Establishing the Partnership Work	5
Process Evaluation of the Partnership Pilot Project	6
Case Studies.....	7
Case Study 1: New York Hall of Science and Variety Boys & Girls Club of Queens, Inc.	7
Case Study 2: Oregon Museum of Science and Industry and Boys & Girls Clubs of the Portland Metropolitan Area.....	9
Lessons Learned from the Partnership Pilot Project	12
References	13
Appendix A.....	14
Sample Letter to Partner Organization.....	14
Appendix B	15
NYSci: Nano Workshop with Boys & Girls Club.....	15
Appendix C	20
OMSI: Nano Workshop with Boys & Girls Club.....	20

Introduction

During Year 5, the NISE Network's Diversity, Equity, and Access (DEA) working group undertook a partnership pilot project. The purpose of the partnership project was to identify strategies for engaging youth from underrepresented backgrounds in nanoscale informal science learning experiences by using NISE Network programs and building relationships with community-based organizations. To carry out the project, three NISE Network subawardee institutions worked on building partnerships in their communities. The three museums involved were Oregon Museum of Science and Industry (OMSI) in Portland; New York Hall of Science (NYSci) in New York City; and North Carolina Museum of Life & Science (NCMLS) in Raleigh-Durham.

The DEA working group identified Boys & Girls Clubs of America (BGC) as a strategic partner for the partnership project for a variety of reasons. BGC have a commitment to serving youth from ethnic minority and low socioeconomic status communities, a target audience for the partnership work, since youth from these backgrounds are underrepresented among museum and science center audiences. Many museums already have a history of working with the BGC or have an interest in partnering with them or similar afterschool programs. Since Clubs are found throughout the country, the lessons learned from the project could apply to a wide variety of communities.

The pilot process allowed NISE Network to pilot test both building on prior partnerships with the BGC and starting new partnerships. OMSI had a pre-existing relationship with BGC, while NYSci and NCMLS were starting from scratch to develop relationships with their local Clubs. Unfortunately, NCMLS was unable to get their partnership off the ground over the course of the partnership pilot project. This was due to the challenge of establishing contact at their local BGC, and it wasn't until July 2010 that NCMLS was able to identify the right individual to connect with at the organization. For this reason, this report does not include a case study of NCMLS' experience partnering with their local BGC.

About the Boys & Girls Clubs of America

The BGC has a long established history in the United States, serving youth for over 100 years. Their mission is "to enable all young people, especially those who need us most, to reach their full potential as productive, caring responsible citizens." A joint study led by the Search Institute and the BGC identified five key elements present in effective BGC programs: 1) a safe, positive environment; 2) a fun place for youth; 3) supportive relationships with adults; 4) opportunities to acquire physical, technological, artistic, social, and life skills built upon high expectations from BGC staff; and 5) recognition of youth's accomplishments and self-worth (Search Institute, 2005).

The BGC is comprised of a national organization that serves as an umbrella organization for over 1,100 independent organizations throughout the U.S., Puerto Rico, Virgin Islands, and on U.S. military bases around the world. The local organizations serve youth through nearly 4,000 chartered Club locations. Clubs are located in a variety of settings including rural and urban areas, Native American and Alaskan lands, public and private

schools, public housing, and U.S. military bases. In 2009, the organization served 4.2 million youth between the ages of 6 and 18 (Boys & Girls Clubs of America, 2009).

Programming and services vary by Club location and are determined by local need and resources. Generally speaking, programs are geared towards promoting academic success, healthy lifestyles, and good character and citizenship. While there is some diversity in the focus of each Club's programming, there are also similarities. For example, programming is led by paid professional staff and always held at the same designated site. Programs take place predominantly afterschool and weekends, including during the summer months.

The BGC reaches youth in two ways, through memberships and community outreach activities. Club memberships allow youth to drop in to their neighborhood BGC site to access daily programming and services. Membership allows for continued contact between youth and youth development professionals, and helps to foster relationships with caring adults. Non-member youth are reached through Club-led community outreach programming and events.

For more information about the Boys & Girls Clubs of America, visit their website www.bgca.org.

Establishing the Partnership Work

To begin the partnership work, NISE Network staff contacted the BGC National Headquarters, following up on their participation in the 2009 DEA workshop in Washington, D.C. Mary Grybeck, Director of Technology Programs and Training, provided the DEA working group with some background about the BGC, how the Clubs are structured, and some suggestions for partnering with local Clubs. Grybeck also suggested particular local Clubs to contact in the three communities where the pilot projects were going to take place.

Typically, outside groups come into the BGC to do a one-time presentation. However, Grybeck said the ideal situation for the BGC would be ongoing programming that is hands-on in nature and involved co-teaching by BGC staff. The ongoing programs would provide an opportunity for the staff and youth to get to know each other and develop relationships, something BGC staff stresses to anyone presenting to their groups.

The NISE Network staff discussed with Grybeck a variety of ideas for partnering with the BGC, including presenting activities to Clubs or training BGC staff to deliver NISE Network activities. For the purpose of the pilot, Grybeck felt it would be most effective to send NISE Network staff into the Clubs to provide programming, instead of training BGC staff. In order to train BGC staff, the Network would need to provide funding to cover the time BGC staff spent in training. Because of the pilot testing timeline and lack of funds to train staff, it was decided that NISE Network would deliver programming to Clubs in the pilot test communities. Grybeck felt the ideal situation would be to have consistent contact with the BGC youth, for example, once a week. She suggested longer projects that would keep kids coming back to participate. Unfortunately the DEA working group did not have the time or resources to be able to go into BGC once a week over a long period of

time. Instead, each of the three museum pilot sites created their own strategy to partner with their local BGC in order to have meaningful contact with youth over a period of multiple visits. The program strategies and the decisions behind them were captured through the evaluation of these pilot test efforts and are described throughout this report.

See Appendix A for a sample letter to partner organizations in order to establish initial communication about developing a partnership.

Process Evaluation of the Partnership Pilot Project

The process evaluation of the partnership pilot project was carried out to document how the partnerships developed over time and generate lessons learned from the process to help guide other informal educators working with BGC or similar afterschool programs. The process evaluation was carried out using a participatory evaluation approach. Participatory evaluation is “applied social research that involves a partnership between trained evaluation personnel and...organizational members with program responsibility...” (Cousins & Earl, 1992, pp. 399–400). The approach recognizes and draws upon the evaluation expertise of the evaluator and the program expertise of the organizational members. The evaluator partners with members to carry out various phases of the evaluation, including designing instruments, collecting data, analyzing results, and disseminating findings (Cousins & Earl, 1995). For the partnership pilot project evaluation, the evaluator, Amy Grack Nelson, worked collaboratively with members of the DEA working group to design and carry out the evaluation.

Qualitative methods were used to gather the depth and breadth of understanding necessary to document the partnership process. Data collection methods included documentation and reflection on a NING social networking site, notes from DEA working group calls, and interviews with NISE Network staff from OMSI and NYSci at the end of the project (carried out by one of the DEA working group members). The main source of data for the evaluation was the NING social networking website (www.ning.com) set up for the project. NING is a password-protected website where individuals can respond to threads in forums and write their own blog. The evaluator suggested using NING as a method to jointly gather and reflect on data of the partnership process. The working group thought NING would be a good fit for the project and committed to posting on the site. The evaluator drafted a series of questions to guide documentation and reflection of the process and brought them to the group. The group discussed each question, made revisions, and added additional questions to ensure the important aspects of the process were captured. The questions were then set up as individual forums on the NING site. Over the course of the project, members of the DEA working group used the site to document the steps during the partnership process, write reflections on the process based on the pre-determined questions, read posts to learn about others' processes, and post comments or questions related to a posting. During biweekly DEA working group calls, the group would also discuss items posted on the NING site and any additional questions that needed to be added to NING.

Listed below are the questions the evaluator and DEA working group collaboratively developed to guide their reflective writing on NING.

- If you don't have a history of working with your local Boys & Girls Club, how did you go about establishing contact with them? Describe any challenges you had with the initial contact and how you addressed them. If you do have a history working with the Boys & Girls Club, what is your history with the organization? How did you go about connecting with them for this partnership work?
- What are the needs of your local Boys & Girls Club? What ideas do they have for partnerships? How could your institution help address their needs or partnership ideas? What needs/ideas might be difficult for your institution to address and why? What would it take to address those needs?
- What are your personal goals and outcomes for this partnership? What have you done to try to reach those goals? What has prevented you from reaching those goals? How have your goals changed since you started working on this partnership? What were the reasons why they changed?
- What do you feel has made the partnership with your Boys & Girls Club work? What features of the Boys & Girls Club make them a good organization to partner with?
- What costs have been involved in setting up and implementing your partnership? How did you cover those costs or in-kind support? What things did you end up not doing because they were cost prohibitive?
- As we think about sharing this work with others, we want to give people an idea of the timeline of your partnership. What are the key points of your timeline? If your timeline changes, why did it change? What didn't you include in your timeline that you should have? What aspects of the partnership timeline would you allocate more time for if you were to do it over? Why would allocate more time?
- What would you share with other institutions if they wanted to know about your program design?

Following the participatory evaluation approach, this report was also a collaborative effort. The evaluator drafted an outline of what to include in the report based on the questions above and the DEA working group members commented and provided suggestions on the outline. The evaluator and a member of the DEA working group then compiled this report. For sections of the report describing the partnership process at OMSI and NYSci, much of the narrative was taken directly from descriptions written on the NING site by OMSI and NYSci staff to reflect their contribution to the process evaluation.

Case Studies

Case Study 1: New York Hall of Science and Variety Boys & Girls Club of Queens, Inc.

As part of the partnership pilot project, the New York Hall of Science established a new relationship with the local Boys & Girls Club, the Variety Boys & Girls Club of Queens, Inc. (VBGCQ). Located in Long Island City, New York, the Club serves youth from a variety of ethnic and socioeconomic backgrounds. Over five months (from February – June 2010), NYSci worked to establish successful contact with VBGCQ and develop a program that met the needs of the diverse youth that VBGCQ serves. Despite some initial

challenges, NYSci and VBGCQ were able to collaborate and develop a schedule of programming that met the needs of each organization: NYSci was able to bring nano programming to youth from underserved communities, and VBGCQ gained additional programming for the youth it serves. Both organizations recognized the value of this new collaboration and are working on future opportunities for collaboration.

Establishing the Relationship

At the start of the project, NYSci didn't have a history of working with the BGC. The funds from the NISE Network provided the opportunity to establish the partnership. NYSci Director of Education, Preeti Gupta, initiated contact with the VBGCQ Director of Education in February 2010. While interest in bringing nano programming to the Club was high, VBGCQ staff transitions in March and April slowed progress. In May, a new VBGCQ Director of Education was in place and Gupta was able to reestablish contact and collaborate on development of a schedule of nano activities that built on the strengths of NYSci Explainers and was appropriate for VBGCQ youth.

Program development discussions revolved around questions of content, delivery style, and scheduling. This collaboration would be the first science programming that VBGCQ had offered in recent memory, so NYSci staff provided VBGCQ staff with a short introduction to NISE Network and the concept of nanoscale science and technology. VBGCQ staff was also interested in the delivery style and teaching approach that NYSci staff would bring to the Club. Because the Club atmosphere is very informal, VBGCQ staff emphasized the importance of avoiding a traditional classroom approach to program delivery (i.e., lecture), which does not align with the context or environment of the Club. Fortunately, the inquiry-based hands-on learning approach of the NYSci Explainers was a perfect fit.

Implementing Activities

During planning discussions, VBGCQ and NYSci staff designed a program consisting of four weekly events for middle school youth in June 2010. This included three visits to VBGCQ by NYSci Explainers and one free Saturday visit to NYSci for youth participating in the program. VBGCQ visits were scheduled near the end of the Club's day, from 5:30-6:30 pm, which allowed both the youth and NYSci staff flexibility to run a bit over time without infringing on other Club activities.

The VBGCQ Education Director prepared an informational flyer about the program in the weeks prior to the first NYSci visit to recruit youth, emphasizing the chance to explore science in a fun, hands-on way. Ten youth pre-registered to participate in the program, and retention across visits was stable. NYSci Explainers felt that the youth represented a good cross-section of the youth at VBGCQ: they came from a variety of ethnic backgrounds (Latino, African American, Caucasian and bi-racial), were from households that ranged from low to middle socioeconomic level, and equally represented both genders.

The NYSci Explainers designed a cumulative program of activities that would build youth's knowledge of nano and sense of self-efficacy as science learners, using a mix of activities from the NISE Network catalog and existing NYSci activities, which were adapted to emphasize nano concepts. The first session focused on familiarizing youth with the NYSci staff and introducing the concept of nano. During the icebreaker in the

first session, they also included an assessment question to gauge youth's prior content knowledge. The second and fourth sessions concentrated on exploring nano concepts of scale and properties of matter at the nano level. The NYSci Explainers ended the fourth session with a reflection on what youth learned about nano over the course of the program so they could informally assess learning outcomes. All three visits to VBGCQ incorporated fun warm-up activities, which allowed the youth to get in the spirit of inquiry, and take-home materials to encourage further exploration and continued interest in participation. For the third session, youth made a Saturday visit to NYSci. See Appendix B for a detailed agenda of the programming.

The museum visit provided an opportunity for youth to not only participate in additional nano programming, but also explore the museum. To address transportation issues and costs, bus transportation was provided by VBGCQ to and from NYSci. Upon arrival, youth were greeted by NYSci staff and taken directly to participate in the NanoDays activity carts set up on the museum floor. The group then had time to explore the rest of the museum. Around two-thirds of the kids who were in the program were able to make it to the museum.

Although NYSci staff had suggested a maximum of 15 participants, only 10 youth signed up for the program. However, the NYSci staff felt 10 ended up being the right number for the hands-on programming they had planned at the Club. Had there been more participants, they felt programming would have had to be more demonstration oriented, making it difficult to meet VBGCQ's request for hands-on programming. NYSci also felt having two NYSci Explainers at each session was essential for ensuring that all participants were engaged with the hands-on activities.

Overall, NYSci felt this effort represented a positive partnership experience that set the stage for future collaboration. The VBGCQ contact was engaged during the sessions, taking notes during the program and asking questions about the content. After the programming was done, the Club requested a NanoDays kit of their own and NISE Network was able to fulfill this request. NYSci and VBGCQ staffs plan to continue discussions about future partnership efforts, including bringing science content to the elementary school-aged youth at the Club.

Case Study 2: Oregon Museum of Science and Industry and Boys & Girls Clubs of the Portland Metropolitan Area

The Oregon Museum of Science and Industry (OMSI) used the partnership pilot project as an opportunity to reestablish a relationship with the Blazers Boys & Girls Club (BGC) in Portland, Oregon. For more than 20 years, OMSI sponsored and staffed a science and technology room at the Blazers BGC, offering daily activities on weekday afternoons during the school year, and activities all day during the summer months. The relationship between OMSI and Blazers BGC went well beyond activities in the science room. OMSI organized, coached and supported youth robotics teams through local, regional, and state tournaments; hosted groups from the Club at the museum; and engaged youth and families from the Club for audience focus groups, front end evaluation, prototype testing, and to pilot many programs. Due to the recent economic downturn, support for full-time OMSI science room staff was no longer available. Despite decreased OMSI presence at the Club, a good working relationship with the management of the Club continued. The

partnership pilot project resulted not only in a reenergized relationship with Blazers BGC, but led to the development of relationships with three other Clubs in the Portland area.

Renewing Ties

Building on the existing ties between OMSI, Blazers BGC, and the Boys & Girls Clubs of the Portland Metropolitan Area (PMA), the OMSI Outreach Director, Marilyn Johnson, and Technology Research and Development Manager, Anders Liljeholm, initiated conversations with the PMA Regional Executive Director and Program Director in February 2010. In addition to presenting an opportunity to offer programming to the Blazers BGC, OMSI staff discussed the value of this project as an opportunity to shape NISE Network products and activities to fit the needs of particular partners, in this case the Boys & Girls Clubs. The original intent was to partner with only the BBGC, but as conversations between OMSI staff and PMA leadership progressed, the final plan included visiting three additional area Clubs. Each site serves different parts of the greater Portland population, which gave OMSI the opportunity to reach children from more diverse backgrounds than the average OMSI visitor.

As with NYSci and NCMLS, overall planning and implementation of partnership programming was delayed. This was due to timing conflicts with major BGC fundraising drives during early winter of 2010. As a result, visits to local Clubs didn't occur until April and May of 2010.

Implementing Activities

OMSI and PMA leadership worked together to design a program consisting of three one-hour weekly visits to each Club, ending with a Family Science Night at OMSI. The three hours per Club was per PMA leadership's request, since they felt OMSI's initial suggestion of two hours per Club would not be sufficient time with the youth. Once they'd decided on four Clubs and three visits per Club, OMSI laid out their plan of visiting two Clubs for three weeks and then the other two Clubs for three more weeks. PMA leadership then took the lead on scheduling OMSI visits to the Blazers, Hillsboro, Sellwood, and Regence Boys & Girls Clubs and notified OMSI of the day of the week and time of day that worked best for the local Club leaders.

At the four BGC sites, OMSI primarily worked with youth in grades 3-5. This was per OMSI's request that youth participating in their programming be in third grade or higher. Recruitment of youth for the activities varied over the course of the project. In some instances, Club staff announced the NISE Network programming during Club meeting time, and selected youth to participate. In other instances, activities were not announced, but simply set up in an accessible area where youth could come and go as they pleased.

Liljeholm delivered programming at all four sites. Ideally, OMSI wanted to have another staff person delivering activities with Liljeholm, but was unable to make it work due to scheduling conflicts. For the programming, Liljeholm utilized NISE Network activities, alternating between stage and hands-on exploration presentations. The same programming was done at all four Clubs. See Appendix C for a detailed agenda of the programming.

The first session was carried out using a stage presentation format. Liljeholm felt the format worked pretty well with the BGC groups and in the setting, a room that could be closed off to prevent kids from wandering in and out during programming.

During the second session, Liljeholm decided to use NanoDays kit activities. He set up six activities as stand-alone stations, much like exhibits. However, unlike stand-alone exhibits, he discovered that the NanoDays activities did not work well on their own because they required more facilitation than he could provide for 20 kids. For this reason, Liljeholm felt a more classical demonstration, stage presentation, or tabletop exhibits would be a better fit for the high youth to educator ratio he experienced at the Clubs. Although the format of the second session didn't work very well, the take-away provided during the session was extremely popular. The youth liked the foldable paper buckyballs and wanted as many as they could get to bring home.

For the third session, a stage presentation format was used again. However, instead of having kids in a room with the doors closed, Liljeholm opened the doors and let the kids wander in and out. This format seemed to work better than the previous two formats he had tried. He felt this might be his default approach if he worked with BGC in the future. He acknowledged that it does make scripted demonstrations challenging because kids are coming and going, but felt it works well with short activities, like those in the NanoDays kit, if they are used as demos instead of stand-alone activities.

The fourth session was a free Family Science Night at OMSI for all BCG members and their families. The event was promoted during Club meetings and through flyers. The flyers were also emailed to Club staff at all Portland area Clubs. More than 100 youth and their families attended the Family Science Night, including families from two Clubs not visited by OMSI. Some Clubs provided transportation to and from the event for their youth, bringing a group in the Club van. Attendees enjoyed a nano cart demonstration and free admission to the museum. One barrier OMSI had during this event was the ability to provide food. OMSI said they typically provide food for these types of events and it even had been suggested by PMA leadership, however there was not enough in the partnership pilot project budget to accommodate food at the event. OMSI felt providing food would probably have increased attendance.

During the four sessions, the level of support from Club staff was minimal, although OMSI didn't request staff support directly from the local Club. During the Club visits, the support person left while Liljeholm was delivering activities. This made it more challenging for him to match the activities to the context and build relationships with kids over the course of three one hour sessions. During subsequent sessions, he went in prepared to be with the youth on his own and set expectation for the kids when they came in the room.

Since visits to the four Clubs did not occur concurrently, Liljeholm was able to make modifications to program delivery based on early experiences. For example, the first few weeks he had 20 kids join for the activity and it was difficult to manage the highly energetic group. In later weeks, he had 15 kids participate and he felt that was about the right number for him to manage while facilitating activities. Over the course of the project, Liljeholm also made adjustments to the programming formats to allow better set-ups for hands-on activities and facilitation of the group.

Overall, OMSI viewed this partnership effort as a great success for OMSI and the Portland-area Boys & Girls Clubs. OMSI was able to deepen its existing relationship with the Blazers BGC and established new ties with three other Clubs.

Lessons Learned from the Partnership Pilot Project

Based on the partnership pilot project experience, the evaluator and DEA working group members identified key lessons learned from the process. These lessons are meant to help other science centers and museums develop partnerships with their local BGC or similar afterschool program.

Be persistent in making a connection

As in many nonprofit organizations, BGC staffing can be very fluid. It may take months to find the right person in the organization to get a program established, but as in NYSci's case, once it happens implementation can move along quickly.

Explore what both sides can bring to the partnership

Explore the strengths of each partner and the contributions they can make to partnership. It may be easy to assume in this type of endeavor that the science center or museum is providing most of the assets to the partnership, but do not discount the assets embodied by the potential partner. BGC often support youth that do not regularly visit science centers and museums, and present good opportunity to reach these children and their families. They may also have physical assets to bring to the table. While both OMSI and NYSci were able to provide free entrance to program participants, Clubs were able to provide transportation to and from the museum.

Visit the facility prior to program delivery

The physical layouts of Clubs vary widely, especially when it comes to classroom space. The BGC environment is very active, with youth participating in sports, arts & crafts, computer activities or just hanging out. Making time to visit the location will inform choice of activity and give you a feel for the amount of privacy you will have for your visit as well as the amount of BGC staff support you can expect on site.

Deliver programming in pairs

If possible, involve BGC staff as co-teachers. If BGC staff is not available to co-teach, it's recommended to send teams of at least two people for program delivery. This allows for mutual support during activities and increased attention to youth. NYSci successfully delivered their programming with two staff members, while OMSI ended up only able to send one person to their local Clubs. Although OMSI had success with their programming, they also had some challenges facilitating and managing the group with only one staff person.

Consider multiple visits

Repeat visits create added value in a number of ways. They communicate to the BGC that your institution has a long-term interest in partnership. The extended contact hours for youth to familiarize themselves with the visiting museum staff and begin to develop

relationships. For NYSci, repeat visits also provided the opportunity for informal measurement of learning outcomes. Multiple visits may also be useful for recruitment. In the case of OMSI, new youth were drawn to the programming at each successive visit.

Modify activities to match the environment

Given the active environment at Clubs, careful thought should be put into the program design to ensure a positive experience for your staff, youth participants, and BGC staff. Programs should be designed to allow each participant to have the same experience at the same time, so plan for modifications that support large group activity and longer engagement times. Consider opening and closing activities that “hook” youth, even if not nano-related.

Keep groups small

Although the ability to facilitate groups of youth may vary by educators, both OMSI and NYSci suggested keeping the size of the group small. NYSci felt 10 youth with two educators was an ideal number, while OMSI felt 15 youth was the maximum group size they could handle with one facilitator.

Provide youth with take-aways

A great way to get and keep kids engaged is to ensure that there is some kind of take-away for youth to bring home and remind them of their learning experience. Youth participating in both NYSci and OMSI programming were able to leave with at least one product from their experience. As was evident in OMSI's experience, the youth were excited about having something to bring home and the paper buckyballs were in high demand.

References

Boys & Girls Clubs of America. (2009). *Inspiring and achieving impact: 2009 annual report*. Atlanta, GA: Author.

Cousins, J. B., & Earl, L. (1992). The case for participatory evaluation. *Educational Evaluation and Policy Analysis*, 14, 397–418.

Cousins, J. B., & Earl, L. (1995). The case for participatory evaluation: Theory, research, practice. In J. B. Cousins & L. Earl. (Eds.), *Participatory evaluation in education: Studies in evaluation use and organizational learning* (pp. 3–18). London: Falmer.

Search Institute. (2005). *Deepening impact through quality youth development strategies and practices*. Minneapolis, MN: Author.

Appendix A

Sample Letter to Partner Organization

[Date]

[Address]

Dear [Recipient],

I am writing on behalf of [Your Organization's Name], located in [Your Location], regarding establishing a partnership to bring exciting educational content about nanotechnology and nanoscience to [Partner Organization]. [Your Organization's Name] is part of the Nanoscale Informal Science Education Network (NISE Net), a National Science Foundation-funded nationwide community of researchers and informal science educators dedicated to fostering public awareness, engagement, and understanding of nanoscale science, engineering, and technology.

As part of NISE Net, [Your Organization's Name] has been involved in delivering fun, hands-on informal science learning experiences around nano content in various venues, and we'd like to explore how we can partner with the [Partner Organization] to extend the reach of our nano programming and introduce you to the resources available to you through NISE Net and [Your Organization's Name]. We are committed to designing a partnership plan that meets the needs of your program participants and staff, and look forward to scheduling an initial conversation to get to know each other better.

If you are interested in learning more about NISE Net and NISE Net activities, please visit the network's website at www.nisenet.org and our website for the general public at www.whatisnano.org. You can also learn more about [Your Organization's Name]'s mission and programs on our website at [your website here].

Thank you for your time and consideration. I can be reached directly at [your contact information here] with any questions.

Sincerely,

[Your Name]

[Your Title]

Appendix B

NYS*ci*: Nano Workshop with Boys & Girls Club

Day 1 - Introduction to Nano

1. Introductions
2. Warm up - Snowball fight
 - a. On a sheet of paper, answer the following
 - Name?
 - What's your favorite science subject?
 - Three words that come to mind when you think of nano
 - What's the smallest thing you've seen?
 - b. Crumple sheet into a ball and proceed to have a snowball fight.
 - c. Everyone freezes and picks up the closest snowball to them. If it is their own, they must trade with someone else.
 - d. Identify the person's sheet and answers out loud for everyone to hear.
 - e. That person must go next until everyone's sheet was read.
3. Macro vs. Micro vs. Nano
 - a. Place the words Macro, Micro and Nano on the wall and give students pictures.
 - b. Students take turns putting pictures under the title they feel it fits under.
 - c. Explain to them what each word represents and allow them to switch positions of pictures. (1 meter = 100 centimeters = 1000 millimeters = 1 billion nanometers)
 - d. Go through each picture
 - If they guessed correctly, explain what it is.
 - If the picture was moved at any point, ask why they originally chose that spot and why it was moved.
 - If not in the correct location, explain what it is and place into correct location.

4. Draw yourself (gain better understanding of size)
[http://www.nisenet.org/catalog/programs/exploring_size -
measure yourself nanodays 08 09 10 11](http://www.nisenet.org/catalog/programs/exploring_size_-_measure_yourself_nanodays_08_09_10_11)
 - a. Measure everyone's height.
 - b. First have them draw themselves in inches (five feet becomes five inches).
 - c. Have them show everyone what they think they look like in inches.
 - d. Have them draw themselves in centimeters (five feet becomes five centimeters).
 - e. Again, show everyone how they now appear.
 - f. Have them draw themselves in millimeters (five feet becomes five millimeters).
 - g. Show group, then start discussion on how small things can get, how hard it was to draw the millimeter version of them and how small the nanometer version of them will be.

5. Iridescence vs. Pigment (show example of something happening on the nanoscale)
[http://www.nisenet.org/catalog/programs/exploring_materials -
thin films nanodays 2011](http://www.nisenet.org/catalog/programs/exploring_materials_-_thin_films_nanodays_2011)
 - a. Have students guess what happens when you place a drop of water on different construction paper. Allow them to try.
 - b. Have students guess what happens when you place a drop of water on peacock feather. Allow them to try. The construction paper will remain the same color, or get darker, due to the water. The peacock feather will show new colors. The feather has its color due to iridescence. Adding water to the feather changes how the light interacts and causes new colors.
 - c. Have students submerge black construction paper in a plate of water. Place a drop of nail polish on top of submerged construction paper. Drop will spread out and cause a film. Pull out construction paper, and notice the rainbow. Do not touch rainbow until dry (rainbow will still appear when dry).
 - d. Explain that the film, like the peacock feather, is colorful due to iridescence. This is taking place on the nano level.

Note: You can allow students to keep feathers, construction paper and construction paper rainbows.

Day 2 - Crystal Cart

1. Warm up - Fruit Basket upset - To learn about the group
 - a. There is one less seat than participants.
 - b. The person without a seat stands in the middle.
 - c. The say something about him/herself (likes, something they've done, etc.) For example, "Everyone who has been to a Mets game" or "Favorite color is blue."
 - d. Everyone who that can also claim that statement must switch seats. They cannot go to a seat directly to the side.
 - e. Person left standing must now say a statement true for them.
 - f. Repeat cycle until time allotment done.
2. How size affects things
 - a. Ping Pong Balls vs. Sprinkles. Show how inefficiently ping-pong balls fill honey bear jar while sprinkles leave very few visible gaps.
 - b. Show what happens when you pour water from one glass to another.
 - c. Ask what will happen if you put your finger in the water, pull it out and hold it over the water. Will see a drop of water remain on fingertip. Speak briefly of cohesion and how property allows water to remain on finger. Show how cohesion allows water to flow down string to second cup and not spill.
3. Show how adding energy to materials can change it in the nanoscale, and have a visible effect. (Liquid Crystal Sheet)
http://www.nisenet.org/catalog/programs/exploring_materials_-_liquid_crystals_nanodays_08_09_10_11
 - a. Give out samples of Liquid Crystal Sheet. Have students place one hand on the sheet and not remove it until they told.
 - b. Ask students what they observe. Why do they think the handprints appeared different?
 - c. The liquid crystals absorb the heat, which causes it to change its shape on the nanoscale. While we can't see this actually happening, what happens is the light reacts differently and new colors are seen. Different amounts of heat cause the shape to change more or less and a different color.

4. Crystals providing energy
http://www.nisenet.org/catalog/programs/electric_squeeze
 - a. Quartz, when squashed, will release electrons. Quartz is often used to run watches and as an igniter in stoves.
 - b. Show piezoelectricity demonstration. Push down on handle, which strains the quartz crystal and creates electricity.
 - c. Piezo Rocket: Use quartz igniter (piezoelectricity) to cause a spark. The spark will ignite alcohol gas contained in a plastic film canister, causing the canister to fly off.
 - d. While we are unable to see what is happening in the nanoscale, it provides us energy to do all sorts of things.
5. Finish up by allowing them to create their own liquid crystal business cards.

Day 3 - Museum Visit

The Club stopped by the museum and was taken directly to our nano carts. They participated in each of the activities. They were allowed free time in the museum when done, and then allowed into the playground.

Day 4- Adhesives using Nano

1. Warm up - Scream - Loosen up vocal cords and have a good laugh.
 - a. Group makes a circle.
 - b. Leader asks everyone to look down.
 - c. Leader asks everyone to look up.
 - d. When they look up they have to look directly at someone in the circle.
 - e. Upon making eye contact with another player both players must scream as loud as they can and then exit the circle.
 - f. Repeat this step only one person is left, if the group has an odd number of people, or everyone is knocked out, if group has an even number.
2. Bearded Dragon claws vs. Anoles' feet
 - a. Have the children guess which reptile uses nano as a tool to cling to walls and why.
 - b. Point out that anoles' feet stick to the smooth walls of the container they are kept in but the bearded dragons claws slip off.

- c. Use the hairbrush along with pictures to show the nano size hairs called setae that cover the anoles' feet.
 - d. Stick the rubber disks together to show how the anoles stick and remove feet from the surface due to adhesion of the setae to a seemingly smooth surface on the nano level.
 - e. Scientists study the feet of animals, like the anoles, to attempt to develop products that can stick to walls without using glue, tape, or any other common adhesives.
 - f. Use the sticky notes, CD case and weight to show how adhesive force and shear force can determine if the anole sticks or falls from a surface.
 - g. What would you do if you could stick to walls like the anoles?
 - h. Anole facts
http://www.nisenet.org/catalog/programs/biomimicry_synthetic_gecko_tape_through_nanomolding
 - Change from brown to green when they are alarmed.
 - Use nano size hairs to stick to walls.
 - They are mistaken for geckos or chameleons because of color change and wall sticking.
 - Can drop their long tails if gapped by a predator.
 - Live in hot and humid environment.
 - i. Bearded Dragon facts
 - Native to Australia, they live in dry rocky regions hence the brown tan color.
 - They are great climbers
 - They are omnivorous, eating both plants and insects.
 - Make great pets because of the gentle nature.
 - Get their name because of the spiky scales under their chins that turn black on the males.
 - Males do a territorial head bob.
3. Check of understanding of nano by doing snowball fight from the first day.

Appendix C

OMSI: Nano Workshop with Boys & Girls Club

Day 1:

Stage presentation format with one presenter talking to a large crowd.

- Intro to Nano Cart Demo
http://www.nisenet.org/catalog/programs/intro_nano_cart_demo
- StretchAbility
http://www.nisenet.org/catalog/programs/exploring_size_-_stretchability_nanodays_2010
- Sizing Things Down
http://www.nisenet.org/catalog/programs/sizing_things_down

Day 2: NanoDays 2010 Kit Activities

NanoDays activities set up on tables as mini exhibits.

- Exploring Measurement – Molecules (Exploring Size - Scented Balloons)
http://www.nisenet.org/catalog/programs/exploring_size_-_scented_balloons_nanodays_2010_2011

Note: Carrying out the activity as written in the instructions didn't not work well with the groups. Kids didn't pay attention to the smells inside the balloons; instead they were playing with the balloons and throwing them around the room. OMSI found that it worked better to tie the balloons together in a chain with string, and then tie the chain of balloons to the table. This was very effective at getting the kids to pay attention to the smells in the balloons.

- Exploring Measurement – Ruler
http://www.nisenet.org/catalog/evaluation/exploring_measurement_-_ruler
- Exploring Measurement – Human Body
http://www.nisenet.org/catalog/evaluation/exploring_measurement_human_body

- Exploring Structures – Buckyballs
[http://www.nisenet.org/catalog/programs/exploring_structures -
_buckyballs_nanodays_08_09_10](http://www.nisenet.org/catalog/programs/exploring_structures_-_buckyballs_nanodays_08_09_10)
- Exploring Materials – Nano Fabric
[http://www.nisenet.org/catalog/programs/exploring_products -
_nano_fabrics_nanodays_10_11](http://www.nisenet.org/catalog/programs/exploring_products_-_nano_fabrics_nanodays_10_11)
- Exploring Tools – SPM
[http://www.nisenet.org/catalog/programs/exploring_tools -
_special_microscopes_nanodays_08_09_10_11](http://www.nisenet.org/catalog/programs/exploring_tools_-_special_microscopes_nanodays_08_09_10_11)
- Exploring Materials – Ferrofluid
[http://www.nisenet.org/catalog/programs/exploring_materials -
_ferrofluid_nanodays_08_09_10_11](http://www.nisenet.org/catalog/programs/exploring_materials_-_ferrofluid_nanodays_08_09_10_11)
- Exploring Materials – Liquid Crystal
[http://www.nisenet.org/catalog/programs/exploring_materials -
_liquid_crystals_nanodays_08_09_10_11](http://www.nisenet.org/catalog/programs/exploring_materials_-_liquid_crystals_nanodays_08_09_10_11)

Day 3: Stage presentation format with one presenter talking to a large crowd.

- The Electric Squeeze
http://www.nisenet.org/catalog/programs/electric_squeeze
- Inkjet Printer
http://www.nisenet.org/catalog/programs/inkjet_printer
- Flying Cars
http://www.nisenet.org/catalog/programs/flying_cars
- Coke/Mentos explosion
http://www.nisenet.org/blogs/network_news/nise-net-at-astc-annual-conference

Day 4: Family Science Night at OMSI