

# **NURTURES Evaluation Report: Year 2**

## **June 2012 – March 2013**

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**On the behalf of:**



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This report summarizes the activities and findings of the evaluators of the NSF MSP project at The University of Toledo entitled NURTURES from June 2012 through March 2013.

## **I. Executive Summary**

This reporting period evaluates the Training Phase of NURTURES. During this phase, the project team piloted components of the program that will be implemented during the Implementation Phase (Years 3 – 5). This report includes the 2012 Summer Institute planning retreat and implementation, the planning retreat for the 2013 Summer Institute, and the process of establishing evaluation data collection instrumentation for Implementation Phase.

The 2012 planning retreat offered members of the project the opportunity to create relationships among the Math Science Partnership groups and began the continued process of collaboration. The 2012 Summer Institute piloted a potential model for the 2013 Institute and included opportunities for project leaders to interact with teacher leaders and work to develop plans for the academic year and future Institutes. Teacher leaders provided formative feedback through a focus group interview in which they recommended that a pretest that measures expected competency levels and provides online tutorials or refers the participant to readings and materials to reach the expected competency levels would level the playing field to some extent and eliminate frustration for both participants and instructors. They also recommended that the application for the Institute could include items that provide project planners with a better idea of participant familiarity with specific topics.

The 2013 planning retreat was well-received by teachers and university faculty. Respondents to an exit survey indicated the retreat assisted in their understanding of the project goals, of what is expected during the Summer Institute, and of how the National Standards fit into the project design.

During the past year the evaluation team has been piloting several instruments to use to measure the impact of various NURTURES components including the Summer Institute, the family backpacks, and the community events. The short term effects of the Summer Institute will be measured using faculty designed content tests to measure content gains and a focus group interview to gather formative feedback about the Institute in general. Long term effects of the Institute will be measured using the Science Teacher Efficacy Beliefs Instrument, the Science Teacher Ideological Preference Scale, a post test of content given approximately six months after the Institute, and classroom observations of participants teaching science. Students will be interviewed from randomly selected participant classrooms to provide a clearer understanding of the impact teaching science using inquiry has had on them. In addition, third grade students will complete the Student Attitudes about Science survey that is currently being used in another NSF MSP, a NSF GK-12, and a US Department of Education Teacher Quality Enhancement grant. Kindergarten student scores on the KRAL will add another measure of student learning and a potential assessment of student inquiry skills is under exploration.

To determine how best to measure the impact of the family backpacks, teacher leaders participated in a focus group interview in November 2012. At that time, the teachers had not considered whether there should be a standard means of using the backpacks in their classrooms (e.g., should all teachers conduct some type of follow up lesson about the topic once every student received the backpack?). They also noted some obstacles with the backpacks such as children not returning them promptly or children whose parents have a record of non-participation. The teachers provided the evaluators with several outcomes to look for including bridging home and school, taking science learning outside the school, opportunities for the application of what is learned in school in new settings, and parent increased understanding of how children learn science as well as how they can help their children to learn science. Using these outcomes, a focus group interview protocol was developed to use with parents who have

worked with the backpacks. To date one interview has been conducted with others planned. Findings from the first interview indicated that parents found the backpacks to be easy to follow, liked the fact that everything needed was included in the backpack, enjoyed spending time with their children doing the activity, and were impressed with how much their children know and can learn. During the Implementation Phase interviews with parents will continue.

NURTURES also piloted several community science events. Parent feedback was collected at each event in collaboration with the project staff and findings were used to continually improve the events. To determine how best to measure the effects of the community events on families, the evaluation team attended most of the events. At the beginning, a goal-free approach was used to gain a better understanding of what was occurring. At later events, the evaluators began scoring events using a rubric that examined essential components. The rubric continues to undergo modification based upon use and findings. After consulting with the project evaluation advisor in the summer, a final version will be drafted.

NURTURES Phase II has met its goals and progressed on schedule. The project team has successfully piloted the Summer Institute, the family backpacks, and the community events. Teacher leaders have piloted the use of Summer Institute content and pedagogy. Families have been enthusiastic about the community events and the backpacks. The partnership with informal science organizations has been balanced and open. The planning retreat has set a sound foundation for the 2013 Summer Institute. Evaluation instruments to measure project outcomes have been selected, developed, or are under development.

## I. Introduction

The evaluation plan for the project was created by Acumen Research and Evaluation, LLC to determine the impact of NURTURES on preschool through grade 3 science teaching and as a result children’s interest in and curiosity about science. The NURTURES grant evaluation logic model includes three phases of the evaluation plan matched to the three phases of the project: Planning, Training, and Implementation. The grant is currently in year 2 and Phase 2 (Year 2 ends June 30, 2013). Evaluation of the Training Phase focused on piloting evaluation procedures to be used during the Implementation Phase of the project. In addition, some formative feedback was gathered concerning the 2012 Summer Institute, family backpacks, community events, and the NURTURES 2013 Summer Institute planning retreat.

### A. Training Phase Evaluation Model

Table 1 depicts the Training Phase evaluation model. Teachers who will work as project staff during the Implementation Phase (teacher leaders) attended the 2012 Summer Institute and provided the evaluation team with formative feedback through a focus group interview conducted at the conclusion of the Institute. One aspect of the Training Phase evaluation plan has not yet been completed— faculty measures have yet to be developed for Summer Institute to use to assess content and pedagogy gains (see Section III, Evaluation Data Collection Instrumentation).

*Table 1: Training Phase Evaluation Model*

Level 2: Training—Goals 7 & 8		
Method	Variable Measured	Purpose
Teacher and principal exit evaluation of each summer course	Participants’ perception of course and instructor	To determine satisfaction level in order to improve institute design, content, and delivery
Teacher/Principal focus group conducted annually	Participants’ perception of application of course content to classroom; teamwork opportunities among teacher leaders; and of value of teacher/community collaboration	To determine degree to which Summer Institute prepared participants for implementation phase
Faculty prepared tests of content and pedagogy knowledge	Participants’ knowledge gain of science content	To determine content mastery and the extent of knowledge gained
Examination of inquiry based lessons and family activities	Participants’ knowledge gain of integrating science into PK-3 classroom and of appropriate complementary family science activities	To ensure that quality lessons and activities are being developed
Examination of calendar of events	Communication between teachers and informal science organizations	To determine the extent to which school and family activities coincide with community events
Treatment and control teacher scores on STEBI and STIPS	Teacher beliefs about their own self-efficacy in teaching PBS	To measure the extent to which teachers identify themselves as science teachers and the degree of support they feel they receive from their schools

## **II. Summer Institutes**

The 2012 Summer Institute (SI) was an opportunity for the project leaders to try out various methodologies, schedules, and activities that may be included in the actual Summer Institute that will begin Year 2 in 2013. Two measures were used to provide formative evaluation feedback to the project team: an observation of the 2012 planning retreat and a focus group interview with the participating teachers (n = 8).

### **A. Planning Retreat 2012**

The retreat brought together the key players who helped implement the complementary learning paradigm reflecting the NURTURES mission and goals. Groups included NURTURES leadership (n = 4), scientists and engineers (n = 7), prek-3 teachers (n = 8), and NURTURES staff (n = 6) and graduate assistants (n = 8). The retreat consisted of several segments: an ice-breaker, science immersion (where attendees were introduced to prek-3 science), piloting of several family backpack activities (participants in small groups tried and then commented on the activities including ease of instructions, age appropriateness, and application to classroom science), piloting of a potential community family event (sponsored by Challenger Space Center), an introduction to the Summer Institute and the opportunity to work on a team to draft a plan for one week of the Institute.

The formative evaluation of the retreat was based upon theory of the cyclical nature of interpersonal collaboration. Components of the cycle include dialogue, decision making, action (moving beyond planning), and evaluation (review or reflection). Ranking of the collaboration ranges from network (little interaction, no group identity, no common goal) to professional learning community (all members interact, group identity is strong, evidence of a common goal) (Gajda and Koliba, 2007). The evaluation examined the extent to which the retreat facilitated a professional learning community as evidenced by the amount and type of interaction experienced in the group as a whole as well as in the smaller break-out groups.

There was evidence within each of the retreat's events of interpersonal collaboration that reflected high levels of teamwork. Members of the groups felt free to present ideas and all members participated in group activities. For events that required a consensus, the groups engaged in conversation and made decisions as a group. All members participated in the group decision making. *The 2012 planning retreat was effective in its goal of preparing the partnership for the Summer Institute through group activities.* The retreat offered the opportunity for pre-existing groups to connect and for partnerships beyond pre-existing groups to be forged.

### **B. Summary of 2012 SI Focus Group Interview**

Note: All descriptions of the Institute were provided by the participating teachers during the focus group interview and may or may not accurately reflect what actually occurred.

Eight teachers who participated in the four week 2012 NURTURES Summer Institute—Planning Phase participated in the interview. The first two weeks were designed to reflect what the actual Summer Institute might look like (beginning 2013). Both the mornings and afternoons were broken into two or three sessions. Each session had a focus, pedagogy, science immersion, metacognition, and collaboration component. Teachers appreciated that each block of time (morning/afternoon) included an activity. It was engaging and the teachers lost track of time. The second two weeks of the Institute was a time of reflection where the teachers were asked to review and reflect upon what occurred during the first two weeks.

Given the opportunity to redesign the Institute, all would have changed the structure to integrate the reflection phase into the pilot Institute phase. By the second two weeks, it was a group effort to remember what the first two weeks entailed. The teachers especially had difficulty recalling information from the daily feedback sessions that occurred during the first two weeks.

Each session during the reflective period was a half day. The teachers had mixed feelings about the informational sessions that occurred during that portion of the Institute. Many of the teachers felt the instructors were “preaching to the choir” about certain topics; this was particularly true for assessment. Most felt the assessment session to be redundant and did not add to what they already knew and practiced. They wished that they had been surveyed prior to participation to determine the need for certain topics. They offered that they all have various strengths and weaknesses and wished those qualities had been taken into account when creating sessions.

They also felt the last week of the Institute to be the hardest week as it seemed the facilitators were rushing through sessions (perhaps, one teacher suggested, because they were running out of time). Overall, the teachers made the following suggestions for what might make the 2013 Summer Institute meaningful:

- Provide Institute participants with optional iPad training prior to participation so they will be up to date with the technology the grant offers.
- To facilitate and clarify the education sessions, combine pedagogy and metacognition into one lesson.
- Science content sessions should increase time spent with scientists and engineers.
- Facilitators should work with the teachers to determine whether certain topics/activities should be included next summer because the teachers were already familiar with many topics. For example, most of the teachers (at least those from Toledo Public Schools) are familiar and/or comfortable using graphic organizers and the Thinking Works program. Some type of pre-assessment would allow the Institute planners to gain a better understanding of how accomplished teachers are in certain areas thereby avoiding content that has been mastered and concentrating on those areas that are weak. In a more positive light, they also pointed out that pedagogy has changed drastically over the years and that this topic is one that deserves more time.
- If daily feedback forms will be part of the 2013 Institute, the teachers recommended they be anonymous. This year they were not and as a result some may have withheld certain comments.

While participating in the Institute, science definitely became a part of the participants’ everyday lives. They saw the science behind the function wherever they went. They appreciated the way the facilitators engaged them and those with whom they worked during the first two weeks (specifically the content instructors) adjusted their teaching to the participants’ learning styles. The teachers felt that as a result of participating in the Institute they have improved their quality of questioning and the use of engineering practices in their teaching. All felt they left the Institute with a very clear understanding of what is expected of them during the academic year.

*Conclusions & Recommendations:* Overall the 2012 Summer Institute achieved its goal of piloting a potential model for subsequent Institutes. The design included opportunities for project leaders to interact with the teachers and work to develop plans for the academic year and future Institutes. The teachers' recommendation that some means of determining skill and knowledge levels of future participants is valid and should be considered. It is inconceivable that once the Institute gains full force a comprehensive means of assessing each participant will be possible; however, some type of web-based pre-participation assessment that measures expected competency levels and provides online tutorials or refers the participant to readings and materials to reach the expected competency levels would level the playing field to some extent and eliminate frustration for both participants and instructors. Along these same lines, optional iPad training should be provided prior to participation (or early in the Institute if time is allotted). Finally the application for the Institute could include items that provide project planners with a better idea of participant familiarity with specific topics.

### **C. Planning Retreat 2013**

The two day 2013 Planning Retreat for the upcoming Summer Institute was held in March. The purpose of the retreat was to allow project members to work together in the design of the summer program, to establish a clear understanding of project goals and individual roles within the goal attainment, and to further develop teamwork. At the conclusion of the retreat, k-12 teacher leaders (7 responded) and university faculty (6 responded) were asked to complete an online feedback survey that asked their level of agreement with statements about the event (n = 13). Two participants did not complete the survey at the time of this report. Overall, ratings for the retreat were high with a majority (n > 10) agreeing with the following statements:

1. The retreat helped me better understand my role in the NURTURES 2013 Summer Institute.
2. Learning about the SCIENCE Classroom Observation Instrument\* helped me better understand the teacher behaviors necessary for high quality science lessons.
3. Learning how to use the SCIENCE Classroom Observation Instrument helped me to understand the types of teaching/behaviors I need to model in the Summer Institute.
4. Completing the activity matrix was a useful way to plan for the Summer Institute.
5. I will integrate what I learned during the retreat into the design of my portion of the Summer Institute.
6. I was intellectually engaged with important ideas relevant to NURTURES during the majority of the retreat.
7. The retreat helped me to better understand the National Research Council Standards for high quality PreK-12 science teaching.
8. The retreat was well organized.
9. I found working in teams to be beneficial during the retreat.
10. Adequate time and structure were provided for "sense-making," including reflection about concepts, strategies, issues, etc.
11. The pace of the retreat was appropriate.
12. Active participation of all participants was encouraged and valued.
13. There was a climate of respect for participants' experiences, ideas, and contributions.
14. I was encouraged to generate ideas, questions, conjectures and propositions during this session.

15. As a result of the retreat, I feel I have a good start on the development of lessons for the Summer Institute.

\*The project-developed SCIENCE coding instrument determines the extent to which teachers are implementing inquiry practices specified by the Framework for K-12 Science Education. It is being used to assess the effectiveness of the NURTURES professional development, to research whether implementation of inquiry practices can improve science learning outcomes at the PK-3 level, and to educate teachers on how to implement the inquiry practices specified by the Frameworks.

Participants were asked to include any comments they had in addition to responses to the items. Only university faculty (scientists) offered comments:

- I think the information about the change in standards and how it will affect teaching is so useful that it needs to be shared with university faculty in a few years. If the change in standards and teaching is as positive as we expect, our students will come to college much better prepared to discuss and explain, and our lectures can reflect that by changing our methods of content presentation and learning.
- It was a wonderful improvement to work with teachers in planning their activities rather than advise after the fact.
- It would have been nice to have more time to work on planning more specifics per lesson planning for the summer institute. It was excellent to better understand the expectations (i.e. modeling behaviors, etc.) prior to teaching content which was not discussed prior to last summer's sessions.

*Conclusions & Recommendations:* Faculty who participated last year felt this year's retreat to be better organized and more meaningful. All participants found the retreat to be beneficial. It is recommended that future retreats continue to follow the 2013 model.

### **III. Evaluation Data Collection Instrumentation**

During the Training Phase, the evaluation team spent the majority of its time developing, refining, or researching suitable measurement instrumentation to collect reliable and valid data to represent the various aspects of the project. This section narrates the process of instrumentation development and/or selection for several components of the project: family backpacks, community events, classroom observations, and the 2013 Summer Institute.

#### **A. Family Backpacks**

During the 2012-13 academic year, the teacher leaders piloted NURTURES family backpacks. Family backpacks provide families with science activities designed to extend school science learning to the home and are linked to classroom science content and/or to community event science. In November 2012, the evaluator met with the teacher leaders to discuss how the backpacks have been used and whether they have experienced problems with them.

Teachers allowed students to keep the backpacks for different amounts of time. One teacher allowed the backpack to go home for a week—another for a few days. The teachers felt some type of introduction is needed prior to sending the first backpacks home. They suggested a letter or introducing them at parent-teacher conferences or both. One teacher noted that some parents did not turn the worksheet over and complete the remaining items. Another thought a Spanish version would be helpful. When asked how they determine the order in which students

are selected to take the backpack home, one did so alphabetically but another selected those who have been responsible turning in homework. Others started with families that attended community science events. There was some concern that certain students may not return the backpacks and indeed one teacher mentioned that one backpack went missing for a while.

In general, the children who have used the backpacks were excited about the novelty and one teacher was impressed that the backpacks continued to come back with all equipment/supplies accounted for. Sometimes parents wrote a thank you note to include in the backpack when it was returned. One teacher mentioned that there should be an option for a mentor or older student at the school to complete the backpacks with children whose families simply will not support the activity. Another wondered whether there was a way to track whether families who have experienced the backpacks are more likely to attend community science events than those who have not.

Finally, the evaluator asked the teacher leaders what they believed were the “ideal outcomes” and any unintended outcomes of the family backpacks. Teachers responded that the backpacks should assist in bridging home and school, should take learning outside the school, should provide the students with the opportunity to apply what is learned in school to a new environment, and should provide parents with a better understanding of how children learn science and how they as parents can help their children to learn science.

In March, the evaluation team followed up with a small focus group interview with parents from a kindergarten class (n = 5). At the time of the interview, the families had received two different backpacks. One focused on the difference between day and night and the other involved creating a windsock. Parents felt the windsock activity to be superior and mentioned that their children really enjoyed it. Parents found the instructions for the backpacks to be easy to follow and that their children learned how to follow step by step instructions, improved their reading, and were thoughtful about the activity. Parents learned how much their children can comprehend. One parent noted, “It’s interesting to see what a five year old knows. How do they know of this?” suggesting that the backpacks are actually making parents more aware of their children’s abilities. The parents recommended the backpacks to other parents and especially liked that everything needed was there (“you don’t have to search through the house for anything”).

Based upon feedback from teachers and parents, the evaluators will construct a parent feedback interview that will be randomly given to parents in classrooms of the 2013 Summer Institute participants. The method will be either a focus group interview, a telephone interview, or a face to face interview during parent-teacher conferences. Another option may be random interviews conducted with parents during community events. This will be determined during the summer when the evaluation team meets with the project evaluation advisor, James Shymansky.

## **B. Community Science Events**

Each month during the academic year informal science partners sponsored a community family event. To date, sponsors have included Toledo Botanical Gardens, Life Learning Lab at Lourdes College, Challenger Center for Space Education in collaboration with Toledo Public Libraries, University of Toledo Ritter Planetarium, ImaginationStation (Science Museum), and Toledo Metroparks. At each event, project staff asked parents to complete a customer feedback type survey to gather formative evaluation data. The evaluation team assisted the project staff by recording and analyzing the data. Each survey was tailored to the event and asked parents about specific event learning centers. Parents rated activities on a scale of 1 to 5 with 5 representing

satisfaction. Data gathered from these events was used to continually improve the community events. A sample feedback survey can be found in the Appendix. While data from the surveys can provide information as to parent/family satisfaction with the event, not all families complete the surveys and therefore data may not be representative of all who attended. In addition, those who complete the survey are eligible to win an iPad. There is the potential that this biases the sample in two ways: First, only those who are interested in owning an iPad may complete the survey and secondly, respondents may be reluctant to provide negative feedback if they believe it may affect their chance to win (Marsden and Wright, 2010).

Nevertheless, the community event feedback does provide some insight as to the success of the events. In general, the overall feedback was very positive. Looking at the Top-2 for each of the close-ended items, average scores ranged from 62.2% to 97.0% (Table 2), with three of the four items having an average score above 80%. The first item summarizes the respondents view concerning the quality of the NURTURES stations at each community event. The Toledo-Lucas County Main Library community event had the highest score, with 93.8% of the respondents viewing the different stations at this event as having above average or higher level of quality. The Ritter Planetarium had the lowest score, with 75.2% viewing the different stations at this event as having above average or higher level of quality. Of particular note is the item with the lowest overall average score, the second item in Table 1. The item question asks: “How much does your child talk about the science he/she does in school?” The responses for this item include the following: (1) My child does not talk about science; (2) My child only talks about science when prompted; (3) My child offers to talk about science; (4) My child frequently talks about science.

Table 2 Summary of Close-Ended Questions

Participant Reaction	Toledo		Toledo-Lucas		Imagination Station
	Botanical Gardens*	Lourdes*	County Main Library*	Ritter Planetarium	
Top 2--Stations	-	86.5%	93.8%	75.2%	79.1%
Top 2--Frequency of Science Talk w/Child	-	72.7%	47.4%	77.4%	51.1%
Top 2--Return to Site	-	90.9%	100.0%	97.0%	100.0%
Top 2--Recommend to Others*	87.0%	54.5%	80.0%	100.0%	100.0%

Percentages are combined agree and agree strongly responses.

Interestingly, the two lower scores occurred at events that were located near downtown Toledo (inner city) while the other two events with higher scores in the low to mid-70s were in Sylvania, OH and on the University of Toledo campus—suburban neighborhoods. This amounts to a 25 point difference in parent’s assessment in the level of children’s science conversations. Since one of the objectives of the NURTURES program is to get inner city parents and their

children involved in NURTURES community event and talking about science, monitoring this item in the future by location of the event in conjunction with schools attended by children at the event could provide insight as to differences in student interest in science.

Several open ended questions were used to allow attendees at the community events to provide their opinions of the different community event activities. In response to the question “Did you find the NURTURES (community event) program worthwhile? Why or why not?” several words were frequently used by respondents to describe the events: educational, knowledge, learning experience, hands-on, understanding, interesting, enjoyable and fun. These events were seen as worthwhile activities because they provided parents with an activity that was both educational and fun. Another question asked “What are some positives about the program you attended today?” Here, many of the responses were similar to the previous question, i.e., educational, hands-on, etc. Additional comments focused on the value of the family time provided by the activities. Another phrase that stood out in response to this question was the energy or the implied enthusiasm kids had for the activities. And finally, several comments about the friendliness and helpfulness of the volunteers were made as well.

A final question was asked about future activities: “What are some suggestions you would make about for the future?” A frequent response was “Nothing!” or “None!”, that is, do not change anything, but “have more of these types of events.” Other responses focused on the need for a different time-frame for certain events or more time and space to complete the activities. The issue of the need of additional space and time seemed to be a frequent point of criticism in response to the Ritter Planetarium event. One of the more constructive criticisms was in regard to the need for a discussion time for the children. This was suggested as more of a group activity, something beyond the discussions going on within families, to help students and parents talk about what they were learning. Other criticisms seemed to center on the children attending the event that were beyond the NURTURES targeted demographic, i.e., children with special needs or children in pre-school/toddlers.

The evaluation team worked with project staff to determine methods to collect data about event attendees. Because families are asked to register for the event, demographic information such as ages of children, schools children attend, and number of attendees can be collected. More difficult is gathering race/ethnicity information as it is not included on the registration form and may appear to be intrusive if included. The evaluation team would like to verify that those who attend provide a representation of the targeted population. While race/ethnicity may not be collected, calculations based upon school attended may provide sufficient information to determine representation. A final concern is that the number who attended may not necessarily match the number who registered (indeed at several events the number attended was well below the registration number). The evaluation team will work with the project staff to determine a way to gain an accurate identification of those who attended (e.g., requiring check in prior to entering the event).

The goal of the community events is to provide families with opportunities to learn science together. Another goal is to make families aware of science activities they can engage in outside of school. To create an observation tool to measure the effects of the community events on families, the evaluation team began by simply attending events to understand the experience. As events progressed, the team began listing hallmarks of a family science event. After several iterations, a rubric based upon NURTURES goals was developed. Because of the somewhat chaotic nature of these events, the rubric had to be precise and simple.

The categories in the Community Events Rubric are based primarily on the descriptions of the events found in the grant proposal. These descriptions were supplemented with information from observations, event plans and other event materials. In designing this rubric we have tried to balance our evaluation between the quality and nature of the engagement observed between adults and children at the activities and our understanding that not all families will take advantage of every opportunity. Therefore a focus on the *potential* of each activity to provide the type of experience discussed in the NURTURES proposal was included.

The rubric itself has three main sections. The first of these sections asks for basic information about the observed activity including the location of the event, duration of the observation, the activity name and description (taken directly from the information provided to parents) and a general description of the observed activity. The second section asks for several activity indicators to be rated. The first three of these indicators focus on general instructions, facilitation and engagement of participants. The remaining items focus on goals of the community events that are specifically discussed in the grant proposal. Where appropriate, direct statements from the proposal itself have been used (e.g. item 7). The final section of the rubric asks the observer to justify the ratings given with evidence from the observation.

The resulting tool (see Appendix) is still in a draft form and will be used at the final community event in April. During the summer when external evaluation advisor Shymansky visits, the draft and results will be shared and a final version will be created.

Finally, community event key partners were interviewed to determine their level of understanding of the role of informal science in the project and the process they followed to create and host their event (see Appendix for questions). At the time this report was prepared four informal science partners had been interviewed (telephone). All of the partners viewed their organization's role in NURTURES as a means to provide families with science learning. They indicated that the NURTURES staff interacted with each organization to provide a framework of expectations and three of the four felt they understood what was expected of them from the beginning. The fourth stated that by the time of the event they understood expectations. All felt the guidance provided by NURTURES staff to be helpful. When asked how they determined which events to offer to families with young children all stated they had been working with families regularly so they relied upon experience. Two organizations were pleased with the turnout; the other two had hoped for a larger turnout but were pleased nonetheless with the results. All felt NURTURES publicized their event adequately. While three of the organizations felt the community events can help families and teachers, one noted that participation in NURTURES actually helps the informal science organization gain a better understanding of what children are learning in school and adapt their own programming to match.

### **C. Classroom Observations**

In October the evaluation team discussed with James Shymansky, evaluation advisor, methods of measuring the effects of the Summer Institute and follow up activities on teacher science instruction. Under his recommendation, the evaluators began by simply observing the teacher leaders during science instruction. Using a goal-free approach to evaluation (Scriven, 1983), the evaluators observed five separate lessons and took notes about what was observed—what appeared to work, what obstacles inhibited implementation of the lesson or student learning, and which elements of instructional best practices were necessary to deliver a quality inquiry-based lesson. In tandem with instrument development, the evaluators began researching existing tools. The EQUIP instrument (Electronic Quality of Inquiry Protocol, Marshall, Smart,

and Horton, 2009), has been adopted as the observation instrument. This tool measures the quality and quantity of inquiry based instruction (see copy in Appendix) and scores on the instrument have shown validity (Marshall, Smart, and Horton, 2009). EQUIP will be piloted in some of the teacher leader classrooms during the remainder of this academic year and then implemented in full in 2013-14.

#### **D. 2013 Summer Institute Evaluation Plans**

Prior to the 2013 Summer Institute, new attendees will complete the Science Teacher Self Efficacy Beliefs (STEBI; Enochs and Riggs, 1990; Riggs and Enochs, 1990) and the Science Teacher Ideological Preference Scale (STIPS; Gado, 2005) instruments to obtain baseline measures of teacher science self-efficacy and teacher preferences for inquiry versus non-inquiry teaching strategies. The survey will be administered again spring 2014 to examine gains.

To measure content gains, faculty teaching during the Summer Institute will work with the evaluation team to prepare a valid means of measuring content and pedagogy knowledge gains. These assessments will be given at the beginning and at the conclusion of the Summer Institute. During the academic year (approximately six months after the Institute), a follow up assessment will be given to examine long term gains.

#### **IV. Conclusions**

NURTURES Phase II has progressed as planned. The project team has successfully piloted the Summer Institute, the family backpacks, and the community events. Teacher leaders have piloted the use of Summer Institute content and pedagogy. Families have been enthusiastic about the community events and the backpacks. The partnership with informal science organizations has been balanced and open. The planning retreat has set a sound foundation for the 2013 Summer Institute. Assessment instruments have been identified and those that are not yet in their final form will be completed during the summer meeting with the project evaluation advisor.

## V. References

- Enochs, L., & Riggs, I. M. (1990). Further development of an elementary science teaching efficacy belief instrument: A preservice elementary scale. *School Science and Mathematics*, 90(8).
- Gado, I. (2005). Determinants of k-2 school teachers' orientation towards inquiry-based science activities: A mixed method study. *International Journal of Science and Mathematics Education*, 3, 511-539.
- Gajda, R., & Koliba, C. (2007). Evaluating the imperative of intra organizational collaboration: A school improvement perspective. *American Journal of Evaluation*, 28(1), 26-44.
- Marsden, P.V. and Wright, J.D. eds. (2010). *Handbook of survey research*. 2<sup>nd</sup> Ed. Bingley, UK: Emerald Group.
- Marshall, J.C., Smart, J., and Horton, R.M. (2009). The design and validation of EQUIP: An instrument to assess inquiry-based instruction. *International Journal of Science and Mathematics Education*, 8, 299-321.
- Riggs, I., & Enoch, L. (1990). Towards the development of an elementary teacher's science teaching efficacy belief instrument. *Science Education*, 74, 625-637.
- Scriven, M. (1983). Evaluation ideologies. *Evaluation in Education and Human Services*, 6, 229-60.

## **VI. Appendix**