A Summary Evaluation of
The Local Investigations of Natural Science (LIONS) Program for 2008-2009

Presented to:

Litzsinger Road Ecology Center

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Thank you very much to the individual educators, students and LIONS staff who so graciously participated in this evaluation.

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LOCAL INVESTIGATIONS OF NATURAL SCIENCE EXECUTIVE SUMMARY 2008-2009

The primary finding from this evaluation was that despite variations in Local Investigations of Natural Science (LIONS) specific projects, strategies of implementation, and challenges to implementation, both LIONS educators and students believed that their involvement in the program had a positive influence on their teaching and learning. However, the content and quality of these improvements in teaching practice and student learning varied by LIONS program recruitment status.

In Spring 2006, the Missouri Botanical Garden received a National Science Foundation grant to fund the LIONS program. LIONS trained educators from the St. Louis region, through professional development about place-based education, to deliver after school and summer programming to students grades 5 through 8. Since its inception, the LIONS program has included evaluation of program implementation and outcomes. There were dramatic changes in the scope of the program, which expanded beyond the originally targeted University City school district by adding additional schools recruited by LIONS staff. This expansion occurred after the district did not recruit enough educators for the program. The three programs that were recruited by LIONS, in contrast to those recruited by the University City school district, were found to be exemplary in their level of involvement and quality of programs offered to participating students.

Additional evaluation findings included:

- ❖ LIONS educators implemented programs with varying levels of success and challenges;
- ❖ Most LIONS programs were hands-on, but did not incorporate service-learning;
- ❖ LIONS involvement impacted educator practice after school and in the classroom;
- ❖ Involvement in LIONS positively influenced student learning; and
- ❖ LIONS educators were well-supported by LIONS staff.

> *"I've heard from a couple of teachers who have asked, 'How do these kids know this stuff?! Well, because we've been doing it after school. Students are bringing into the classroom what they are learning in LIONS. I feel like we are able to work about twice as fast with LIONS as we could during the normal day. They are really interested in it and we can really tap that interest in the smaller group size – that just can't happen easily during the normal school day."*
>
> *- LIONS Educator*

The evaluation collected data from the following sources:
- ❖ **Surveys:**
    - o 19 Educators and 109 Student surveys
- ❖ **Student focus groups:**
    - o Four groups with 24 students at three different schools
- ❖ **Interviews:**
    - o Interviews with 11 LIONS educators and 1 LIONS staff

> *"I always liked math, I didn't like science – that's one of the reasons I joined LIONS. Now I understand it more and am starting to like it."*
> *- LIONS Student*

> *"At one point, I didn't like my science teacher, so I didn't really pay attention, but [my LIONS teacher] has made science more fun, and I actually want to listen."*
> *- LIONS Student*

Conclusions and Recommendations

The results from the 2008-2009 evaluation data confirmed and substantiated findings from previous years. In summary, LIONS educators showed continued growth in their educator practice in LIONS and back in their school classrooms, especially around using hands-on learning. This progress occurred on different trajectories, depending on whether they had been recruited by the district or by LIONS, with LIONS-recruited programs showing higher levels of success.

This evaluation has indicated some practical issues for the design and implementation of out-of-school time programs, such as the importance of accounting for: recruitment issues; educator readiness to teach similar programs; and educator background in pedagogical and STEM-related work.

From a broader perspective, at least two topics emerging from this project may well be worth further future investigation, either within the context of LIONS or in other projects like it. A more specific exploration is indicated to examine the relationship between educator capacities, student outcomes, and continuous educator learning and growth as a result of those capacities and interactions. It is hypothesized that certain identifiable educator capacities may help educators create more effective learning environments, providing better opportunities for student learning. However, the extent to which these educator capacities can be shaped is yet to be determined. More targeted investigations of the multiple roles of out-of-school programming and its potential to positively impact educator capacities and student learning and development in specific and identifiable ways may offer noteworthy insights to this question.

INTRODUCTION

In Spring 2006, the Missouri Botanical Garden received a National Science Foundation (NSF) grant to fund the Local Investigations of Natural Science (LIONS) program. The program trained educators from the St. Louis region to deliver after school and summer programming to students grades 5 through 8. During a summer institute, program staff trained teachers in place-based education and provided them with resources to develop curricula. LIONS staff also introduced educators to organizations and programs in the St. Louis region that could be utilized as community partners, guest speakers, field trips or service-learning projects.

Since the inception of LIONS, the scope of the program has expanded beyond the originally targeted University City school district, additionally incorporating two independent schools in the city that serve a racially and economically diverse student population, a rural school in the Ozarks serving a military base population, and one other district educator not recruited by the district. This expansion was necessary, due in large part to the University City school district's inattention to teacher recruitment responsibilities, despite efforts by LIONS staff to conduct such recruitment. The four programs that were recruited by LIONS, in contrast to those recruited by the University City school district, were found to be exemplary in their level of involvement and quality of programs offered to participating students.

There were several differences in the educators selected by the district, compared to those selected later by LIONS staff. The district-selected educators chose the program out of some interest, whether for extra income or another reason. For instance, the year 1 evaluation found that most teachers reported at the initial professional development workshop that they had no skill or particular passion for teaching math or science. The LIONS educators recruited by LIONS staff, on the other hand, were chosen based on their demonstrated pedagogic and content competence in other programs in which they had collaborated with LIONS staff. In one case, a University City district teacher was recruited by LIONS staff after being "missed" in the district recruitment efforts. This educator showed considerable professional growth since joining the LIONS program.

In the first year of the LIONS program (2006-2007), the evaluation indicated that educators and students were pleased with LIONS and that it had impacted them positively in some ways. The greatest impacts were found in the realms of student interest in science and in their community. The 2006-2007 evaluation anticipated that with additional educator training and student participation, these outcomes were likely to expand in upcoming years of the LIONS program. Indeed, in the following year (2007-2008), evaluation data indicated that overall, LIONS educators developed greater confidence and skill in teaching hands-on Science, Technology, Engineering, and Math (STEM) related curricula, and using the local environment as a context for learning, and students increased their knowledge about STEM content. However, the particular increases in teaching practice varied by teacher recruitment. Both groups of educators (those originally recruited by the district, and those recruited later by LIONS staff) showed benefits of the LIONS program, but LIONS-recruited educators started at a higher level and improved from there.

The current evaluation attempted to continue to pursue educator and student outcomes, with an eye towards potential differences in programs, based on initial recruitment status.

Evaluation Methods

The overall purpose of this evaluation was to assess the effectiveness of LIONS in terms of process (program implementation) and outcomes (results). The primary foci of the evaluation were to address the following questions:

> ➤ Does dosage of the LIONS program correlate with change in youth outcomes and educator practice outcomes?
> ➤ To what extent does student participation in LIONS predict interest, skills, and/or behavior in science, technology, engineering and math (STEM)-related career activity?
> ➤ What are the factors that determine variation in the implementation of the LIONS program for different LIONS sites?
> ➤ In what ways has LIONS influenced educators' use of local cultural and natural resources as a foundation for learning, and technology as a tool to engage students in learning (during out-of-school (OST) time and during their in-school time)?
> ➤ In what ways have LIONS' STEM opportunities influenced students' interest and engagement in learning, the community or the natural world, and perceptions of OST?

To answer these questions, several different types of data were collected, including both qualitative and quantitative data from students and from educators. See Appendices for full versions of all instruments. In particular, the following data were collected:

Surveys:
- ❖ 19 Educator surveys
  - o 10 educator surveys from Fall 2007
  - o 9 educator surveys from Spring 2009 (included all but 2 educators, from the same school, involved in LIONS)
- ❖ 109 Student surveys[1]
  - o Surveys conducted in Spring 2009, from 7 programs (all but 1 LIONS programs)

All LIONS educators were asked to fill out surveys and administer surveys to the students they worked with. 80% of educators did fill out the surveys, and administer them to their students. Educator and student surveys were designed based on surveys previously developed by PEER Associates for similar place-based education programs.

Focus Groups:
- ❖ 4 Student focus groups with 24 students at 3 different schools

Student focus groups were conducted on site at students' respective schools and lasted for approximately 20 minutes each. The focus groups were semi-structured and designed to assess what the students had learned in the LIONS program, as well as to collect their opinions in general about the program.

Interviews:
- ❖ 11 Educator interviews, and 1 LIONS staff interview

Interviews were conducted with all LIONS educators and 1 LIONS staff who was active in some of the LIONS after-school programs.

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[1] Student surveys were also conducted in Fall 2007, and were included in preliminary analyses, but evaluators decided not to include that data in this report because no significant differences (or patterns) were found.

Interview and Focus Group Analyses

The interviews and focus groups used during this evaluation had a "semi-structured" or "open" format in which a basic set of ideas was pursued, but the conversation was flexible enough to follow in the direction of whatever emerged as most interesting or relevant. This type of interview is particularly useful in program evaluation because it creates engaging interactions that help us understand both the process and the outcomes of a program, including what participants know and like about the program, how they have been affected by the program, and what they think should be different (Monroe, 2002). Interview and focus group guides were developed that were specific enough to adequately encompass the evaluation questions but flexible enough to meet the stakeholders' level of participation in LIONS activities. See Appendix for interview and focus group guides. Most interviews were audio recorded, and were transcribed from recordings.

After fieldwork was complete, interviews were coded to illuminate key emergent issues and answer the evaluation questions (Miles & Huberman, 1994). Specifically, evaluators used the following protocol for coding and analyzing the data:
1) Wait until the vast majority of data has been collected.
2) Read through all the data (making minimal notes) for the purpose of clarifying the context and getting a holistic impression of the data set.
3) Create an initial list of 5-20 themes that seem to reflect the data.
4) Code all data according to the theme list, while remaining open to the emergence of new themes, sub-themes, and meta-themes.
5) As the remaining data is collected, code it according to the theme list.
6) Look within the data from each theme, sub-theme and meta-theme and recode as necessary to establish clarity and coherence within each level.
7) Generate an outline of the findings and discussions section of the report based upon the final theme list.
8) Write up the narrative based upon the outline, pulling in data from transcripts to support as appropriate.
9) Drafts were reviewed by one or more colleagues on the evaluation team, including final approval by the Principal Investigator.

Survey Analyses

The analyses presented in the findings section may represent a different way of thinking for many people reading this document. Therefore, the following section will introduce the theory behind the dose-response analysis strategy.

Understanding the dose-response analysis strategy:
The basic idea of the "dose-response" measurement strategy is to use statistical analyses to test whether participating in this program increases the occurrence of intended program outcomes. The core question becomes: "Is the LIONS program having an effect?" The "dose" is a number from 0 to 4 calculated for each survey respondent from survey items that ask about the number of program-related activities they participated in, and the extent to which the program is being implemented with the students they work most closely with. The "response" is a number from 1 to 4 that is the average of survey items about specific

outcomes that programs are interested in, such as educator use of local resources, or educator engagement in their profession, or a student's attachment to their local community. If the dose and response correlate with each other (i.e. if a change in one is accompanied by a consistent change in the other), then the program is likely to be having an effect. One measure of this correlation is the percent of variance accounted for, or the R^2 statistic.

But what percent variance constitutes a large effect for the LIONS program? Overall, if 10% (or R^2 =.10) of a teacher's attitude or behavior as reported on a survey can be attributed to that particular program (especially given that there are so many other factors at play) this could defensibly be interpreted that the program is almost certainly having some noteworthy effect. Correlations of R^2 =.30 (or 30% variance) likely represent large effects.

External Evaluation Team

All aspects of the evaluation were facilitated by PEER Associates, Inc. PEER Associates is committed to using a multiple-methods, utilization-focused, participatory evaluation process. It is our intention to help organizations better understand their programs and to help them to improve their programs based on evidence of program functioning and outcomes. We also intend to help organizations build their own capacity to reflect on and internally evaluate programs and to help to improve the evaluablility of programs.

FINDINGS AND DISCUSSION

The primary finding from this evaluation was that despite variations in specific projects implemented, strategies of implementation, and challenges to implementation, both LIONS educators and students believed that their involvement in the program had a positive influence on their teaching and learning. However, the content and quality of these improvements in teaching practice and student learning varied by LIONS program recruitment status.[2] The LIONS program achieved some level of success in every school that implemented the program, but was not powerful enough to completely overcome the challenges that district-recruited educators presented. This could be in part due to the fact that the dose of the LIONS program was fairly consistent across educators and students, not allowing for enough variation in the data to see statistically significant differences.

Of particular note is the fact that the LIONS programs affected educator practice not only for the after-school program, but also back in their classrooms, in terms of their in-school curriculum development and pedagogical approach.

Additional evaluation findings included:

❖ LIONS educators implemented programs with varying levels of success and challenges;
❖ Most LIONS programs were hands-on, but did not incorporate service-learning;
❖ LIONS involvement impacted educator practice after school and in the classroom;
❖ Involvement in LIONS positively influenced student learning; and
❖ LIONS educators were well-supported by LIONS staff.

LIONS educators implemented programs with varying levels of success and challenges

All educators reported that they implemented a variety of projects in their LIONS programs, incorporating different elements, levels, and degrees of science, technology, engineering and math (STEM). Educators from higher performing schools were more willing and able to adapt curriculum offerings from LIONS and/or develop new ones to better suit their students and situations, while educators from lower performing schools tended to more closely follow set curricula offered by LIONS staff.

> *"This spring we did a whole study on birds, how to identify birds, bird habitats, planted a bird garden, bird coloring, etc. We also did something off the cuff when the weather turned colder and the migrating birds had left. We started this 90th anniversary project for our school. [LIONS staff] helped us get old census data, and we studied how things have changed, the demographics and did a few math-type things related to that."*
> *- LIONS Educator*

The relative success of a project had less to do with a specific project topic than the way in which the LIONS educator addressed the activity. Educators identified projects that included more hands-on or active learning as more successful. Additional components that added to project success included project topics that were: student generated, new and/or "fun,"

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[2] NOTE: Higher performing schools (which also happened to be recruited by LIONS staff) were identified as such by both the PEER Evaluation Team and LIONS staff, based on review and consideration of a variety of empirical evidence regarding program functioning. Therefore "higher performing" and "LIONS-recruited" are used interchangeably in this report.

connected to students, had a real-world purpose, and had an identifiable STEM connection. All LIONS educators, regardless of whether they taught high or low performing LIONS classes, identified at least some success components in each of their after-school programs.

Not only did educators at all performing levels of LIONS schools report some successes, they all discussed a number of educator-based and school-based challenges. Educator-based challenges included: finding time for LIONS preparation, finding topics of interest to students, connecting LIONS projects to work being done in school, the need for additional adult help with LIONS groups, and educator energy levels. School-based challenges included: limited support from other educators and administrators on site, time constraints regarding when and for how long programs could be offered, access to resources, and logistical challenges.

> *We've tinkered with a whole bunch of things over the last two years. We've tried lots of things – Journey North just wasn't engaging enough for our kids, same with Forest Keepers. It didn't feel usable to them. Kids having ownership makes a difference.*
> *- LIONS Educator*

Like the interview data, educator surveys also indicated that educators from higher performing schools (i.e. those that were recruited by LIONS staff) had more successful LIONS programs. Educators from these schools were more likely to report better outcomes for community impact, and their own practice (see Table L3 in Appendices for full details), as well as student outcomes, such as civic engagement, stewardship behavior, and benefiting students with learning challenges (see Figure L1 in Appendices).

On the other hand, the extent to which LIONS educators interacted with LIONS programming (or program dose) was not a good predictor of LIONS outcomes in either educator or student surveys (See Table L1 in Appendices). Overall, recruitment status appeared to be a better predictor of both educator and student outcomes than program dose.

Most LIONS programs were hands-on, but did not incorporate service-learning

All LIONS educators reported successfully implementing elements of hands-on, STEM-based learning in their programs. One educator, from a low performing LIONS program, reported in an interview that, "hands-on learning is by far what these kids seem to need the most and what they enjoy the most."

> *The hands-on learning [has been the most successful part of the program]. I try to do as much as possible because they've been in school all day sitting and listening. I try to let the kids lead where they want to go with this.*
>
> *- LIONS Educator*

Yet, only a small percentage of LIONS programs implemented elements of community-based learning into their programs. In interviews, most LIONS educators reported that they were not able to work in the community as much as they would have liked. One educator stated that even when the program strived to teach about the community, the students were not interested, and did not "latch onto it." Educators in lower performing schools cited lack of time as a key barrier to using the community as a context for learning. For instance, one educator pronounced that although the LIONS staff attempted to describe how to integrate community-based learning into the program, the educator needed "more time to do this, to make the connections. When in the classroom can we do this?" Even an educator from a higher performing LIONS program said in an interview, "we are still not where we should be in our community work, but have had some other kinds of successes."

Similarly, the service-learning aspect of the LIONS program was not implemented fully. In interviews, no LIONS educators reported successfully implementing service-learning into their programs. Some of the community–based projects implemented by LIONS schools contained elements of community service in them, but service-learning was not a primary focus of the overall project work.

Although service-learning was not integrated well into LIONS programs, educator surveys did indicate that LIONS-recruited educators incorporated aspects of service-learning more than district-recruited educators did (ΔX^3 = +0.6, $p < .10$) (See Table L3 in Appendices). Similarly, student surveys indicated a statistically significant difference in student reports of service-learning for students of LIONS-recruited versus district-recruited educators (ΔX = +0.4, $p < .05$), such that students from higher performing LIONS programs reported higher levels of service-learning in their programs (see Table L5).

> *"We talked about ways to use GIS with our community – a resource plan with the park board, but transportation is always an issue, competing extra-curricular activities with kids, adult supervision, teachers going in different directions, etc. There are just many challenges to doing this."*
>
> *- LIONS Educator*

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[3] ΔX indicates difference in mean outcome between district-recruited and LIONS-recruited programs.

LIONS involvement impacted educator practice after school and in the classroom

One of the main goals of the LIONS program was to expand and broaden the way that educators taught in the LIONS after-school program, and ultimately back in their own classrooms. The LIONS program seemed to be attaining this goal. In interviews, educators at all performing levels of LIONS programs reported improved attitudes about teaching, quality of pedagogy, and increased STEM content. Educators talked about feeling less fearful and more comfortable teaching science. This increased comfort with STEM content translated to educators bringing this subject matter into their classrooms more frequently. In fact, one educator mentioned that being a part of the LIONS program validated the more hands-on teaching approach in the classroom, so that it was more accepted by other educators and school administration.

> *"In the classroom, we don't always get to be project-based. There's a lot of core material that has to be communicated through a text. We create lab experiences in science to deal with that. LIONS really showed me that, when kids can choose direction and create and express their own interests, they are going to complete and retain what they know."*
> *- LIONS Educator*

Several educators related that it was their experience with LIONS that directly affected how and what they taught back in their classrooms. One educator stated in an interview:

> *Before we started LIONS, even though my background is in science, I never really used it in my teaching, especially doing anything with place-based education or habitats. So when we started doing that with the watershed project, and now with the garden, I starting bringing a lot more of that into my teaching in the [classroom], and I focus more on that throughout the year.*

In educator surveys, LIONS-recruited educators were more likely to report transferring LIONS curricular goals and teaching styles to their classrooms than did district-recruited educators ($\Delta X = +0.6$, $p < .10$) (See Figure L1 below and Table L3 in the Appendices).

Figure L1. Comparison of Mean Transferring LIONS Learning Back to Classroom for Educator Surveys of District-Recruited vs. LIONS-Recruited Educators
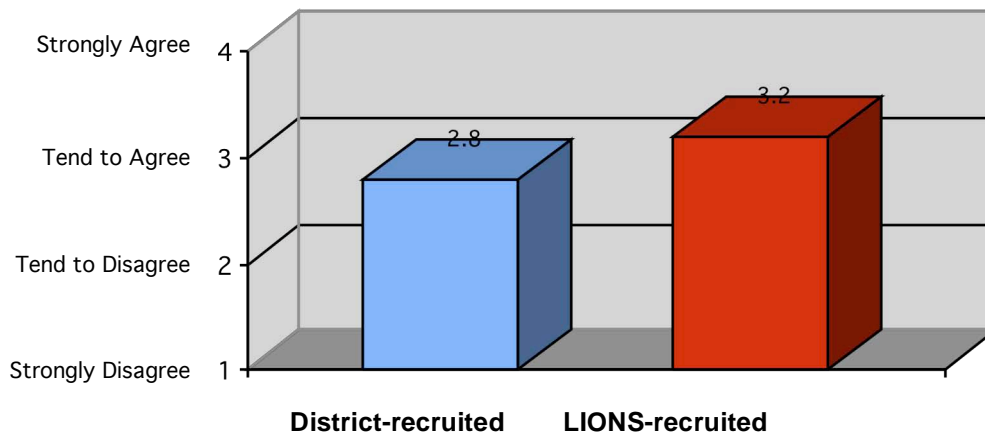
Involvement in LIONS positively influenced student learning

Students attending all performing levels of LIONS programs reported increased engagement

> *"Especially in science, the LIONS kids have kind of got a one-up on the other kids. I see improved attitudes, engaged, happy, motivated kids"*
>
> *- LIONS Educator*

in learning, enhanced concept comprehension and application, more positive attitudes about STEM, and improved relations with LIONS teachers and other LIONS students in their classrooms. Students were more interested in learning, especially about STEM topics, after participating in their LIONS programs. One LIONS student exclaimed, "I used to think that science was sort of stupid, now I understand it." In focus groups, students expressed their enjoyment of several LIONS activities. In addition, several students felt that the format of the LIONS program, being after-school and including more hands-on and experiential components, allowed them more time and space to learn and improve academically. Some student responses about how the LIONS program may have enriched their learning or impacted their academic achievement included:

> *"I think it helps me more with my science."*
>
> *"Since I'm not doing really good in science, LIONS helps."*
>
> *"Some of the topics carry over into class. I think it does help your grades."*
>
> *"During science class things come up that came up during LIONS."*

In interviews, educators agreed with student reports that students had increased engagement with and enthusiasm for STEM topics. Educators also noticed increases in student initiative, leadership, and cooperation, and improved abilities to apply inquiry skills, knowledge, and experiences from LIONS to their work in the classroom.

Like for other outcomes, LIONS-recruited educators and students reported higher outcomes than did district-recruited educators. In student surveys, students of LIONS-recruited educators were more likely to report higher levels of stewardship behavior than students of district-recruited educators (ΔX = +0.3, p < .10). Educator surveys indicated similar patterns, such that in educator surveys, LIONS-recruited educators were more likely to report higher perceptions of student performance than district-recruited educators (See Figure L2 below, and Table L3 in Appendices).

Figure L2. Comparison of Mean Levels of Educator-Reported Student Outcomes for District-Recruited vs. LIONS-Recruited Educators
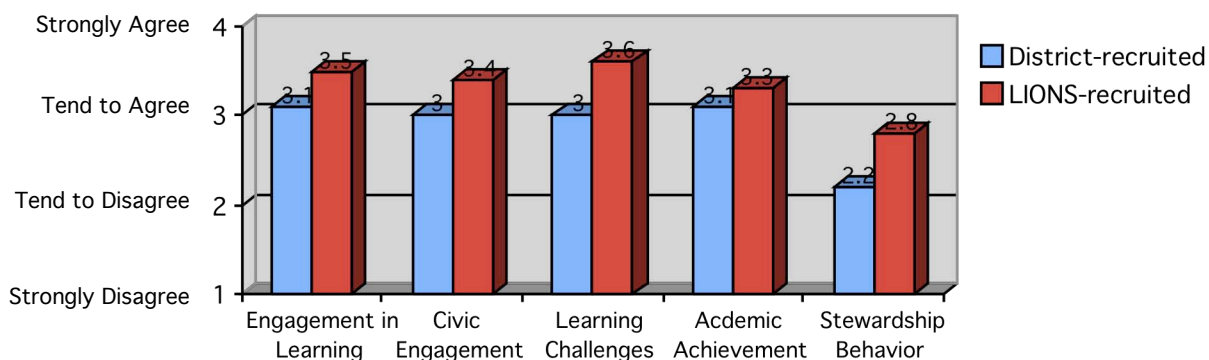
LIONS educators were well-supported by LIONS staff

Educators at all performing levels of LIONS schools reported being highly satisfied with the

> *"[LIONS staff member] was very supportive. He arranged field trips for us and secured transportation whenever we needed to go to the parks. He was just an amazing help. He actually came and participated in our class in geocaching, teaching both the kids and me, so now I have a strong foundation to build from. I think [he] went above and beyond and we were very thankful to have him."*
> *- LIONS Educator*

levels and types of assistance they received from LIONS staff. In interviews, educators discussed accessibility of needed materials and resources, as well as the availability of LIONS staff to provide information and even teach a class when necessary. In the lower performing LIONS programs, LIONS staff frequently helped out with teaching in the after-school program. Indeed, for one program, a LIONS staff member was a regular presence in the program, teaching and leading activities almost every week. In an interview, the educator for this particular LIONS program recognized the value of having a LIONS staff member who helped out, and said:

> *I don't know if we could have done LIONS without her because there were just so many students and this was difficult for some of them. She also would help with lessons and provide resources. [LIONS staff person] helped bring all of the resources and materials on a day when I just couldn't get those things. It was so good to have another pair of hands!*

Educators from higher performing LIONS programs also attributed much of the success of their programs to the LIONS grant and staff support. One educator stated that the "grant helped us move faster than we would have on our own and helped put things in place for future classes and the school."

When asked in interviews how they might improve the LIONS program, educators discussed: increased publicity for the LIONS program, more staff to assist educators with LIONS groups, and more opportunities to connect with other LIONS educators. It should be noted that the latter two items have been regularly offered to LIONS educators by LIONS staff throughout the program, with little to no follow up response from those educators.

Interestingly, when students were asked in focus groups what they would do differently if they ran LIONS, they talked about making the program even more hands-on, experiential, and focused on technology, with more field trips. It should be noted that all of these components were also the things they expressed liking about the LIONS program.

> *"Support has been phenomenal. [LIONS staff member] always responds, gives us assistance, deals with technical problems, usually within 24 hours. Financial support is great – we are able to get things we couldn't get from the school."*
> *- LIONS Educator*

CONCLUSIONS AND RECOMMENDATIONS

The results from the 2008-2009 evaluation data confirmed and substantiated findings from previous years. In summary, LIONS educators showed continued growth in their educator practice, especially around using hands-on learning. This progress occurred on different trajectories, depending on whether they had been recruited by the district or by LIONS, with LIONS-recruited programs showing higher levels of success. LIONS-recruited educators were more likely to integrate community resources and service-learning, although still not to the anticipated level for LIONS programs. Similar improvements were indicated in student outcomes, such that students from LIONS-recruited programs showed higher levels of academic engagement, stewardship behavior, and interest in STEM concepts.

This evaluation effort, which has occurred since the beginning of LIONS, has outlined some practical issues for the design and implementation of out-of-school time programs, such as the importance of accounting for: recruitment issues; educator readiness to teach similar programs; and educator background in pedagogical and STEM-related work. In addition, the findings from this longitudinal evaluation effort have been found to be durable over time.

From a broader perspective, at least two topics emerging from this project may well be worth further future investigation, either within the context of LIONS or in other projects like it. A more specific exploration is indicated to examine the relationship between educator capacities, student outcomes, and continuous educator learning and growth as a result of those capacities and interactions. It is hypothesized that certain identifiable educator capacities may help educators create more effective learning environments, providing better opportunities for student learning. However, the extent to which these educator capacities can be shaped is yet to be determined. More targeted investigations of the multiple roles of out-of-school programming and its potential to positively impact educator capacities and student learning and development in specific and identifiable ways may offer noteworthy insights to this question.

Recommendations

Recommendations are focused on suggestions for upcoming year's evaluation.

- ✓ Continue longitudinal investigation of effects of LIONS programs.
    - o Some LIONS educators expressed an interest participating in some sort of program-based action research in order to attempt to demonstrate the program's effectiveness, as well as to engage in a longitudinal study of LIONS potential long-term impact on students.
- ✓ Focus on the four continuing schools, all of which are higher performing schools.
    - o Determine the obstacles that even these more successful educators and programs face.
    - o Investigate how much these educators can accomplish, given the constraints and limited resources of the LIONS program.

APPENDICES

APPENDIX A – SURVEY TABLES

The analyses presented in the findings section may represent a different way of thinking for many people reading this document. Therefore, the following section will introduce the theory behind the dose-response analysis strategy.

Understanding the dose-response analysis strategy:
The basic idea of the "dose-response" measurement strategy is to use statistical analyses to test whether participating in this program increases the occurrence of intended program outcomes. The core question becomes: "Is the LIONS program having an effect?" The "dose" is a number from 0 to 4 calculated for each survey respondent from survey items that ask about the number of program-related activities they participated in, and the extent to which the program is being implemented with the students they work most closely with. The "response" is a number from 1 to 4 that is the average of survey items about specific outcomes that programs are interested in, such as educator use of local resources, or educator engagement in their profession, or a student's attachment to their local community. If the dose and response correlate with each other (i.e. if a change in one is accompanied by a consistent change in the other), then the program is likely to be having an effect. One measure of this correlation is the percent of variance accounted for, or the R^2 statistic.

But what percent variance constitutes a large effect for the LIONS program? Overall, if 10% (or $R^2 = .10$) of a teacher's attitude or behavior as reported on a survey can be attributed to that particular program (especially given that there are so many other factors at play) this could defensibly be interpreted that the program is almost certainly having some noteworthy effect. Correlations of $R^2 = .30$ (or 30% variance) likely represent large effects.

Interpreting the survey tables:
In addition to the percent of variance accounted for, for each variable, there is some descriptive information: mean (average), median (number in the middle if all numbers were stacked up in order from smallest to largest), and standard deviation (a number conveying how much variation is in the answers: small standard deviation means answers were closer together, larger standard deviation means answers varied widely). Remember that most of the answers (except for dose) correspond to a 4-point scale, which is as follows:

1 = Strongly DISAGREE
2 = Tend to DISAGREE
3 = Tend to AGREE
4 = Strongly AGREE

So, if the average answer is a 3.5, then that means it is somewhere between tend to agree and strongly agree. Response averages of less than 2.5 suggest that overall, the sample of respondents disagreed with the statement, with the strength of disagreement increasing as the number becomes smaller. Conversely, response averages of greater than 2.5 suggest that overall, the sample of respondents agreed with the statement, with the strength of agreement increasing as the number becomes larger.

Table L1. Summary of Data for Fall 2007 and Spring 2009 LIONS Educator Surveys, Correlating LIONS Dose to LIONS-Related Outcomes (N=19)

Variable *(items included)*	N	$\overline{X}$	M	SD	$\triangle R^2$	F	df
Dose *(calc from d1a-m)*	19	0.8	0.5	0.5	-	-	-
Other place-based ed. training *(calc from =d1v-z)*	19	1.1	1.0	1.3	.01	0.1	17
Service learning *(lsl index = l3,l6)*	17	3.2	3.5	0.8	.08	1.3	15
Teacher engagement/growth *(pteg index = p3,p6)*	19	3.5	3.5	0.4	.00	0.1	17
Reports of student performance *(X module = x2,x3,x4,x5,x7,x8,x9,x10,x11,x12)*	19	3.1	3.0	0.4	.03	0.5	17
Student engagement in learning *(xsel index=x1,x5,x12)*	19	3.3	3.7	0.6	.05	1.9	17
Student civic engagement *(xsce index = x3,x7)*	19	3.2	3.0	0.4	.02	0.4	17
Student stewardship behavior *(xssb index = x4,x8)*	19	2.5	2.5	0.5	.00	0.2	17
Student academic achievement *(xsaa index = x2,x10,x11)*	19	3.2	3.0	0.4	.15	2.9	17
Benefits students w/learning challenges *(item=x11)*	16	3.3	3.0	0.6	.21[†]	3.7	14
Perceptions of community improvement *(Y module =y4,y5,y6,y7,y8,y9,y10)*	19	3.0	3.0	0.4	0.4	0.7	17
Community environmental quality *(yeq index = y4,y7)*	18	2.7	2.8	0.5	.00	0.1	16
Community planning/decision process *(ypdm index=y5,y8)*	17	2.5	2.5	0.7	.04	0.6	15
General community quality *(ygen index=y4,y5)*	16	2.4	2.3	0.5	.00	0.4	14
Program adds value to com. *(ypav index=y6,y7,y8,y9)*	19	3.1	3.0	0.4	.12	2.3	17
Community improvement projects *(item = y10)*	19	3.4	4.0	0.7	.01	0.1	17
Curriculum goals *(icg index=i1,i2,i3)*	19	3.0	3.0	0.4	.00	0.1	17
Other miscellaneous items							
Ongoing LIONS support necessary *(item=f5)*	19	3.5	4.0	0.6	.06	1.0	17
LIONS staff responsive *(item=m1)*	19	3.8	4.0	0.4	.00	0.0	17
LIONS skills helped create solid plan *(item=m2)*	18	3.6	4.0	0.8	.00	0.0	16
Plan a LIONS project for next year *(item=m5)*	18	3.6	4.0	0.8	.29*	6.7	16
GIS important part of project *(item=m8)*	18	3.1	3.0	1.0	.00	0.1	16
Want more GIS skill development *(item=m10)*	19	3.5	4.0	0.7	.00	0.0	17

NOTE: *Table row shading loosely represents the level of data reduction, i.e. modules are light gray. Results of particular interest are shaded purple.* **N** = *sample size;* **X** = *mean;* **M** = *median;* **SD** = *standard deviation;* $\triangle R^2$ = *% of outcome variability accounted for by dose composite;* **p** = *statistical significance test, threshold < .05/(# of component indices);* [†] = *significant at p < .10;* * = *significant at p < .05;* ** = *significant at p < .01;* **F** = *regression test;* **df** = *degrees of freedom*

Table L2. Summary Comparing Data for Fall 2007 and Spring 2009 LIONS Educator Surveys, (N=19)

Variable *(items included)*	Fall 2007			Spring 2009			
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	$\Delta\bar{X}$
Dose *(calc from d1a-m)*	10	0.6	0.2	9	1.1	0.6	+0.5*
Other place-based ed. training *(calc from =d1v-z)*	10	1.3	1.7	9	0.9	0.8	-0.4
Service learning *(lsl index = l3,l6)*	9	3.2	0.8	8	3.3	0.8	+0.1
Teacher engagement/growth *(pteg index = p3,p6)*	10	3.5	0.4	9	3.5	0.5	-
Reports of student performance *(X module = x2,x3,x4,x5,x7,x8,x9,x10,x11,x12)*	10	3.2	0.2	9	2.9	0.4	-0.3
Student engagement in learning *(xsel index=x1,x5,x12)*	10	3.5	0.4	9	3.1	0.7	-0.4
Student civic engagement *(xsce index = x3,x7)*	10	3.4	0.3	9	3.0	0.5	-0.4†
Student stewardship behavior *(xssb index = x4,x8)*	10	2.6	0.4	9	2.5	0.7	-0.1
Student academic achievement *(xsaa index = x2,x10,x11)*	10	3.3	0.4	9	3.1	0.4	-0.2
Benefits students w/learning challenges *(item=x11)*	8	3.4	0.5	8	3.3	0.7	+0.1
Perceptions of community improvement *(Y module =y4,y5,y6,y7,y8,y9,y10)*	10	3.0	0.3	9	3.0	0.4	-
Community environmental quality *(yeq index = y4,y7)*	9	2.6	0.6	9	2.8	0.3	+0.2
Community planning/decision process *(ypdm index=y5,y8)*	9	2.5	0.7	8	2.6	0.7	+0.1
General community quality *(ygen index=y4,y5)*	8	2.1	0.4	8	2.8	0.4	+0.7*
Program adds value to com. *(ypav index=y6,y7,y8,y9)*	10	3.2	0.3	9	3.0	0.5	-0.2
Community improvement projects *(item = y10)*	10	3.3	0.7	9	3.6	0.7	+0.3
Curriculum goals *(icg index=i1,i2,i3)*	10	3.0	0.5	9	2.9	0.3	-0.1
Other miscellaneous items							
Ongoing LIONS support necessary *(item=f5)*	10	3.6	0.5	9	3.4	0.7	-0.2
LIONS staff responsive *(item=m1)*	10	3.8	0.4	9	3.9	0.3	+0.1
LIONS skills helped create solid plan *(item=m2)*	9	3.6	0.7	9	3.3	1.0	-0.3
Plan a LIONS project for next year *(item=m5)*	10	3.7	0.7	8	3.5	0.9	-0.2
GIS important part of project *(item=m8)*	9	3.0	1.1	9	3.1	0.9	+0.1
Want more GIS skill development *(item=m10)*	10	3.4	0.7	9	3.6	0.7	+0.2

NOTE: *Table row shading loosely represents the level of data reduction, i.e. modules are light gray. Results of particular interest are shaded purple.* **N** = *sample size;* **X** = *mean;* **M** = *median;* **SD** = *standard deviation;* Δ**X** = *change in mean;* **p** = *statistical significance test, threshold < .05/(# of component indices);* [†] = *significant at p < .10;* * = *significant at p < .05*

Table L3. Summary of Fall 2007 and Spring 2009 LIONS Educator Surveys, Comparing District-Recruited and LIONS-Recruited Educators (N=19)

Variable (items included)	District-Recruited			LIONS-Recruited			
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	$\Delta\bar{X}$
Dose (calc from d1a-m)	9	0.8	0.7	10	0.8	0.3	-
Other place-based ed. training (calc from =d1v-z)	9	0.5	0.7	10	1.7	1.5	+1.2*
Service learning (lsl index = l3,l6)	7	2.9	1.0	10	3.5	0.5	+0.6†
Teacher engagement/growth (pteg index = p3,p6)	9	3.3	0.4	10	3.6	0.4	+0.3
Reports of student performance (X module = x2,x3,x4,x5,x7,x8,x9,x10,x11,x12)	9	2.9	0.3	10	3.2	0.3	+0.3*
Student engagement in learning (xsel index=x1,x5,x12)	9	3.1	0.7	10	3.5	0.4	+0.4
Student civic engagement (xsce index = x3,x7)	9	3.0	0.4	10	3.4	0.4	+0.4†
Student stewardship behavior (xssb index = x4,x8)	9	2.2	0.4	10	2.8	0.5	+0.6*
Student academic achievement (xsaa index = x2,x10,x11)	9	3.1	0.3	10	3.3	0.4	+0.2
Benefits students w/learning challenges (item=x11)	7	3.0	0.6	9	3.6	0.5	+0.6†
Perceptions of community improvement (Y module =y4,y5,y6,y7,y8,y9,y10)	9	2.9	0.4	10	3.1	0.2	+0.2
Community environmental quality (yeq index = y4,y7)	8	2.6	0.6	10	2.8	0.3	+0.2
Community planning/decision process (ypdm index=y5,y8)	7	2.2	0.7	10	2.8	0.6	+0.6
General community quality (ygen index=y4,y5)	7	2.5	0.6	9	2.4	0.5	-0.1
Program adds value to com. (ypav index=y6,y7,y8,y9)	9	2.9	0.5	10	3.2	0.8	+0.3†
Community improvement projects (item = y10)	9	3.3	0.9	10	3.5	0.5	+0.2
Curriculum goals (icg index=i1,i2,i3)	9	2.8	0.4	10	3.2	0.4	+0.4*
Other miscellaneous items							
Ongoing LIONS support necessary (item=f5)	9	3.6	0.7	10	3.5	0.5	-0.1
LIONS staff responsive (item=m1)	9	3.8	0.4	10	3.9	0.3	+0.1
LIONS skills helped create solid plan (item=m2)	8	2.9	1.0	10	3.6	0.7	+0.7†
Plan a LIONS project for next year (item=m5)	8	3.3	1.0	10	3.9	0.3	+0.6†
GIS important part of project (item=m8)	8	3.0	0.9	10	3.1	1.1	+0.1
Want more GIS skill development (item=m10)	9	3.4	0.5	10	3.5	0.9	+0.1

NOTE: *Table row shading loosely represents the level of data reduction, i.e. modules are light gray. Results of particular interest are shaded purple.* **N** = *sample size;* **X** = *mean;* **M** = *median;* **SD** = *standard deviation;* Δ**X** = *change in mean;* **p** = *statistical significance test, threshold < .05/(# of component indices);* † = *significant at p < .10;* * = *significant at p < .05*

Table L4. Summary of Data for Spring 2009 LIONS Student Surveys, Correlating LIONS Educator Dose to LIONS-Related Outcomes (N=109)

Variable *(items included)*	N	$\overline{X}$	M	SD	$\triangle R^2$	F	df
Use of local resources *(L module = l1,l3,l4,l6)*	108	3.1	3.0	0.6	.01	0.7	95
Service learning *(lsl index = l3,l6)*	101	2.9	3.0	0.9	.03	3.0†	95
Use of local places *(llp index = l1,l4)*	108	3.3	3.5	0.6	.00	0.0	95
LIONS helps me get better grades *(item=x10)*	94	2.9	3.0	1.0	.00	0.3	112
Student engagement-civic, learning *(C module=c1,c2.c3,c4,c5,c6,c7,c8,c9,c10,c11,c12,c13,c14,c15)*	109	3.2	3.2	0.5	.00	0.2	95
Connection to community *(ccc index = c1,c2,c7)*	109	3.2	3.3	0.5	.00	0.2	95
Self-efficacy *(cse index = c5,c8)*	107	3.2	3.5	0.5	.01	1.4	94
Social responsibility *(csr index = c3,c4,c6,c9)*	109	3.4	3.5	0.5	.06	5.6*	95
Enthusiasm for learning *(cel index=c10,c11,c12,c15)*	109	2.9	3.0	0.7	.00	0.0	95
Stewardship behavior *(csb index = c13,c14)*	106	3.1	3.5	0.9	.00	0.1	92
Interest in learning science *(iils index=i7,i8,i9,i10)*	109	3.0	3.0	0.5	.05	4.6*	95
Student attachment to place *(N module = n1,n2,n3,n4,n5,n6,n8,n9,l1,l4,c1,c2,c7)*	109	3.0	3.0	0.5	.04	0.5	95
Time spent outdoors *(nto index=n1,n2,n6)*	108	2.7	2.7	0.7	.02	1.6	95
Understanding of place *(nup index = n3,n5)*	102	3.0	3.0	0.8	.02	1.8	90
Overall affect about place *(noa index = n4,n8,c1,c2,c7)*	109	3.1	3.0	0.6	.01	0.9	95

NOTE: *Table row shading loosely represents the level of data reduction, i.e. modules are light gray. Results of particular interest are shaded purple.* **N** = *sample size;* **X** = *mean;* **M** = *median;* **SD** = *standard deviation;* $\triangle R^2$ = *% of outcome variability accounted for by dose composite;* **p** = *statistical significance test, threshold < .05/(# of component indices);* † = *significant at p < .10;* * = *significant at p < .05;;* **F** = *regression test;* **df** = *degrees of freedom*

Table L5. Summary of Data for Spring 2009 LIONS Student Surveys, Comparing Educators recruited by the district, and recruited by LIONS Staff (N=109)

Variable *(items included)*	District-Recruited			LIONS-Recruited			
	N	$\overline{X}$	SD	N	$\overline{X}$	SD	$\Delta\overline{X}$
Use of local resources *(L module = l1,l3,l4,l6)*	41	3.1	0.6	67	3.2	0.6	+ 0.1
Service learning *(lsl index = l3,l6)*	37	2.7	1.0	64	3.1	0.8	+ 0.4*
Use of local places *(llp index = l1,l4)*	41	3.1	0.6	67	3.3	0.6	- 0.1
Student engagement-civic, learning *(C module=c1,c2,c3,c4,c5,c6,c7,c8,c9,c10,c11,c12,c13,c14,c15)*	41	3.2	0.4	68	3.2	0.5	-
Connection to community *(ccc index = c1,c2,c7)*	41	3.3	0.5	8	3.2	0.6	- 0.1
Self-efficacy *(cse index = c5,c8)*	40	3.2	0.7	67	3.1	0.7	- 0.1
Social responsibility *(csr index = c3,c4,c6,c9)*	41	3.5	0.4	68	3.4	0.5	- 0.1
Enthusiasm for learning *(cel index=c10,c11,c12,c15)*	41	2.9	0.7	68	2.9	0.7	-
Stewardship behavior *(csb index = c13,c14)*	39	2.9	0.9	67	3.2	0.8	+ 0.3[†]
Interest in learning science *(iils index=i7,i8,i9,i10)*	41	2.9	0.4	68	3.0	0.5	+ 0.1
Student attachment to place *(N module = n1,n2,n3,n4,n5,n6,n8,n9,l1,l4,c1,c2,c7)*	41	3.1	0.4	68	2.9	0.5	- 0.2
Time spent outdoors *(nto index=n1,n2,n6)*	41	2.8	0.8	67	2.6	0.7	- 0.2
Understanding of place *(nup index = n3,n5)*	37	2.9	0.7	65	3.1	0.8	+ 0.2
Overall affect about place *(noa index = n4,n8,c1,c2,c7)*	41	3.2	0.6	68	3.0	0.5	- 0.2[†]

NOTES: *Table row shading loosely represents the level of data reduction, i.e. modules are light gray, overall modules are dark gray. Results of particular interest are shaded purple. Outcome scale range = 0 to 4;* **N** = *sample size;* **X** = *mean;* **SD** = *standard deviation;* Δ**X** = *change in mean between pre- and post- measures; * = significant at p < .05; ** = significant at p < .01.*

APPENDIX B – EVALUATION PLAN 2008-2009

LIONS 2008-2009 Evaluation Plan

Category	Evaluation Questions and/or Descriptions	Evaluation Strategy/Activity	Personnel Accountable	When	Approx. % of eval plan
1. Surveys	*Does 'dosage' of LIONS program correlate with change in youth outcomes and educator practice outcomes?* *To what extent does student participation in LIONS predict interest, skills, and/or behavior in STEM-related career activity?*	a) Administer 10-15 educator and 50-100 student surveys	LIONS lead/PEER support	Fall08/ Spr09	3%
		b) Enter/download, clean, prepare PEER and NSF survey data for analysis	PEER lead/LIONS support	Spring 09	6%
		c) Analyze, write up survey data for inclusion in interim report	PEER lead/ LIONS support	Summer 09	14%
2. Interviews/Observations	*In what ways have educators implemented the LIONS program?* *What are the factors that determine variation in the quality of education for different LIONS sites?* *In what ways has LIONS influenced educators' use of local cultural and natural resources as a foundation for learning, and technology as a tool to engage students in learning (during OST and during their in-school time)?* *In what ways have LIONS' STEM opportunities influenced students' interest and engagement in learning, the community or the natural world, and their perceptions of OST?*	d) Conduct, transcribe, and travel to interviews w/ LIONS teachers (phone interviews), and sample of students' concept map (in person)	PEER lead/ LIONS support	Spring 08	20%
		e) Running summary of LIONS-like projects done in classroom (monthly e-mail reminder to teachers)	LIONS lead/ PEER support	ongoing	3%
		f) Track teachers' use of local resources, and adaptations of LIONS curricula (PEER develop tracking tool, LIONS staff track)	LIONS lead/PEER support	ongoing	3%
		g) Plan, compile, and analyze results, and write up in a formal report ready for LIONS staff and NSFAYS	PEER lead/ LIONS support	Spring/ Summer 09	20%
3. Service-Learning	*What are the obstacles and successes associated with doing a service-learning project?*	h) Interviews with LIONS teachers (either by phone, or in conjunction with 2d above)	PEER lead/LIONS support	Winter 08	3%
		i) Tracking system of service-learning project (mechanism TBD)	LIONS lead/PEER support	ongoing	3%
		j) Analyze results and write up in a report (format TBD)	PEER lead/LIONS support	Summer 09	11%
4. Program Staff Support	*What are realistic expectations and plans for generating useful evaluation results within existing resource constraints?* *Meetings, email, conversations with staff to maximize value from evaluation activities.* *Integrating plans with budgets, accounting.*	k) Revise current & develop future evaluation plans	PEER lead/ LIONS support	ongoing	3%
		l) General, on-going support for utilization of evaluation results and program documentation	PEER lead/ LIONS support	ongoing	6%
		m) Administrative, financial management support	AAP	ongoing	7%

100%

APPENDIX C – EDUCATOR SURVEY

LIONS Educator Survey

We recognize that teachers and school staff have many demands on their time and appreciate your completing this survey. Your frank feedback is very valuable for helping us to improve the LIONS Program. We appreciate your best guess on any items that may seem a little broad or not directly connected to LIONS. We also recognize that LIONS is not the only factor affecting your students. You will notice that the question numbers and letters are not always in sequence. That is because this survey is a key part of a larger effort to measure the impact of place-based education programs[1]. Please do not leave any blanks.
THANK YOU!

Your individual responses will be seen only by the evaluation team, and your name will NOT be used in any report, publication, or discussion without your prior permission.

Your School _____Your Name _____ Today's Date _____

How much do you disagree or agree? For each item, please circle only *one* number that best matches your opinion.	Strongly Disagree	Tend to Disagree	Tend to Agree	Strongly Agree	Not sure or N/A
P.3 I feel energized and confident while teaching about the local environment and/or community.	1	2	3	4	0
P.6 LIONS has helped me become a better teacher.	1	2	3	4	0
Y.6 LIONS gets students more involved in solving real life problems in our community.	1	2	3	4	0
Y.7 The quality of the environment in our community is improving as a result of LIONS.	1	2	3	4	0
Y.8 Through LIONS, students are collaborating with important decision makers in our community.	1	2	3	4	0
Y.9 LIONS may be nice, but it doesn't address real needs in our community.	1	2	3	4	0
Y.10 I am (or plan to become) actively involved in projects to improve the social and/or environmental quality of our community.	1	2	3	4	0
Y.4 Our community is environmentally healthy.	1	2	3	4	0
Y.5 The key decision makers in our community have a good plan for addressing the important needs in our community.	1	2	3	4	0
I.1 I use math and science during in-school time as a tool for investigating the local community.	1	2	3	4	0
I.2 I transfer to the classroom the new teaching styles or activities I experiment with in LIONS.	1	2	3	4	0
F.5 Ongoing support from LIONS (whether in formal workshops or informal emails/phone calls) is necessary to successfully implement LIONS.	1	2	3	4	0
M.1 The LIONS staff has been responsive to my needs for support.	1	2	3	4	0
M5 I plan on participating in LIONS next year.	1	2	3	4	0
I.3 I found it difficult to develop a cohesive LIONS curriculum.	1	2	3	4	0

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[1] Place-based education is the use of the local environment as a framework for all learning.

How much do you disagree or agree? For each item, please circle only one number that best matches your opinion.	Strongly Disagree	Tend to Disagree	Tend to Agree	Strongly Agree	Not sure or N/A
M2 I was able to use the skills I gained from LIONS institutes and workshops to create a solid plan for this year's LIONS projects	1	2	3	4	0
M8. GIS and other technologies were an important part of our LIONS project this year.	1	2	3	4	0
M10 I want more GIS and/or technical skills development	1	2	3	4	0

When answering items in this section, please refer to your LIONS students.	Strongly Disagree	Tend to Disagree	Tend to Agree	Strongly Agree	Not sure or N/A
X1 Our students are enthusiastic about learning.	1	2	3	4	0
X2 LIONS may be nice, but it doesn't really improve student academic achievement.	1	2	3	4	0
X3 Through LIONS, students gain a sense of responsibility for improving the local community and environment.	1	2	3	4	0
X4 Through their schoolwork, students regularly take action to protect and improve the environment.	1	2	3	4	0
X5 Students prefer LIONS- style activities to more traditional style school activities.	1	2	3	4	0
X7 LIONS students have a strong connection to the community where our school is located.	1	2	3	4	0
X8 At home or outside of school, students regularly take action to protect and improve the environment.	1	2	3	4	0
X9 Standardized test scores are an accurate indicator of student academic achievement.	1	2	3	4	0
X10 LIONS helps students increase standardized test scores.	1	2	3	4	0
X11 LIONS is particularly beneficial for students with learning challenges.	1	2	3	4	0
X12 Students are self-directed in their work on the LIONS activities.	1	2	3	4	0

How often do these things happen? For each item, please circle only one number that best matches your opinion. These items refer to LIONS students that you know best or work most closely with.	Two Days per year or less	Three to six days per ear	About one day a month	One day a week or more	Not sure or N/A
L6 In LIONS, students learn a lot about math and/or science through community volunteering and/or service-learning work	1	2	3	4	0
L3 As part of LIONS, students work on real-world problems in their community, school buildings and/or school yard.	1	2	3	4	0

D.1 For the following items, please type a NUMBER in the box beside each activity description to indicate how many times you have participated in that LIONS-related activity OVER THE YEARS. Please type the actual number instead of spelling it. For example: "1" not "one", (but don't type the quotation marks). Type 0 in the box if you have not taken part in that activity or if it does not apply to you. If the number of times is large or hard to quantify, just put your best guess. The idea here is to try and get an overall estimate of your level of involvement with LIONS and which types of support are most used. It might help to read through the whole list of activities first to jog your memory.

	Number
a. LIONS summer professional development institutes	
b. taught LIONS summer program	
c. LIONS workshops and meetings during the school year	
d. quick, informal meetings or conversations with LIONS staff	
e. LIONS staff providing me with curriculum and content resources	
f. LIONS staff working with me to plan curriculum or prepare lessons	

	Number
m. other LIONS activity (please specify) _____	
the next four items (v-y) refer to other place-based or env.education activities NOT directly associated with LIONS	
v. non-LIONS college or graduate level courses related to place-based or env. education	
w. non-LIONS workshops/conferences/ seminars related to place-based or env. ed.	
x. non-LIONS place-based or env. education books/curriculum guides I've read	
y. non-LIONS place-based or env. education articles/lesson plans I've read/studied	

D.1z Of the non-LIONS place-based or environmental education activities you listed in D.1v-y above, approximately what portion of these did you do *as a result of* being inspired by LIONS:
a. none
b. about a quarter
c. around half
d. maybe three quarters
e. all
f. I'm not sure/couldn't guess

For questions D3-D9, please circle the one answer that most closely applies

D.6 What subject do you teach:
a. Not a teacher/ doesn't apply to me
b. elementary classroom, integrated
c. math
d. science
e. social studies/ history
f. English
g. foreign language
h. physical education or health
i. art or music
j. technology
k. Other: _____

D.7 My role in the school is:
a. specialist
b. student aide or paraprofessional
c. administrator
d. classroom teacher: elementary
e. classroom teacher: middle school
f. classroom teacher: high school
g. other:_____

D.8 For how many school years have you been working in this school? (count the current school year as one)
a. First year here
b. 2-3 years
c. 4-5 years
d. 6 or more years

D.9 For how many school years have you been teaching? (count the current school year as one)
a. First year
b. 2-3 years
c. 4-5 years
d. 6 or more years

For the remaining questions, please write your answers in the spaces provided. Please continue your answers on the back of this survey if you need more space.

M.20   What were the two or three most significant barriers you overcame in your LIONS work this year?
1.

2.

3.

M.21   What were the two or three most important supports for you during LIONS this year?
1.

2.

3.

M.22   What two or three things would best support you in developing future LIONS activities?
1.

2.

3.

I.4   During the LIONS summer institute we talked some about the essential characteristics of a good OST project. Which of these have you incorporated into your work? Why/why not? In terms of these characteristics, how does your actual project compare with what you originally planned?

The End. Thank you again for taking the time to fill out this survey!
Please return this survey in the envelope provided to a LIONS staff person.

APPENDIX D – STUDENT SURVEY

LIONS Student Survey

We are interested in <u>your</u> ideas about the **environment** and your **community**. By community, we mean everything in the town or neighborhood where you live or go to school, including people, nature and the buildings. There are no right or wrong answers! Please answer <u>every</u> question. Thanks a bunch!

Your answers will be used to help make LIONS better. We won't tell anyone else how you answered a question without your permission.

Your School _____ Your Name _____ Grade _____

Are you □ Male *or* □ Female   LIONS Teacher's Name _____ Today's Date _____

C10 This is how I feel about LIONS: (circle one)
   a. I do not enjoy LIONS and what I'm learning is not important to me.
   b. Sometimes I learn useful things in LIONS, but usually what I learn is not that important.
   c. I learn something important on most days. I can usually see how most of what I learn at LIONS will be useful in my life.
   d. Almost everything I learn is important and useful. I enjoy learning at LIONS every time.
   e. I'm not sure

How much do you disagree or agree? For each sentence, circle only the <u>one</u> number that best matches your answer. Please do not leave any blanks.	No way!	Not really	Kind of true	Yes!	I don't know
C1 I feel like I am part of a community.	1	2	3	4	0
C2 I pay attention to news that affects the community.	1	2	3	4	0
C3 Doing something that helps others is important to me.	1	2	3	4	0
C4 I like to help other people, even if it is hard work.	1	2	3	4	0
C5 I know what I can do to help make the community a better place.	1	2	3	4	0
C6 Helping other people is something everyone should do, including myself.	1	2	3	4	0
C7 I know a lot of people in the community, and they know me.	1	2	3	4	0
C8 I feel like I can make a difference in the community.	1	2	3	4	0
C9 I try to think of ways to help other people.	1	2	3	4	0
C11 I like it when I get to be absent on a regular school day.	1	2	3	4	0
C12 On my own time, I often read books, use the internet, or go outside to learn more about the topics we're working on in LIONS.	1	2	3	4	0
C13 In the last two months I have done something *with my LIONS after-school group* to take care of my neighborhood or community.	1	2	3	4	0
C14 In the last two months I have done something *on my own time* to take care of my neighborhood or community.	1	2	3	4	0
C15 I enjoy learning about the environment and my community.	1	2	3	4	0
L7 Because of LIONS I have learned a whole bunch of interesting things about my community or the local environment.	1	2	3	4	0

(please complete both sides)   LIONS Stu Survey v3c   *Page 1 of 2*

How much do you disagree or agree? For each sentence, circle only the <u>one</u> number that best matches your answer. Please do not leave any blanks.	No way!	Not really	Kind of true	Yes!	I don't know
I.8 What we learn in LIONS is *less* interesting that than what we do during the regular school day.	1	2	3	4	0
x.10 LIONS helps me do better on tests and get better grades.	1	2	3	4	0
I.9 I am interested in plants and animals and their habitat.	1	2	3	4	0
I.10 I like to learn about and do activities in science, math and/or technology.	1	2	3	4	0
N.3 I know a lot about plants and animals that live inside my community.	1	2	3	4	0
N.4 I like living in my community.	1	2	3	4	0
N.5 I often think about how what I do affects nature and the people around me.	1	2	3	4	0
N.8 I hope to stay in this community when I am grown up.	1	2	3	4	0
N.9 My community is basically the same as any other community.	1	2	3	4	0

How often do these things happen? For the statements below, please circle only <u>one</u> number that best matches how often you do or see the things described. Please do not leave any blanks.	Hardly ever less than 2 days per year	A little bit 3 to 6 days per year	Sometimes about a day a month	A lot one day a week or more	I don't know
L.1 The school building and grounds (places outside of the classrooms) are used as places for learning.	1	2	3	4	0
L.3 As part of LIONS, we work on solving some problems happening in the community and/or the school.	1	2	3	4	0
L.4 The activities we do in LIONS are about nature in the neighborhood and/or about the city where we live.	1	2	3	4	0
L.6 Students do community volunteering and/or service-learning work as a way to increase their learning.	1	2	3	4	0
N.1 I visit parks, playgrounds, forests, creeks, ponds or other natural areas *by myself*.	1	2	3	4	0
N.2 I visit parks, playgrounds, forests, creeks, ponds or other natural areas *with friends, family or as part of a group*.	1	2	3	4	0
N.6 I spend almost the whole day inside buildings, cars, or buses.	1	2	3	4	0

E.2 In the space below, please tell us anything else you'd like to about what you like or don't like about LIONS. You can also share any other thoughts you have about learning about the environment or community.

The End. Thank you for completing this survey.

(please complete both sides)   LIONS Stu Survey v3c   *Page 2 of 2*

APPENDIX E – EDUCATOR INTERVIEW GUIDE 08-09

Introduction to interviews/focus group:
- *We are outside evaluators with PEER Associates, hired by the Missouri Botanical Gardens to conduct an evaluation of the Local Investigations of Natural Science (LIONS) program.*
- *Main purpose is to get your perspective on how LIONS is impacting you and your students, what is working well and what could be improved.*
- *This is NOT a performance assessment of your work.*
- *The interview generally takes between 20 and 30 minutes.*
- *Your responses are confidential in that names are never used. Quotes are used. Only evaluation staff will see raw data.*
- *Your participation is voluntary, and you can stop at any time.*
- *Data from these interviews will be analyzed, and written up in a report that we'll give to the LIONS. They will decide how to share the reports with participants and community members.*
- *Request permission to record, take notes*
- *Questions or concerns?*

1. Please **describe the projects** you have implemented in your LIONS program curricula. Which have been **least and most successful**, as far as student engagement and learning?

2. What **components of the LIONS program** (i.e. service-learning, use of community resources, hands-on learning, etc.) have you implemented most and least successfully?

3. I am interested in finding out if your involvement in **LIONS has influenced your work or engagement as a teacher**, either in OST or your in-school curriculum. *(Additional prompts: Has working with LIONS changed the way you think or feel about teaching? The way you teach? The content of what you teach? Your use of local resources?)*

4. We are curious if LIONS has influenced your **students' engagement in learning**? In what ways? *(Additional prompts: Which components of LIONS programs were most successful in promoting student engagement?)*

5. What are the **greatest challenges** you have faced as you have gone through the LIONS OST programs? *(Additional prompts: Have you felt that you had the knowledge, skills, and time to generate quality curricula?)*

6. **In what ways, if at all, did LIONS staff support you** in developing and implementing place-based OST curricula? *(Additional prompts: What kinds of professional development, materials, on-site co-teaching, and curriculum design have been most and least helpful?).*

7. Do you have **any other thoughts** you'd like to share with us?

Thank you so much for your time!

APPENDIX F –STUDENT INTERVIEW GUIDE 08-09

Introduction to interviews/focus group:

- *We are outside evaluators with PEER Associates, hired by the Missouri Botanical Garden to conduct an evaluation of the Local Investigations of Natural Science (LIONS) program.*
- *Main purpose is to get your perspective on how LIONS is impacting you, what is working well and what could be improved.*
- *Questions or concerns?*

1. How do you feel about school? Has the LIONS program influenced how well you do in school or how you feel about school? How about your relationship with your teachers?
2. What is something interesting or important that you have learned about nature this year in the LIONS program?
3. What are your thoughts about science and technology? What do you think other kids your age think about science and technology?
4. If you were running the LIONS program, what would you do differently?

Thank you so much for your time!