Summer Science Project

Evaluation Findings 2013

October 2013

Prepared by the Partnership for Children and Youth
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About the Summer Science Project

The Summer Science Project supports the availability and quality of summer and science, technology, engineering, and mathematics (STEM) learning programs in Oakland, Concord, San Jose, and California. The project is led by the Partnership for Children and Youth (PCY) and Techbridge, in collaboration with three project communities to include Oakland, Mt. Diablo, and Franklin-McKinley Unified School Districts. Summer Science combines the resources and experiences of PCY's Summer Matters Campaign and Techbridge's informal STEM education curriculum to build the capacity of out-of-school time staff to lead hands-on summer and science programming for 3rd-5th grade youth. Through this initiative, project communities receive hands-on curriculum, professional development, and coaching around best practices to engage youth in summer and STEM.

Programmatic Elements

The Summer Science Project supports summer STEM programming through:

- **Training**: From fall 2012-spring 2013, PCY and Techbridge conducted a series of Summer Quality and STEM professional development. This series included four trainings (16 hours) of STEM specific training for program staff at Oakland, Mt. Diablo, and Franklin-McKinley School Districts. These trainings addressed teaching strategies that promote inquiry-based, hands-on STEM.

- **Coaching:** On average, each project community received up to 80 hours of district and/or site-based coaching in the months leading up to and following summer programming. Coaching focused on best practices to engage youth in high-quality summer and STEM programming and ranged from providing resources to co-facilitating summer training. In summer 2013, PCY and Techbridge trained onsite certificated teachers to serve as STEM Coaches for participating program staff. Site-based coaching is an integral component in ensuring that line staff feel confident, prepared, and able to lead high-quality STEM programming in summer. STEM Coaches were, in most cases, onsite daily to provide instructional coaching and assistance with the preparation and delivery of STEM lessons. Coaching also included one or two formal observations of each staff member leading an informal STEM activity. All observations were accompanied by a debriefing session to review written feedback based on the STEM coaching rubric.

- **Quality Assessment:** Quality coaching in spring 2013 was followed by onsite quality assessment site visits utilizing the Comprehensive Assessment of Summer Programs (CASP) Site Observation Tool. During the summer session, coaching continued on a monthly basis to include debrief sessions to review written observation feedback, program evaluation, and goal setting for 2014 summer planning.

Partner Agencies

The Summer Science Project is a collaborative project of:

- **Partnership for Children and Youth (PCY)**: In 1997, a group of concerned government, philanthropy and business leaders decided to do something about the persistent poverty and barriers to success faced by children and youth in Bay Area communities. The Partnership for Children & Youth was created to connect schools and their community partners in these underserved communities with available public and private resources, and to improve the effectiveness of funding streams and services for low income children. PCY works around three key initiatives: Expanded Learning, Community Schools, and Policy and Advocacy. We ignite systems of collaboration, leadership and continuous learning among school districts, government agencies and community-based organization serving low-income children and youth. We do this by supporting community school, after school and summer partnerships through training, assessment, planning, policy and advocacy.

- **Techbridge:** Founded by Chabot Space & Science Center with support from the National Science Foundation, Techbridge was launched in 2000 to expand the academic and career options of girls and to help increase the representation of women and underrepresented youth in STEM. Building on 12 years of success, Techbridge spun off as an independent nonprofit organization in 2011. Techbridge has reached over 4,000 girls in the Bay Area through after-school and summer programs for girls that offer innovative hands-on projects, role models and worksite visits, and academic and career guidance. Through partnering with school districts and community-based organizations, Techbridge has helped engage thousands more girls and boys in STEM.

- **Oakland Unified School District After School Programs Office:** The OUSD After School Programs Office oversees 75 state and federally funded elementary, middle and high school programs, supporting the implementation of quality academic and enrichment out-of-school-time programs in close partnership with 15 community organizations to over 16,000 children and youth over the course of the school year.

- **Mt. Diablo CARES:** Mt. Diablo CARES administers elementary, middle and high school programs at 16 school sites with support from 23 community partners. The program is the result of an ongoing collaboration between the Mt Diablo Unified School District, City of Concord Parks & Recreation, and Bay Area Community Resources. CARES is supported by several funding sources including grants from state and city initiatives.

- **Franklin-McKinley School District:** Franklin-McKinley includes 19 schools that serve over 10,000 elementary and middle school students. In partnership with the CORAL (Communities Organizing Resources to Advance Learning) after school program

of Catholic Charities of Santa Clara County, Franklin-McKinley offers literacy, resiliency, and enrichment activities with support from state and foundation initiatives and funding. Catholic Charities of Santa Clara County has been serving individuals and families for more than 50 years and provides diverse programming including educational services.

Participating Sites

In Summer 2013, Summer Science programming was implemented at the following elementary schools:

Mt. Diablo Unified

- Cambridge
- Delta View
- El Monte
- Fair Oaks
- Ygnacio Valley

Oakland Unified

- Allendale
- East Oakland Pride
- Fruitvale
- Global Family
- Sobrante Park

Franklin-McKinley

- Robert F. Kennedy/ Cornerstone Academy

Summer Science Project Goals

The Science Project has 6 established goals. Available evidence suggests that the project completely met five goals and partially met one goal. For goal 1, we expect to continue progressing in this area by maximizing and/or locating additional resources to provide more hours of programming to project communities of need. Public Profit assisted in the analysis of staff and participant surveys to measure progress on goals 2 and 3; these goals were completely met according to available evidence. Further detail on data sources is in Appendix A of this report.

Project Goals	Progress Toward Goals
1. *Launch Summer Science sites in 3 communities serving at least 900 youth with 120 hours of programming.*	◎
2. *Increase participating youths' interest and confidence in STEM learning.*	●
3. *Strengthen line staff's ability and confidence to teach science lessons in summer and after school.*	●
4. *Develop a replicable and sustainable system of technical assistance for summer STEM programs in other communities in California.*	●
5. *Define how this system integrates with California's developing STEM in OST initiatives.*	●
6. *Prepare Bay Area summer programs as showcases for high quality STEM education.*	●

Key		
●	Complete	
◎	Partial Completion	
○	Not Yet Started	

Findings: Evidence of Progress Toward Project Goals

Launch Summer Science sites in 3 communities serving at least 900 youth with 120 hours of programming.

In Summer 2013, Summer Science served 994 youth at 11 sites in the Oakland Unified, Mount Diablo Unified, and Franklin McKinley School Districts with an average of 114 hours of programming.

In Oakland Unified:

- Programming ran from June 25, 2013 to July 19, 2013, including a total of 143 total hours of programming.
- A total of 342 youth were served from 8:30AM-4:00PM daily, with the exception of field trips.
- Participating youth averaged 89% attendance daily and 127 hours of programming each.

Table 1: Attendance by Site: Oakland Unified School District

Site Name	Total Served	Attendance (Average Daily)	Attendance (Average Total Hours)
Allendale	60	43	103
Sobrante Park	60	60	143
East Oakland Pride	88	73	119
Global Family	60	59	140
Fruitvale	74	67	130

Source: https://www.youthservices.net/ofcy/index.asp

In Mount Diablo Unified:

- Programming ran from June 24, 2013 to July 19, 2013, including a total of 114 hours of programming.
- A total of 352 youth were served from 8:00AM-2:00PM daily.
- Participating youth averaged 80% attendance daily and 91 hours of programming each.

Table 2: Attendance by Site: Mt. Diablo Unified School District

Site Name	Total Served	Attendance (Average Daily)	Attendance (Average Total Hours)
Cambridge	105	89	97
Delta View	84	62	84
El Monte	49	37	87
Fair Oaks	62	53	97
Ygnacio Valley	52	42	92

Source: http://afterschoolattendance.net/

In Franklin-McKinley:

- Programming ran from June 25, 2013 to July 23, 2013, including a total of 85 hours of programming.
- A total of 300 youth were served from 8:30AM-12:30PM daily, with the exception of three field trips lasting from 8:30AM to 2:00PM.
- Participating youth averaged 78% attendance daily and 66 hours of programming each.

Table 3: Attendance by Site: Franklin-McKinley School District

Site Name	Total Served	Attendance (Average Daily)	Attendance (Average Total Hours)
Kennedy / Cornerstone Academy	300	235 students	66

Source: http://youthservices.net

Increase participating youths' interest and confidence in STEM learning.

Youth post-test surveys measured the extent to which participants report ***interest and engagement with science*** as a result of the summer science program. The great majority of youth reported that the program positively influenced their attitudes toward STEM learning with 91% reporting that the summer science program made science more fun and 88% indicating science was more interesting. The program also impacted students' interest in future science learning with 83% reporting that the program made them want to learn more about science and 80% indicating that they are more excited to learn about science in school.

91% of youth report that the summer science program made science more fun and 88% indicated that science was more interesting

Table 4: Youth Interest & Engagement with STEM

Youth Survey Questions	Total
The summer science program made science more fun.	91%
The summer science program made science more interesting.	88%
I enjoy learning science in school.	84%
The summer science program made me want to learn more about science.	83%
The summer science program made me want to play more with science toys.	82%
The summer science program made me more excited to do science activities.	81%
The summer science program made me more excited to learn about science in school.	80%

Reported for proportion of youth responding "yes" to each of the questions listed above.
Source: Summer Science Pilot Youth Survey, n = 524, July 2013

Students ***gained knowledge and skills that they found relevant to their lives***. Ninety-three percent of youth reported that the summer science program taught them new things, 86% indicated that the activities taught them things that mattered to them and 82% even shared what they learned with their families.

Youth learned new things (93%) and the activities taught them things that mattered to them (86%)

On the other hand, summer participants were less likely to report that they did science activities when they weren't in their summer program, with just under half of youth reported doing so.

Table 5: Youths' Knowledge and Skills in STEM Topics

Youth Survey Questions	Total
The summer science program taught me new things.	93%
The summer science activities taught me things that matter to me.	86%
The summer science program taught me things that I shared with my family.	82%
I do science activities when I am not in my summer science program.	48%

Reported for proportion of youth responding "yes" to each of the questions listed above.
Source: Summer Science Pilot Youth Survey, n = 524, July 2013

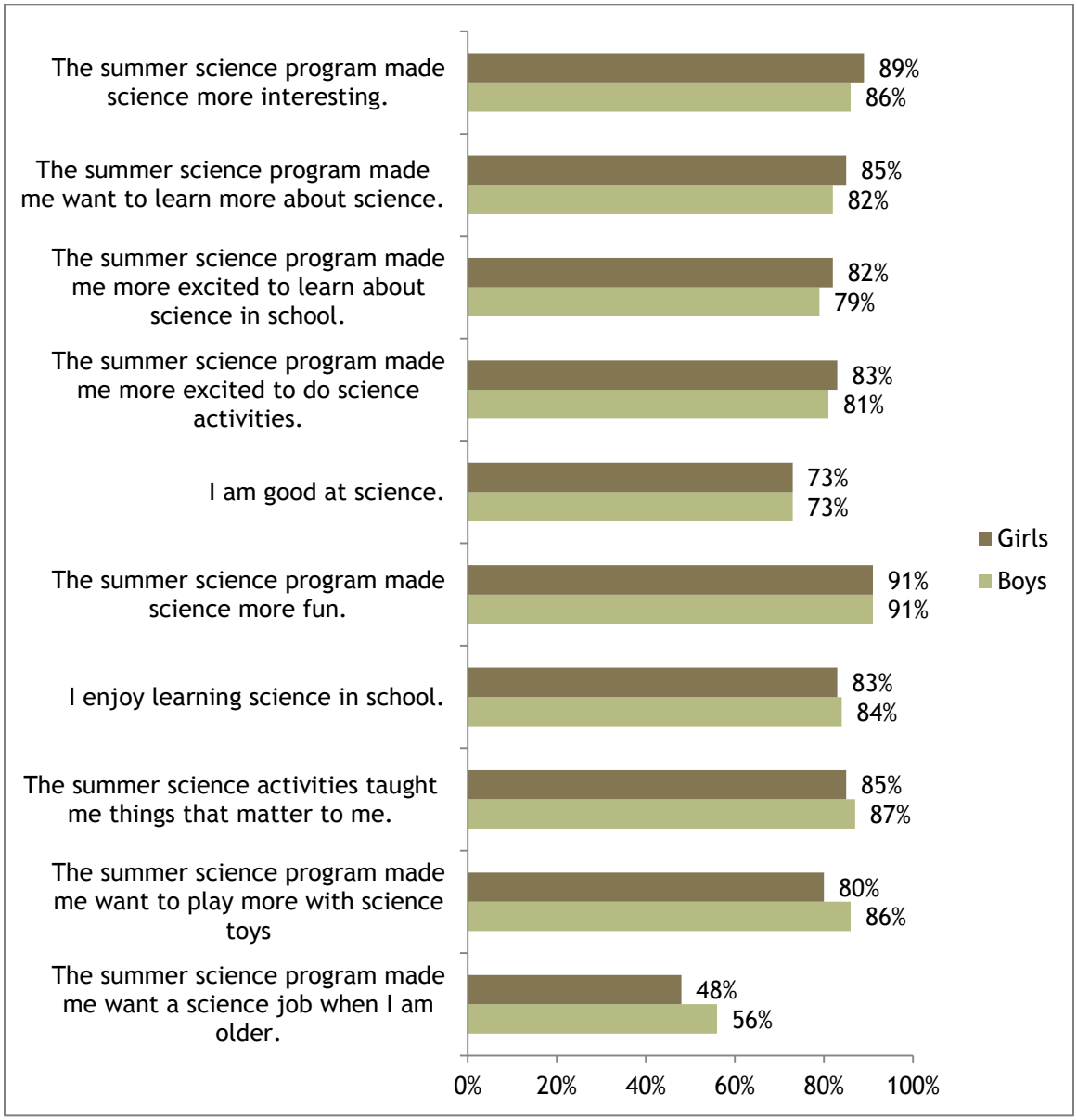
The above findings regarding increased interest, knowledge and skills are even more significant given that some of these youth struggled with science as indicated by reported levels of ***confidence*** in their ability to engage in STEM learning. Just under three-quarters (73%) of youth felt they were good at science, 63% said that science is easy and 84% reported that science makes them think. Thus, students are able to maintain interest in a subject for which they acknowledge they must work hard and persevere to succeed.

Familiarizing youths with ***STEM careers*** was an additional objective of the curriculum. By the end of the program, most youth (81%) knew what scientists do and half (51%) want a job in a science field when they are older.

Youth gave the program high marks for ***quality***. Nearly all (95%) reported that the summer science program had fun science activities and 91% indicated that the program had nice instructors.

Of particular interest is the ***impact of the summer science program for girls***. Youth survey results revealed that for many items girls scored as high or higher than boys. For example, 85% of girls and 82% of boys reported that the summer science program made them want to learn more about science and 73% of both girls and boys agreed that they are good at science. Yet a greater percentage of boys indicated that the summer science program made them want a science job when they are older (56% of boys vs. 48% of girls) and boys were more likely to want to play more with science toys (86% of boys vs. 80% of girls). Select items are presented in Figure 1 with all item results by gender in Appendix B.

Figure 1: Youth Attitudes Toward Science Learning by Gender



Reported for proportion of youth responding "yes" to each of the questions listed above.
Source: Summer Science Pilot Youth Survey, n = 524, July 2013.

Strengthen line staff's ability and confidence to teach science lessons in summer and after school.

Summer staff began and ended the summer program with a strong **belief in the benefit and importance of Summer STEM learning**. For example, at both the pre and post survey 96% of staff felt that summer STEM activities impact the interest of children and youth in school-year STEM activities. Nearly nine in ten (89%) thought that leading high quality summer STEM activities could address limits in students' prior STEM knowledge.

On the other hand, staff members reported a notable decline in their belief that summer STEM activities will affect participants' school-year achievement.

Table 6: Staff Belief in the Benefit/Importance of Summer STEM

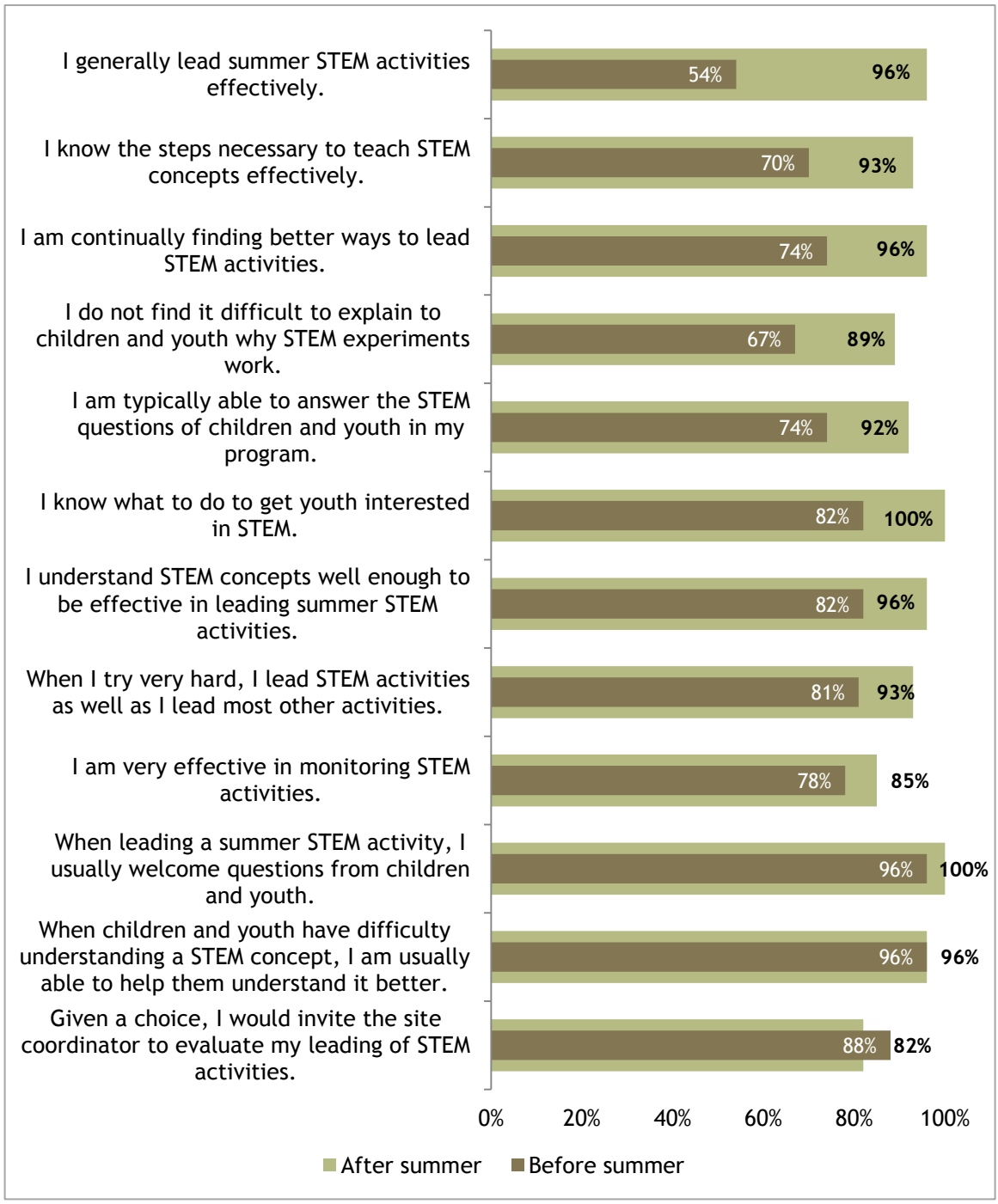
Staff Survey Questions	Before Summer	After	Percentage point change
Summer STEM activities impact the interest of children and youth in school-year STEM activities.	96%	96%	0%
The inadequacy of the STEM background of children and youth can be overcome by leading good summer STEM activities.	89%	89%	0%
Summer STEM activities impact the school-year performance of children and youth in STEM.	96%	93%	-3%
It is important to show children and youth the possibility of having a career in a STEM-related field.	100%	96%	-4%
It is important to help show children and youth that STEM is related to the world around them.	100%	96%	-4%
Increased effort in leading summer STEM activities produces little change in the STEM achievement of children and youth.*	48%	67%	+19%*

Proportion of staff responding "Strongly Agree" or "Agree" with items.
*This item is negatively stated so the desired outcome is for agreement with this item to decrease.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Staff participated in four half-day trainings before summer session. During the summer the program, sites also had access to STEM coaches. The benefit of this training and technical assistance along with the experience gained implementing the approaches with the summer youth was demonstrated in the self-reported growth based on pre and post survey responses**. Staff members' confidence in their ability to lead STEM activities increased**, and in some cases quite dramatically. For example, staff who reported that they could effectively lead summer STEM activities increased from 54% to 96%. At the pre-test 70% of staff agreed or strongly agreed that they knew the steps necessary to teach STEM concepts effectively and that number increased to 93% at the end of summer.

Staff self-reported ability to effectively lead STEM activities increased from 54% to 96%.

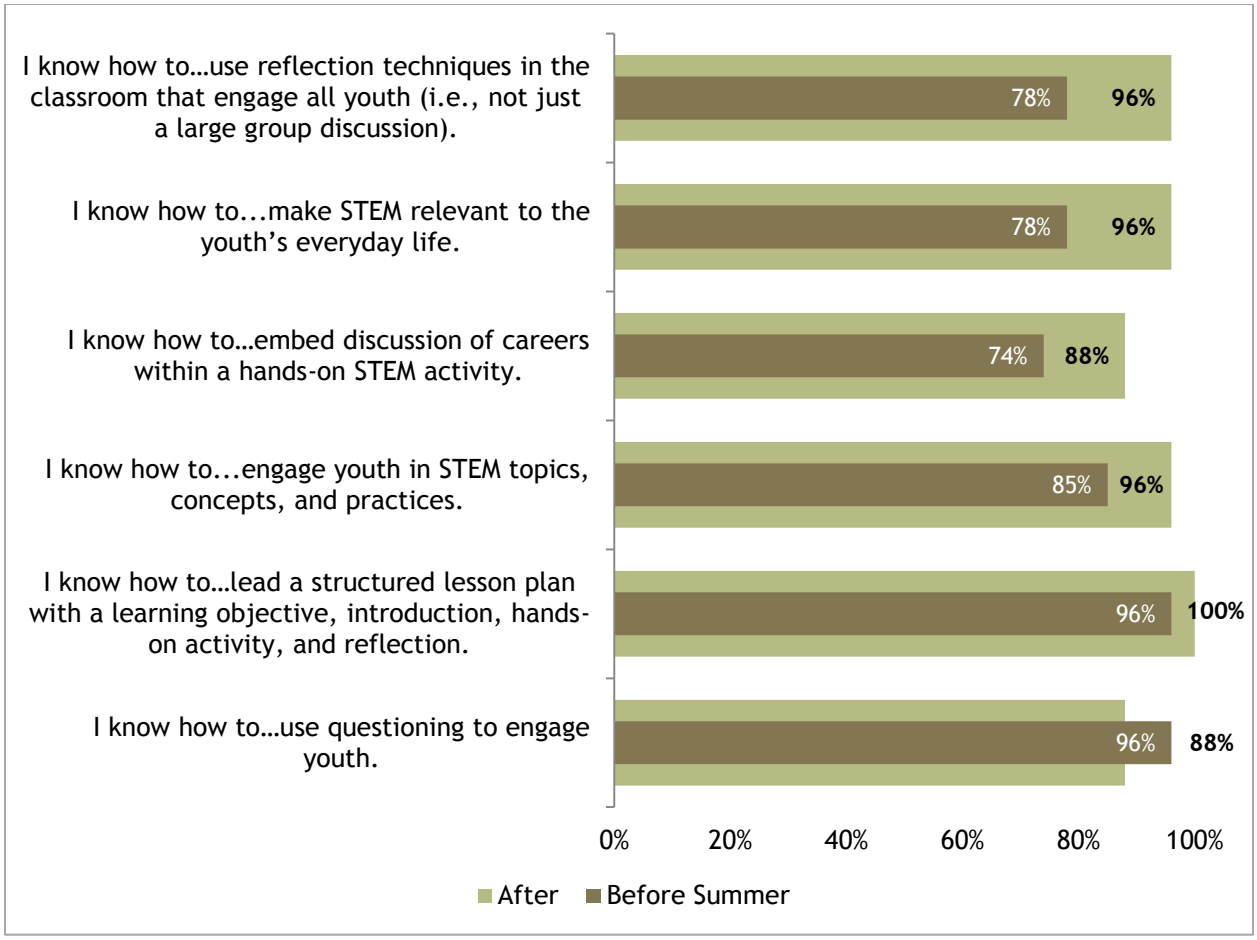
Figure 2: Staff Confidence in Ability to Lead STEM Activities



Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

This increase in staff ability went beyond a general level of efficacy. Staff reported an increase in the **use of specific STEM teaching skills** including reflection techniques, making STEM relevant to youth's everyday life and embedding discussion of careers within an activity. The successful application of these techniques was reflected in the positive youth survey results discussed in the previous section. The only area for which there was no self-reported improvement was using questioning to engage youth, in which 96% agreed before summer and 88% after. When reviewing these self-reported gains it is important to keep in mind that 16 of the 27 respondents were returning staff, having already had some level of training in the previous year.

Figure 3: Staff Use of STEM Teaching Skills



Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Though their knowledge was high at the beginning of the program staff experienced increased **confidence leading topic specific activities**. Self-reported ability to lead activities in energy and electricity, environmental impacts of energy use, and energy conservation increased from 89% agreement to 100% agreement and for source of renewable and nonrenewable energy increased from 89% to 96%. The large proportion of staff returning to the summer STEM programs for a second year, along with the substantial amount of pre-summer training, likely positively influenced the "Before Summer" ratings.

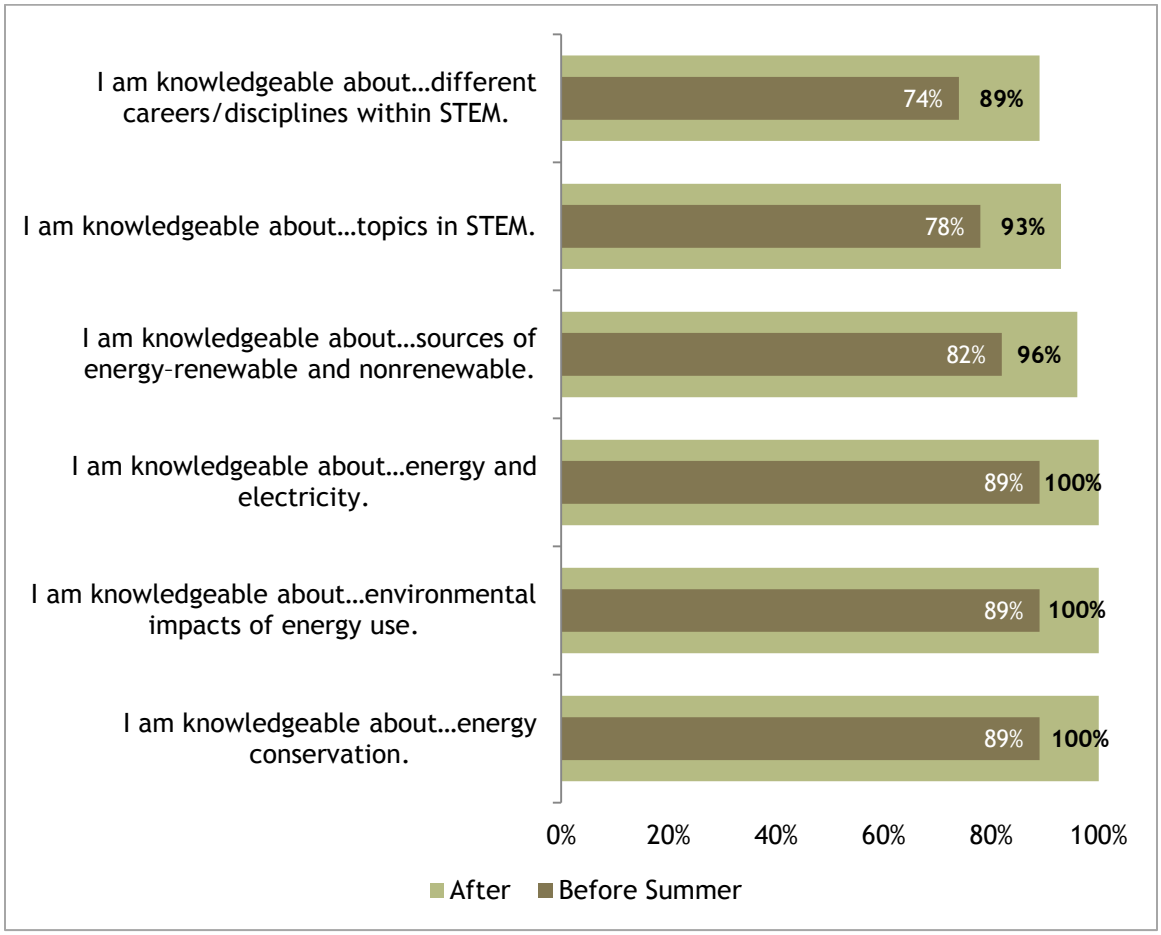
Table 7: Staff Confidence Leading Specific STEM Topic Activities

Staff Survey Questions	Before Summer	After	Percentage point change
I am confident in my ability to lead science activities in…energy and electricity.	89%	100%	+11
I am confident in my ability to lead science activities in…environmental impacts of energy use.	89%	100%	+11
I am confident in my ability to lead science activities in…energy conservation.	89%	100%	+11
I am confident in my ability to lead science activities in…sources of energy-renewable and nonrenewable.	89%	96%	+7

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Staff reported that their knowledge regarding specific STEM careers improved over the summer. Staff knowledge about different STEM careers increased from 74% to 89%. This likely affected the 83% of youth who said they knew what scientists do as cited in the previous section.

Figure 4: Staff Knowledge of STEM Curriculum Topics

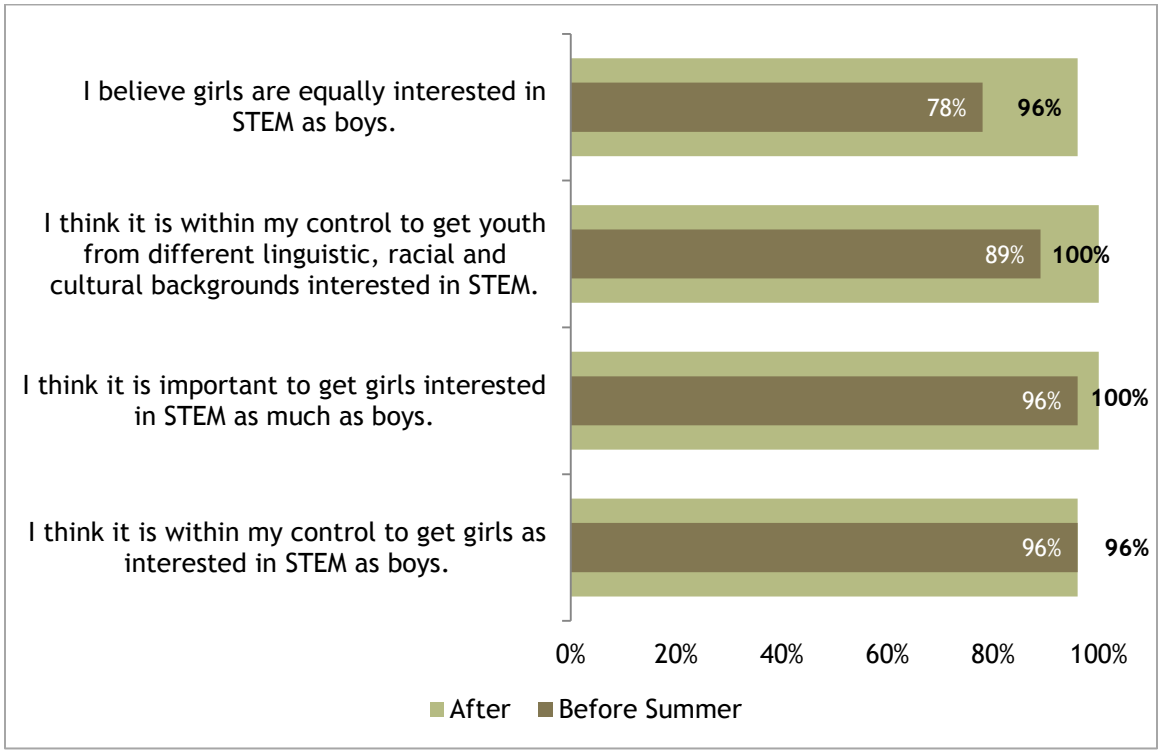


Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

One of the more intriguing findings was the change in staff perceptions regarding **girls' interest in STEM activities** as compared to boys. Before the summer began, 78% agreed that girls are equally interested in STEM as boys and by the end of the summer agreement with that statement increased to 96%. Youth survey results back up the observations of staff with girls indicating equal or greater interest than boys in STEM (see Appendix B).

During the summer staff learned that girls are as interested in STEM activities as boys.

Figure 5: Staff Opinion Regarding Diversity and Gender Equality in STEM Learning



Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Overall, staff members were extremely satisfied with the **quality of STEM summer program training** and its impact on their teaching skills. They reported that the activities and strategies they learned had a positive impact on the youth participants.

Table 8: Impact of STEM Training on Teaching Skills

Staff Survey Questions	Total
I learned strategies to increase youths' confidence in STEM.	91%
I implemented activities that increased youths' interest in STEM.	91%
I implemented activities that increased youths' confidence in STEM.	88%
I feel more confident leading STEM activities in summer.	88%
I learned strategies to increase youths' interest in STEM.	84%
I feel more confident leading STEM activities in afterschool.	81%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 33, April and September 2013

Staff reported that the training topics were relevant, facilitators were knowledgeable and responded to questions and the sessions were well organized. Respondents were somewhat less likely to agree that the topics were applicable to their after school program, however.

Table 9: Quality of STEM Training

Staff Survey Questions	Total
Facilitators were knowledgeable of the topics presented during sessions.	94%
The Summer Science Pilot Trainings were well organized.	94%
Facilitators presented relevant topics applicable to my summer program.	91%
Facilitators were responsive to questions asked/follow ups needed.	88%
I am satisfied with the Summer Science Pilot Trainings.	88%
Facilitators presented relevant topics applicable to my after school program.	79%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 33, April and September 2013

Develop a replicable and sustainable system of technical assistance for summer STEM programs in other communities in California.

In year two of the Summer Science Project, PCY and Techbridge made a unified effort to align the goals of the Summer Matters Campaign and the STEM components when providing technical assistance (TA) to partner communities. Deeper intentionality, more advance planning and coordination of TA resulted in smoother project logistics and implementation by all partner agencies. As a result, the communities gained a better understanding of what a quality summer STEM program looks like with regard to program operations and point of service delivery.

To create a more replicable and sustainable Summer Science model, a few core elements of the training and coaching were modified from the previous year to include:

- Implementation of a year-round comprehensive project calendar.
- Establishment of summer program quality teams at the district, site, and organizational level to include 2-4 key stakeholders involved in the planning, implementation, and assessment of the summer science project. Team members may have included a Site Administrator, After School Staff, Program Partner, Academic Liaison, and/or department head.
- Earlier launch of summer planning and project kick-off meetings.
- More clearly defined roles and training requirements for line staff, coordinators, and STEM Coaches including role descriptions and key responsibilities.
- Increased time during line staff trainings for participants to practice and receive feedback from their peers and trainers on their ability to lead STEM activities.
- Incorporating curriculum specific suggestions for how to adapt activities for different age groups.
- Transferring coaching duties fully to communities with onsite teachers providing all site-based STEM coaching.
- Altering the line staff training structure (4 half days as opposed to 2 full days) which led to a more focused and engaged training cohort.
- Providing more guidance to communities around creating a management system for all STEM activity supplies.

These strategies were critically important to the success of the Summer Science Project and resulted in documented changes in staff confidence in, and ability to, plan, support, and teach high-quality summer STEM programming. Partner communities named program support as the top integral component leading to the success of program planning and delivery. As referenced in community reports, the TA received was "comprehensive and specifically tailored to meet our needs." Furthermore, "many resources were provided to help enhance our understanding of program quality." "These tools helped us to build more effective programming in summer and inadvertently year-round." In addition, communities' listed "consistent and reliable face-to-face time," during summer quality team meetings with PCY, as having the greatest impact for district administrators, lead agency directors and managers, and summer coordinators. As result of these and previous findings, we will continue to include these core elements into any recommended systems for statewide TA on STEM and future project years.

Based on the success of integrating overall quality and STEM support, PCY and Techbridge are continuing to look for innovative ways and strategies to support the advancement and progress of partner communities. In summer 2014, we hope to explore specific strategies to gradually release TA support to partner communities. This phased support will allow communities to progressively build their capacity to facilitate their own continuous improvement efforts for

summer and STEM. As such, PCY, Techbridge, and partner communities will be sharing facilitation of improvement processes, including, but not limited to, side-by-side training, assessment, and the selection of STEM curricula to improve program operations and point of service delivery.

Define how this system integrates with California's developing STEM in OST initiatives.

PCY has continued its support and TA to the Power of Discovery: STEM² statewide initiative by serving as an active member of the California Afterschool Network (CAN) STEM Committee and Regional Innovation Support Provider (RISP) Community of Practice group. In these roles, PCY shared best practices, offered guidance and thought partnership to initiative leaders, evaluators, and providers. Additionally, the Summer Science project joined forces with the Power of Discovery to share evaluation outcomes, measurements, and results in order to strengthen documentation and impact of STEM in OST programming in summer and after school. In the future, both initiatives plan to continue efforts to partner and advance systems to support summer and STEM programming in out-of-school time. Areas of particular interest for collaboration include policy and advocacy, technical assistance, and evaluation.

Prepare Bay Area summer programs as showcases for high quality STEM education.

The Summer Science communities were highlighted this summer through media, reports, and site visits from our funding partners and an array of other stakeholders interested in summer learning and STEM Education (e.g., representatives from Oakland Fund for Children and Youth and San Francisco's Department for Children, Youth, and their Families). This year, the project effectively modeled the value of STEM learning by showcasing how STEM in summer can be an effective way to explore program practices and quality with a clear structure and process. The experiences from this summer reinforced the notion that "if you can find a way to do STEM well in summer (e.g. 4 weeks of program), than you can find a way to do any content well." Essentially, the project has continued to develop and highlight that STEM is a content area that creates and fosters an environment of exploration, attention to detail, and collaboration, and much more. These are all key factors of positive youth development which translates into strong programming summer and after school. Summer Science is one example of solid opportunities for youth and staff to thrive and learn. In summer 2013, the project showcased key learning experiences that included, but were not limited to, the following:

- STEM is a "testing ground" to affirm/strengthen youth development practices by providing a solid foundation where youth can explore, build skills, and collaborate. The depth and variation of these practices among the summer project sites led to further customization of site-based training and coaching. As a result, future partnership and development of TA to meet the needs and capacity of sites will continue to be a key area for all improvement efforts.
- STEM learning in OST is a byproduct of positive risk-taking. "Failure is feedback." Summer learning fosters safe and supportive environments where risk is welcomed and celebrated. Utilizing the same curriculum from year one to year two, allowed youth and staff to celebrate risk and find mastery of previous experiments and projects. During a MDUSD CASP visit, a PCY observer documented the level of youth engagement where participants in the STEM activity were remarking on the inability to get the class experiment to work by stating "being a scientist is hard (Student A)." "That's what a scientist does, they fail! So, you have to just keep trying; it's okay to get help (Student B)."

- Gender-neutral learning environments can be impactful for summer STEM. Whether programs decide to offer gender specific or cross-gender STEM programming, the Summer Science project showcased how gender equity may play a role in implementing cooperative learning strategies in a STEM learning environment. For example, sites that intentionally rotated tables, leaders, or assign jobs for groups and paid closer attention to youth engagement by gender often experienced an increase or sustainment of engagement across genders.
- "I am a scientist." Imagination is critical. The unique culture of summer programming drew direct connection to STEM learning at sites across the project. One OUSD project site hosted a "super-hero scientist day" in honor of summer fun and STEM. This event included an all summer assembly where youth were given the opportunity to exhibit their self-created costumes and draw connections to real-life scientist and heroes, including themselves, who have impact on the environment and renewable resources.

Appendices

Appendix A: Data Sources

1. Youth Post-Test Survey

The youth post-test measures the extent to which participants report increased interest and engagement with science learning as a result of program participation. The youth post-test was administered during the final week of programming. A total of 584 youth completed the survey. However, for one site (Sobrante Park in Oakland) all youth answered "yes" to all survey items. This is a highly unusual set of results. Due to concerns that the survey was not administered independently and in a manner similar to the rest of the sites, this site's data (n=60) was removed from all but the site specific results included in Appendix D.

2. Staff Pre-Post Survey

The staff pre-post survey measures assessed change in self-efficacy in leading informal science activities. The survey also measures self-reported confidence and knowledge of the topic areas covered in the Techbridge-led trainings held in Spring 2013. The pre-test was administered during the training sessions; the post-test was fielded at the end of the summer. Twenty-seven staff completed both a pre and post-test and are included in the results showing change between these two assessments. Post-test items regarding feedback on the training sessions included all 33 staff who completed a post-test.

3. Comprehensive Assessment of Summer Programs (CASP)

The CASP is developed by the National Summer Learning Association. Staff members in each community are trained on its use. PCY utilizes the CASP before, during, and after the summer with the purpose to support a continuous improvement cycle in the program. Detailed, actionable feedback is the cornerstone of the CASP. The CASP features a set of protocols and tools designed to: collect information related to research-based indicators of summer program quality; provide feedback on program strengths; and make recommendations for continuous improvement. A complete CASP assessment consists of a review of program documents, a full day of observation and interviews or surveys with program leaders and frontline staff.

Appendix B: Youth Survey Results by Gender

		Total	Male	Female
	Youth Survey Questions	**n=524**	**n=235**	**n=267**
Youths' interest in STEM	The summer science program made science more fun.	**91%**	91%	91%
	The summer science program made science more interesting.	**88%**	86%	89%
	I enjoy learning science in school.	**84%**	84%	83%
	The summer science program made me want to learn more about science.	**83%**	82%	85%
	The summer science program made me want to play more with science toys	**82%**	86%	80%
	The summer science program made me more excited to do science activities.	**81%**	81%	83%
	The summer science program made me more excited to learn about science in school.	**80%**	79%	82%
Youths' confidence in ability to engage in STEM learning activities	Science makes me think.	**84%**	83%	85%
	I am good at science.	**73%**	73%	73%
	Science is easy.	**63%**	64%	63%
Youths' knowledge and skills in STEM topics	The summer science program taught me new things.	**93%**	91%	95%
	The summer science activities taught me things that matter to me.	**86%**	87%	85%
	The summer science program taught me things that I shared with my family.	**82%**	79%	83%
	I do science activities when I am not in my summer science program.	**48%**	50%	47%
Youths' interest in/knowledge of STEM as a profession	I know what scientists do.	**81%**	83%	80%
	The summer science program made me want a science job when I am older.	**51%**	56%	48%
Youths' opinions of program quality	The summer science program had fun science activities.	**95%**	94%	97%
	The summer science program had nice instructors.	**91%**	91%	94%

Appendix C: Youth Survey Results by Community

		TOTAL	Franklin-McKinley	Mt. Diablo	Oakland
	Youth Survey Questions	n=524	n=60	n=252	n=212
Youths' *interest* in STEM	The summer science program made science more fun.	**91%**	95%	90%	90%
	The summer science program made science more interesting.	**88%**	90%	86%	89%
	I enjoy learning science in school.	**84%**	95%	74%	92%
	The summer science program made me want to learn more about science.	**83%**	93%	80%	82%
	The summer science program made me want to play more with science toys	**82%**	87%	76%	90%
	The summer science program made me more excited to do science activities.	**81%**	87%	78%	83%
	The summer science program made me more excited to learn about science in school.	**80%**	83%	73%	88%
Youths' *confidence* in ability to engage in STEM learning activities	Science makes me think.	**84%**	82%	83%	87%
	I am good at science.	**73%**	68%	66%	83%
	Science is easy.	**63%**	68%	53%	74%
Youths' *knowledge* and *skills* in STEM topics	The summer science program taught me new things.	**93%**	95%	93%	93%
	The summer science activities taught me things that matter to me.	**86%**	82%	86%	86%
	The summer science program taught me things that I shared with my family.	**82%**	85%	74%	89%
	I do science activities when I am not in my summer science program.	**48%**	55%	31%	65%
Youths' interest in/knowledge of *STEM as a profession*	I know what scientists do.	**81%**	90%	75%	85%
	The summer science program made me want a science job when I am older.	**51%**	52%	34%	71%
Youths' opinions of *program quality*	The summer science program had fun science activities.	**95%**	93%	95%	95%
	The summer science program had nice instructors.	**91%**	93%	91%	91%

Appendix D: Youth Survey Results by Community, Site and Gender

FRANKLIN-MCKINLEY SCHOOL DISTRICT, SAN JOSE		Kennedy	
		Male	Female
	Youth Survey Questions	n=30	n=30
Youths' *interest* in STEM	The summer science program made science more fun.	90%	100%
	The summer science program made science more interesting.	83%	97%
	I enjoy learning science in school.	90%	100%
	The summer science program made me want to learn more about science.	83%	90%
	The summer science program made me want to play more with science toys	93%	93%
	The summer science program made me more excited to do science activities.	80%	93%
	The summer science program made me more excited to learn about science in school.	77%	90%
Youths' *confidence* in ability to engage in STEM learning activities	Science makes me think.	83%	80%
	I am good at science.	67%	70%
	Science is easy.	63%	73%
Youths' *knowledge* and *skills* in STEM topics	The summer science program taught me new things.	93%	97%
	The summer science activities taught me things that matter to me.	77%	87%
	The summer science program taught me things that I shared with my family.	80%	90%
	I do science activities when I am not in my summer science program.	57%	53%
Youths' interest in/knowledge of *STEM as a profession*	I know what scientists do.	87%	93%
	The summer science program made me want a science job when I am older.	53%	50%
Youths' opinions of *program quality*	The summer science program had fun science activities.	87%	100%
	The summer science program had nice instructors.	89%	97%

MT. DIABLO UNIFIED SCHOOL DISTRICT		Cambridge		Delta View		El Monte		Fair Oaks		Ygnacio Vly	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Youth Survey Questions		n=23	n=41	n=21	n=28	n=10	n=22	n=24	n=30	n=26	n=21
Youths' *interest* in STEM	The summer science program made me want to learn more about science.	83%	83%	71%	79%	90%	77%	67%	77%	62%	81%
	The summer science program made me more excited to learn about science in school.	87%	78%	67%	68%	60%	73%	62%	77%	68%	86%
	The summer science program made science more fun.	83%	90%	95%	93%	90%	82%	83%	97%	96%	90%
	The summer science program made me more excited to do science activities.	83%	80%	76%	86%	70%	73%	67%	72%	84%	90%
	The summer science program made science more interesting.	87%	88%	76%	86%	80%	77%	83%	83%	88%	100%
	I enjoy learning science in school.	78%	71%	76%	68%	50%	68%	71%	80%	81%	86%
	The summer science program made me want to play more with science toys	91%	83%	100%	89%	80%	76%	67%	67%	77%	71%
Youths' *confidence* in ability to engage in STEM learning activities	I am good at science.	64%	63%	76%	71%	80%	77%	62%	70%	50%	52%
	Science makes me think.	87%	98%	76%	93%	80%	77%	83%	70%	69%	76%
	Science is easy.	43%	44%	52%	71%	80%	59%	46%	50%	58%	48%

MT. DIABLO UNIFIED SCHOOL DISTRICT		Cambridge		Delta View		El Monte		Fair Oaks		Ygnacio Vly	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Youth Survey Questions		n=23	n=41	n=21	n=28	n=10	n=22	n=24	n=30	n=26	n=21
Youths' *knowledge* and *skills* in STEM topics	The summer science program taught me things that I shared with my family.	70%	68%	86%	75%	80%	68%	54%	80%	81%	86%
	The summer science activities taught me things that matter to me.	96%	93%	90%	86%	80%	77%	91%	70%	81%	90%
	I do science activities when I am not in my summer science program.	22%	29%	57%	46%	20%	50%	17%	18%	28%	30%
	The summer science program taught me new things.	91%	93%	95%	96%	80%	100%	92%	90%	88%	100%
Youths' interest in/knowledge of *STEM as a profession*	The summer science program made me want a science job when I am older.	35%	37%	33%	54%	50%	36%	25%	28%	31%	29%
	I know what scientists do.	96%	76%	95%	86%	70%	90%	75%	57%	50%	62%
Youths' opinions of *program quality*	The summer science program had nice instructors.	100%	98%	95%	96%	80%	91%	83%	83%	85%	95%
	The summer science program had fun science activities.	91%	95%	100%	100%	100%	100%	83%	90%	100%	100%

OAKLAND UNIFIED SCHOOL DISTRICT		Allendale		E. Oakland Pride		Fruitvale		Global		Sobrante Park	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Youth Survey Questions		n=30	n=30	n=22	n=20	n=18	n=23	n=31	n=22	n=25	n=35
Youths' *interest* in STEM	The summer science program made science more fun.	97%	93%	95%	80%	82%	83%	97%	91%	100%	100%
	The summer science program made science more interesting.	90%	93%	91%	90%	89%	86%	90%	91%	100%	100%
	I enjoy learning science in school.	97%	93%	91%	90%	89%	91%	94%	95%	100%	100%
	The summer science program made me want to learn more about science.	87%	97%	95%	85%	89%	83%	94%	95%	100%	100%
	The summer science program made me want to play more with science toys	86%	86%	86%	80%	71%	61%	97%	86%	100%	100%
	The summer science program made me more excited to do science activities.	93%	87%	82%	85%	78%	83%	84%	82%	100%	100%
	The summer science program made me more excited to learn about science in school.	87%	90%	86%	85%	83%	83%	97%	100%	100%	100%
Youths' *confidence* in ability to engage in STEM learning activities	Science makes me think.	87%	97%	82%	70%	71%	87%	100%	95%	100%	100%
	I am good at science.	93%	90%	86%	90%	76%	64%	81%	86%	100%	100%
	Science is easy.	80%	69%	86%	85%	39%	70%	87%	73%	100%	100%

OAKLAND UNIFIED SCHOOL DISTRICT		Allendale		E. Oakland Pride		Fruitvale		Global		Sobrante Park	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Youth Survey Questions		n=30	n=30	n=22	n=20	n=18	n=23	n=31	n=22	n=25	n=35
Youths' *knowledge* and *skills* in STEM topics	The summer science program taught me new things.	100%	97%	86%	100%	82%	91%	94%	86%	100%	100%
	The summer science activities taught me things that matter to me.	90%	100%	91%	75%	100%	78%	81%	82%	100%	100%
	The summer science program taught me things that I shared with my family.	93%	97%	86%	100%	76%	91%	84%	86%	100%	100%
	I do science activities when I am not in my summer science program.	87%	90%	82%	60%	28%	43%	70%	55%	100%	100%
Youths' interest in/knowledge of *STEM as a*	I know what scientists do.	97%	100%	82%	80%	76%	70%	94%	81%	100%	100%
	The summer science program made me want a science job when I am older.	87%	73%	82%	70%	72%	45%	77%	64%	100%	100%
Youths' opinions of *program quality*	The summer science program had fun science activities.	100%	100%	95%	100%	94%	87%	97%	95%	100%	100%
	The summer science program had nice instructors.	97%	100%	91%	85%	89%	91%	97%	100%	100%	100%

Reported for proportion of youth responding "yes" to each of the questions listed above.
Source: Summer Science Pilot Youth Survey, July 2013.

Appendix E: Staff Survey Results by Community

Table 10: Belief in the Benefit/Importance of Summer STEM

	OVERALL (n=27)		Mt. Diablo (n=10)		Oakland (n=9)		San Jose (n=8)	
Staff Survey Questions	Before Summer	After	Before Summer	After	Before Summer	After	Before Summer	After
Summer STEM activities impact the interest of children and youth in school-year STEM activities.	**96%**	**96%**	100%	100%	89%	89%	100%	100%
The inadequacy of the STEM background of children and youth can be overcome by leading good summer STEM activities.	**89%**	**89%**	100%	90%	78%	78%	88%	100%
Summer STEM activities impact the school-year performance of children and youth in STEM.	**96%**	**93%**	100%	100%	89%	78%	100%	100%
It is important to show children and youth the possibility of having a career in a STEM-related field.	**100%**	**96%**	100%	90%	100%	100%	100%	100%
It is important to help show children and youth that STEM is related to the world around them.	**100%**	**96%**	100%	90%	100%	100%	100%	100%
Increased effort in leading summer STEM activities produces little change in the STEM achievement of children and youth.*	**48%**	**67%**	60%	80%	11%	67%	75%	50%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
*This item is negatively stated so the desired outcome is for agreement with this item to decrease.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Table 11: Confidence in Ability to Lead STEM Activities

	OVERALL (n=27)		Mt. Diablo (n=10)		Oakland (n=9)		San Jose (n=8)	
Staff Survey Questions	Before Summer	After	Before Summer	After	Before Summer	After	Before Summer	After
I generally lead summer STEM activities effectively.	**54%**	**96%**	60%	100%	56%	89%	43%	100%
I know the steps necessary to teach STEM concepts effectively.	**70%**	**93%**	90%	90%	56%	89%	63%	100%
I am continually finding better ways to lead STEM activities.	**74%**	**96%**	80%	90%	67%	100%	75%	100%
I do not find it difficult to explain to children and youth why STEM experiments work.	**67%**	**89%**	90%	100%	33%	78%	75%	88%
I am typically able to answer the STEM questions of children and youth in my program.	**74%**	**92%**	90%	100%	67%	88%	63%	88%
I know what to do to get youth interested in STEM.	**82%**	**100%**	100%	100%	56%	100%	88%	100%
I understand STEM concepts well enough to be effective in leading summer STEM activities.	**82%**	**96%**	90%	100%	67%	89%	88%	100%
When I try very hard, I lead STEM activities as well as I lead most other activities.	**81%**	**93%**	70%	100%	75%	89%	100%	88%
I am very effective in monitoring STEM activities.	**78%**	**85%**	90%	90%	78%	75%	63%	88%
When leading a summer STEM activity, I usually welcome questions from children and youth.	**96%**	**100%**	100%	100%	100%	100%	88%	100%
When children and youth have difficulty understanding a STEM concept, I am usually able to help them understand it better.	**96%**	**96%**	100%	100%	89%	89%	100%	100%
Given a choice, I would invite the site coordinator to evaluate my leading of STEM activities.	**88%**	**82%**	89%	90%	78%	67%	100%	88%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Table 12: Use of Specific STEM Teaching Skills

	OVERALL (n=27)		Mt. Diablo (n=10)		Oakland (n=9)		San Jose (n=8)	
Staff Survey Questions	Before Summer	After	Before Summer	After	Before Summer	After	Before Summer	After
I know how to…use reflection techniques in the classroom that engage all youth (i.e., not just a large group discussion).	**78%**	**96%**	90%	100%	89%	89%	50%	100%
I know how to...make STEM relevant to the youth's everyday life.	**78%**	**96%**	90%	100%	67%	89%	75%	100%
I know how to…embed discussion of careers within a hands-on STEM activity.	**74%**	**88%**	90%	100%	56%	78%	75%	86%
I know how to...engage youth in STEM topics, concepts, and practices.	**85%**	**96%**	100%	100%	67%	89%	88%	100%
I know how to…lead a structured lesson plan with a learning objective, introduction, hands-on activity, and reflection.	**96%**	**100%**	100%	100%	89%	100%	100%	100%
I know how to…use questioning to engage youth.	**96%**	**88%**	100%	100%	89%	67%	100%	100%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Table 13: Knowledge of STEM - Topic Specific

	OVERALL (n=27)		Mt. Diablo (n=10)		Oakland (n=9)		San Jose (n=8)	
Staff Survey Questions	Before Summer	After	Before Summer	After	Before Summer	After	Before Summer	After
I am knowledgeable about…different careers/disciplines within STEM.	**74%**	**89%**	80%	100%	44%	78%	100%	88%
I am knowledgeable about…topics in STEM.	**78%**	**93%**	90%	100%	44%	89%	100%	88%
I am knowledgeable about…sources of energy–renewable and nonrenewable.	**82%**	**96%**	100%	100%	78%	89%	63%	100%
I am knowledgeable about…energy and electricity.	**89%**	**100%**	100%	100%	89%	100%	75%	100%
I am knowledgeable about…environmental impacts of energy use.	**89%**	**100%**	100%	100%	78%	100%	88%	100%
I am knowledgeable about…energy conservation.	**89%**	**100%**	100%	100%	78%	100%	88%	100%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Table 14: Confidence Leading STEM - Topic Specific

	OVERALL (n=27)		Mt. Diablo (n=10)		Oakland (n=9)		San Jose (n=8)	
Staff Survey Questions	Before Summer	After	Before Summer	After	Before Summer	After	Before Summer	After
I am confident in my ability to lead science activities in…energy and electricity.	**89%**	**100%**	100%	100%	89%	75%	100%	100%
I am confident in my ability to lead science activities in…environmental impacts of energy use.	**89%**	**100%**	100%	100%	78%	100%	88%	100%
I am confident in my ability to lead science activities in…energy conservation.	**89%**	**100%**	100%	100%	78%	100%	88%	100%
I am confident in my ability to lead science activities in…sources of energy-renewable and nonrenewable.	**89%**	**96%**	100%	100%	89%	89%	75%	100%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Table 15: Diversity & Gender Equality in STEM Learning

	OVERALL (n=27)		Mt. Diablo (n=10)		Oakland (n=9)		San Jose (n=8)	
Staff Survey Questions	Before Summer	After	Before Summer	After	Before Summer	After	Before Summer	After
I believe girls are equally interested in STEM as boys.	**78%**	**96%**	100%	100%	44%	89%	88%	100%
I think it is within my control to get youth from different linguistic, racial and cultural backgrounds interested in STEM.	**89%**	**100%**	90%	100%	78%	100%	100%	100%
I think it is important to get girls interested in STEM as much as boys.	**96%**	**100%**	100%	100%	89%	100%	100%	100%
I think it is within my control to get girls as interested in STEM as boys.	**96%**	**96%**	100%	100%	89%	89%	100%	100%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 27, April and September 2013

Table 16: Impact of Training on Teaching Skills

Staff Survey Questions	OVERALL (n=33)	Mt. Diablo (n=13)	Oakland (n=12)	San Jose (n=8)
I learned strategies to increase youths' confidence in STEM.	**91%**	92%	83%	100%
I implemented activities that increased youths' interest in STEM.	**91%**	92%	92%	88%
I implemented activities that increased youths' confidence in STEM.	**88%**	92%	75%	100%
I feel more confident leading STEM activities in summer.	**88%**	85%	83%	100%
I learned strategies to increase youths' interest in STEM.	**84%**	77%	91%	88%
I feel more confident leading STEM activities in afterschool.	**81%**	75%	83%	88%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 33, April and September 2013

Table 17: Quality of Trainings

Staff Survey Question	OVERALL (n=33)	Mt. Diablo (n=13)	Oakland (n=12)	San Jose (n=8)
Facilitators were knowledgeable of the topics presented during sessions.	**94%**	100%	92%	88%
The Summer Science Pilot Trainings were well organized.	**94%**	85%	100%	100%
Facilitators presented relevant topics applicable to my summer program.	**91%**	92%	83%	100%
Facilitators were responsive to questions asked/follow ups needed.	**88%**	69%	100%	100%
I am satisfied with the Summer Science Pilot Trainings.	**88%**	92%	92%	75%
Facilitators presented relevant topics applicable to my afterschool program.	**79%**	85%	83%	62%

Proportion of staff responding "Strongly Agree" or "Agree" with items.
Source: Summer Science Staff Survey, n = 33, April and September 2013