5-2014

What do Participants Think of their Experience at an ESF Summer Camp? An Analysis of ESF SCIENCE Participant Surveys from 2006-2013

Isabella M. Garramone

What do Participants Think of their Experience at an ESF Summer Camp? An Analysis of ESF SCIENCE Participant Surveys from 2006-2013

by

Isabella M. Garramone
Candidate for Bachelor of Science
Environmental and Forest Biology
With Honors

May 2014

APPROVED

Thesis Project Advisor: _____

Elizabeth Folta

Second Reader: _____

Brandon Murphy

Honors Director: _____

William M. Shields, Ph.D.

Date: _____

Abstract

SUNY-ESF (State University of New York college of Environmental Science and Forestry) has many outreach programs, including ESF SCIENCE (Summer Camps Investigating Ecology in Neighborhood and City Environments). SCIENCE is a camp with ESF students as instructors that exposes middle- to high- school age participants to urban environmental science. In order to provide immediate feedback about the camps, an end-of-camp survey was created and has been administered to SCIENCE participants since 2006. Approximately 741 surveys from 2006 to 2013 were analyzed and categorized according to emergent themes. Answers that contained parts of multiple categories were counted in each of those categories, and percent responses per category were averaged over all 8 years. The overwhelming majority of responses were about activities that included a food component. Overall, 92% said they would recommend this camp to a friend; 62% of these said they would recommend it because it was fun or "cool," and an additional 25% would because the camp is educational. The results of this survey can help the ESF SCIENCE program in the future by providing baseline data that instructors can reference for methods to alter their programs. Additionally, it can help to show potential funders that the camp is successful in approaching informal science education in a way that is educational as well as fun for all participants and instructors. A more effective survey for obtaining specific data, as well as more information on non food-based activities and lessons, could include utilizing more specific questions, multiple choice questions and a Likert rating scale.

Table of Contents

List of Figures

List of Tables

Acknowledgments

I would like to thank Elizabeth Folta, for her advice and assistance with this paper, as well as for planting the idea for me to do an honors thesis in the first place. In addition, she has answered too many questions to count and provided me with many helpful resources.

I would also like to thank Brandon Murphy, ESF SCIENCE supervisor, for creating and supporting the team of SCIENCE instructors in which I was a member in a very successful and fun summer, in addition to providing me with the resources and ideas to further flesh out and enhance the quality of this thesis.

Furthermore, I would like to thank Cathleen Anthony, for providing me with her survey categories and data from 2013 for comparison and an inter-rater reliability test. Last but not least, I would like to acknowledge the team of SCIENCE instructors I worked with. They assisted in creating a wonderful and unforgettable experience and helped me gather the data for this project.

Introduction

A famous quote by Baba Dioum, an environmentalist and one of the founding members of the executive committee for the International Union for the Conservation of Nature (IUCN) reads: "In the end, we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught" (Barnes, 2007, para. 1). Therefore, in a world of growing environmental concerns, increasing the environmental awareness and literacy of the public is imperative.

Environmental Education & Interpretation

Teachers and environmentalists alike are responding to this call, slowly incorporating learning standards and lessons with environmental themes into schools in the United States. Environmental education is usually a sequential process and associated with formal institutions. In environmental education, subsequent experiences and lessons build upon previously learned foundational materials. "Environmental Education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution" (Stapp, 1969). The concept that the primary outcome of environmental education is increasing environmental awareness and literacy has been echoed many times since, as agencies and legislation have further attempted to define the term.

On the other hand, environmental interpretation is more informal, and is focused on connecting its audience with a resource. The audience is voluntary and it occurs mostly in recreational settings such as parks and nature centers, zoos, aquaria, and even botanical gardens and historical/cultural sites. Interpretive experiences tend to be shorter,

spanning anywhere from a few minutes to half a day, while environmental education experiences tend to last from a few days to an entire school year (Knapp, 2007). Freeman Tilden, a historic naturalist, created six principles for a successful interpretation program in his 1957 book *Interpreting our Heritage* which is still used as a relevant source in the field today. In it, he calls interpretation "the process of revealing natural, cultural, and historical wonders" (Knapp, 2007, p.1). The National Association for Interpretation clarifies: "interpretation is a mission-based communication program that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource" (National Association for Interpretation, n.d.. para. 1).

However, environmental education and environmental interpretation are inextricably intertwined. Environmental education often includes multiple interpretive experiences to further their mission and reinforce their message (Knapp, 2007). Furthermore, they share similar techniques and approaches for creation, implementation, and evaluation of their programs and lessons, whether they are a weeklong series of courses or a short walking tour.

Moreover, it is equally important to reach out to adults and increase their environmental literacy. Reaching adults is more difficult and often takes a more informal role. Strategies for reaching out to adult learners are focused around informal learning centers such as zoos, aquaria, nature centers, gardens, and the like. These locations can use signs, tours, brochures, or other means to communicate their messages and themes.

Teaching children environmental awareness tends to be easier because of the infrastructure and supporting programs such as schools, summer programs, and

institutions with learning-based field trips. It has well been documented that exposing children and young adults to nature has many positive effects. A 2000 study on environmental education programs found that nature experiences increased participants' self-confidence and feelings of security. Furthermore, they were more willing to participate further in outdoor activities, and felt that nature had a personal meaning for them (Palmburg, 2000). Even just a twenty-minute walk through a park has been shown to significantly increase the concentration of children with ADHD (Attention Deficit Hyperactivity Disorder) as compared to a walk in an urban or neighborhood setting (Taylor & Kuo, 2009). Furthermore, exposing them to nature greatly increases the probability that they will take environmentally responsible actions in the future, as shown in figure 1 (Appendix A) (Dresner & Gill, 1994).

However, there are a few select things that can make programs more successful at reaching people and influencing their lives than others. Freeman Tilden's six principles of successful interpretation programs are as follows:

1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.
2. Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.
3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical, or architectural. Any art is in some degree touchable.

4. The chief aim of interpretation is not instruction, but provocation.
5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase.
6. Interpretation addressed to children should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. (Knapp, 2007, p.16-17)

Most of Freeman Tilden's principles for a successful interpretation program will be followed to some extent in any program. However, the method that all of these programs employ most readily is to relate what they are teaching to previous knowledge of the participants or to something that they have already experienced. Educators who design or choose programs strive to do this because it is more likely that participants will better remember this information for the long term. Additionally, it is more likely that a behavioral change as a result of this new knowledge will occur if a stimulus from daily life continually reminds them of what they learned. Even though these behavioral changes may be minute, multiplied over the millions of nature-based camp participants, they make an enormous difference.

Modern Environmental Education

Many organizations have developed to not only provide environmental education programs for children across North American and the world, but also to train environmental educators. They conduct research, standardize educational content, and create educator resources. Furthermore, the North American Association for Environmental Education (NAAEE) works on promoting environmental literacy and has

even received a National Science Foundation (NSF) grant for establishing standards on what makes a person environmentally literate.

Outdoor Recreation & Environmental Values

A recent concerted effort has been made to decrease the amount of time children spend indoors, and to counteract the effects of that sedentary lifestyle. In 2011, participation in outdoor recreation by youth (ages 6-24) increased by one percentage point (The Outdoor Foundation, 2012). In order to increase levels of outdoor enthusiasm and environmental stewardship, it is important to engage youth in the outdoors at the community level, and to foster a connection with nature at an early age (The Outdoor Foundation, 2012). Richard Louv's book, *Last Child in the Woods*, coined the term "Nature Deficit Disorder" for the separation of children from the outdoors and its resulting consequences – attention and mood disorders, obesity, and even myopia. Louv (2005) believes that unstructured time in the outdoors can lead to an increase in creativity and attention span, and a reduction in stress.

Environmental views and beliefs later in life are highly affected by early childhood exposure to environmental media, negative environmental effects, and outdoor experiences including participation in outdoor recreation (Ewert, 2005). In fact, youth who are not involved in outdoor recreation report that they are not interested in the outdoors (The Outdoor Foundation, 2012). Roy Barnes, a professor of biology, believes that children who are introduced to nature and have natural experiences will care and value biodiversity. He writes:

> If we are not introduced to the residents and components of the natural world at an early age, it becomes much more difficult to develop ecological literacy and a desire to preserve nature. If we fail to introduce our children to the other living organisms that share the Earth's ecosystems with us, they will neither know nor appreciate these creatures. If children have not met and do not know these species, it is not logical to think that they will magically discover such an appreciation in adulthood. (Barnes, 2007, para. 2)

Even if participants are enrolled in nature summer camps just as a means to get them out of the house over the summer, it still can have lasting affects in their feelings of connection to nature. A nature camp's most important impact on a child's life is to increase their familiarity with and connection to the environment. This plants the seed that can develop over the following years into environmental awareness and care for the environment, eventually resulting in environmentally responsible actions.

Program Evaluation in Environmental Education & Interpretation

Evaluation is an important and often overlooked part of environmental education and interpretation. It can serve many purposes such as determining educational impact, assessing cost-effectiveness, providing proof of achieving goals, or even to give the participants a role in shaping future programs. It is very useful for assessing the faults and strengths of a particular program in order to adjust it to best serve the intended audience (Knudson et al., 1995). According to the U.S. Forest Service, "without evaluation, we cannot understand what was accomplished, what could be improved and what we should do in the future" (United States Department of Agriculture Forest Service, n.d., para. 1). Even if the evaluation shows that a specific program is not reaching its goals and

objectives, it can illustrate exactly where it fell short and give insights on how to improve and reach the program's objectives (The Department of Environmental Conservation, 2011).

One of the most familiar ways of evaluation that everyone is familiar with are surveys. There are many different types of surveys – they can be online or on paper, with open ended questions, multiple choice questions, or questions with a type of rating scale attached. Some surveys are short, such as those obtaining data on visitor/participant demographics, whereas others can go more in-depth and take much time to fill out.

Evaluation methods also vary by usability, data collection and processing time, and data reliability (Stokking et al., 1999). For example, simple surveys are easy to create with a word processing computer. They can be easily distributed among program attendees or park visitors. Data collection and processing can be automatic with online surveys, but can be time-consuming in open-ended questions. However, it takes a lot of fine-tuning and an experienced social scientist to create surveys that obtains usable data for a specific research question.

No matter the evaluation design, evaluation is often the driving force behind program funding. The information gained from evaluating can show potential funders that a program is, in fact, increasing the knowledge of its participants and getting its message clearly across. Evaluation is a mechanism that provides information to continuously improve a program, making the most out of the time, effort, and money that has already been put into the creation and implementation of the program (The Department of Environmental Conservation, 2011).

What is the "ESF SCIENCE" program?

SUNY-ESF's outreach programs include the Environmental Challenge, a 7th and 8th grade science fair, and ESF in the High School, a program that allows high school students to take ESF classes for credit at their schools. Furthermore, the outreach office manages and schedules ESF summer courses. SCIENCE (Summer Camps Investigating Ecology in Neighborhood and City Environments), a summer science camp with ESF students as counselors, is one of the outreach department's programs. Its primary focus is on urban ecology and sustainability, but it also incorporates fun games and activities as well as conservation stewardship projects. It originally started in 2003 with funding from a National Science Foundation grant. The program exposes middle school-age participants to urban environmental problems and environmental problem solving, as well as the local green spaces in their communities in order to develop a sustained interest in science (ESF Outreach, n.d.).

Each year, ESF SCIENCE partners with local organizations such as the Syracuse City Parks and Recreation Services, the Syracuse City School District, the Spanish Action League, and Girls, Inc. These organizations handle all the arrangements for attracting and signing up participants, while the SCIENCE program conducts all the lessons and activities, and provides the materials for each lesson. SCIENCE instructors spend the first few weeks of summer creating lesson plans, planning schedules, and acquiring the materials needed for each lesson. The remaining weeks are spent running the camps. The number of weeks of camps depends on the partnering organizations, how many weeks of camp they each want, their funding, and ability to find participants for their camp week(s).

In 2007, the SCIENCE program team devised a six-question open-ended test on lesson content to measure how much the participants learn during their experiences. Participants took the same test at the beginning and end of their camp sessions. The questions were looking for definitions of different environmental-themed words, as well as lists of scientific concepts and applications. The post-test answers were on average 26.2% higher than those of the pre-test (table 1). Therefore, the participants are more knowledgeable as a direct result of the camps, although this test may not reflect the wide range of information learned across all participants.

I was part of a five-instructor SCIENCE team in the summer of 2012. Therefore, while the focus of this thesis is on the overall survey results from the years 2006 to 2013, personal reflections and additional documents are from 2012. A sample weekly schedule of activities and lessons, as well as the science concepts covered in each activity, is included in appendix A (table 2).

This study takes a broad view of the camp experience and how this data can be applied to SCIENCE programs in the future. The following research questions will be answered by analyzing survey responses.

- Which aspect of the camp experience is the participant's favorite, and why?
- Which activities are the favorite by all participants, and why?
- Which activities are the least favorite, and why?

Methodology

The Survey

The same survey on participant attitudes has been administered to SCIENCE program participants, unchanged except for the removal of one question, since 2006. The purpose of the survey was to provide immediate feedback about the current camps and some changes that can be made right away, as well as to provide long term data about what works and what does not in implementation the mission of the ESF SCIENCE program. A copy of the blank survey is included in Appendix B.

The survey questions are all open-ended, so the participants can choose to write in whatever answers they want. Therefore, the answers accrued from these questions are extremely variable. In addition, a survey was a good evaluative method for SCIENCE, as middle-school age children are already familiar with the format. Sometimes, however, the survey and other end-of-the-week papers to fill out may have surpassed the attention span of the students, skewing their results. Furthermore, the timing of when the surveys were distributed varies between years.

Surveys were given out to the participants on the last day of each camp week. The timing of the survey within the day and the amount of time given to complete the surveys varied from year to year, and even sometimes week to week. In 2012, based on the high number of survey responses referencing making liquid nitrogen ice cream in previous years, it was decided to distribute the surveys before that activity.

Categorization of Survey Responses

Survey question responses were analyzed by using the categorization technique of qualitative emerging themes. This approach, also called "inductive analysis", aims to reduce the data into specific themes or categories in order to clarify and simplify the results of the survey (Thomas 2006). The responses to each question were broken down into 7 to 15 categories depending on the type of question and the amount of variation in student answers. The categories were determined by perusing a few surveys from each year to find the most frequent types of responses.

The responses that contained parts of multiple categories were counted in each of those categories. For example, one of the answers for "What did you enjoy most about your experience this week?" was "Getting to hang out with the ESF students and learning new things". This answer was included in the educational/learning category, as well as the people/friends category. Additionally, the specific wording of the answer played a big role in where it was categorized. Many of the activities contained more than one topic, such as macroinvertebrate stream surveys. Students who wrote "going in the creek" as their favorite activity were accounted for choosing a water-based activity as their answer, but those who wrote something along the lines of "finding bugs in the stream" were counted as choosing both water- and an animal-based activity.

Answers were counted and categorized question by question, instead of year by year, in order to reduce the amount of variation in how small deviations in responses were categorized. However, the counts for each question remained separated yearly in order to preserve yearly fluctuations in answers.

One question, “What was the most important thing you learned about environments in our city?” was only included on the survey in 2006 and 2007. It appeared as question 2 in those surveys, and has been included here as question 2.1, to keep the rest of the questions as the same number across all years. Furthermore, questions 4, 5, and 6 included two components. An original question, and then a “Why?” asking the students to elaborate upon their answer. The answers to the original question and its following “Why?” were categorized separately.

Some categories of science topics were not included as categories because they did not show up enough in the survey responses, even though they were an integral part of weekly activities. For questions 4 and 5, which asked participants for their most and least favorite activity, it was decided that the categories “nothing” and “none” were fundamentally different from the category of “I don’t know”. These answers were kept separate because a participant who answers number 4 with “I don’t know” could either have liked multiple activities enough to not be able to choose between them, or could not think of any activities that stuck out to them in their mind enough to be called a favorite. Contrarily, a participant who answers “none” has decided that none of the activities were liked enough to be a favorite. The tables of categories for each question and descriptions of criteria for each category is in Appendix A, as tables 3-9.

Statistical Methods

The counts of responses per category were turned into percentages and averaged over the eight years. Because of the qualitative nature of open-ended survey questions and the high variability between curriculums over the years, inter-rater reliability was used to compare the similarities and differences between the categories I created and the

categories another person created with access to the same data. Inter-rater reliability is one of the methods used to measure the extent to which different raters would categorize the same data. Moreover, it can also expose individual biases in data analysis. A higher percent similarity between qualitative data obtained by different people means that the data is more reliable (Multon, 2010). I compared my data with the data of Cathleen Anthony, a colleague that analyzed the 2013 survey data for her own project; she was an ESF SCIENCE instructor that year.

Results

Question 1: What did you most enjoy about your experience this week?

As seen in figure 2, almost half of participants (47%) over all 8 years answered question 1 with a reference to a specific lesson. A further 19% responded with a reference to the liquid nitrogen ice cream lesson that was done at the end of every camp week. In addition to the activities, participants also evoked the educational (8.5%) and fun (8.9%) nature of the camp. Sample responses for these categories are listed below:

- "I enjoyed the various activities that we did such as looking for bugs in Elmwood creek and fishing." (Specific Lesson)
- "I had to put on the water shoes to go in the water to catch scuds, bugs, and spiders" (Specific Lesson)
- "I liked this week because I learned new things and I also learned how to make a compost bin." (Specific Lesson/Educational)
- "We got to build stuff and making ice cream" (Ice Cream)
- "Making the ice cream!! It was GREAT!!!!!" (Ice Cream)
- "I enjoyed a lot this week but my favorite was making ice cream. I learned a lot while having fun" (Ice Cream/Educational/Fun)
- "Meeting people and learning more about the environment to help it live better." (Educational)

- "The thing I enjoyed most this week was learning about water and how valuable it is. It taught me to be able to conserve water and not take it for granted. I had fun and learned some very important facts that I shared with others." (Educational/Fun)
- "All the learning about animals and where they live and how to save energy but also having fun with it" (Educational/Fun)
- "The most I enjoyed this week was the fun and memories I had and made." (Fun)

Question 2.1: What was the most important thing you learned about environments in our city?

The response rate for each category for question 2.1 can be seen in figure 3. Almost half the responses were split between information about animals (20.8%), and information about litter or keeping the environment clean (23.1%). An additional 14.7% provided a response about water quality, while 12.9% referenced pollution and 11.4% included information about plants. Sample responses for this question are listed below:

- "No matter where you are or how your environment is, you should always respect your environment and all the animals in it." (Animals)
- "That we should take care of our environment and the ESF program showed us how to do that and have fun." (Protect/Take care of it)
- "According to the food chain, every living thing has a prey and a predator. The animals eat each other and it is a part of life." (Animals)
- "The most important thing I learned was about the soil and pollutants getting mixed into the water, going into the waterways and polluting the water. We could solve that problem by having rain gardens." (Water Quality/Pollution)

Question 2: What did your instructors do that you really liked?

The response rate for each category for question 2 can be seen in figure 4. Many responses (21.6%) included information about the instructors teaching lessons or

answering questions. A further 20.5% of responses said they made the camp fun, while 14.4% liked that instructors played games with them, and 12.2% liked that the instructors made and gave them ice cream. Sample responses for this question are seen below:

- "They taught us how the species of the environment survive" (Taught)
- "They made us laugh and have fun while learning something new." (Fun)
- "My instructors were kind and made lessons fun. I liked how they connected with us and made sure that we learned and had a good time." (Fun)
- "My instructors were involved! They did all the games and activities with us, which made it more fun" (Played games/Fun)
- "They taught us many things… and made us ICE CREAM! THANK YOU SOOO MUCH!!!" (Taught/Ice Cream)

Question 3: What could the instructors work on or improve for the next group?

The response rate for each category for question 3 can be seen in figure 5. Most of the participants (57.4%) responded either there was nothing for the instructors to improve, or that they did not know what the instructors could improve upon. Around 12% of responses included information about improving a game or activity, and 7.4% of participants said that the instructors should make it more fun. Sample responses for this question are listed below:

- "Nothing – everything they did was fun and educational." (Nothing)
- "They don't need to improve anything – it was perfect! I'm coming back next year!" (Nothing)
- "More activities like running activities." (Activities)
- "Have more time for playing in the water and on playgrounds." (Activities)
- "Being a little more fun and active." (Fun)

Question 4: Which lesson was your favorite? Why?

The emergent themes with the highest percentages of responses for question 4 can be seen in figure 6. These were food-based activities (32.4%) and animal-based activities (32.1%). A further 16% listed a water activity as their favorite, and 6.8% wrote that they liked all the activities and lessons. Responses for why these activities were a favorite include because it was fun (29.8%) and because it was interesting or cool (28.8%). As can be seen in figure 7, another 21.1% listed the educational nature of the activity/lesson as why it was their favorite. Sample responses and their categories are listed below.

- "Solar cookers because I liked smores and solar power is AWESOME" (Food)
- "Ice cream. We got to see a new way that ice cream was made, like dippin'dots and taste it! Nitrogen rox my sox! River sampling – we got to get into the river and catch different animals. SOOOOO much fun! We caught a crayfish!" (Food/Water/Animal/Fun)
- "My favorite lesson was when we went fishing because it was my first time going and it also taught me something." (Animal/Educational)
- "Stream Ecology because it was fun and we got to get in the water and we saw and learned about creatures and insects in the water." (Water/Animal/Fun/Educational)
- "I liked them all because they were all fun." (Everything/Fun)

Question 5: Which lesson was your least favorite? Why?

The breakdown of responses for question 5 can be seen in figure 8. Nearly half of responses (48.7%) indicated that the participant did not have a least favorite lesson. On the other hand, the highest least favorite lesson themes were animal-based (21.1%), water-based (10.8%), and plant-based (7%). As seen in figure 9, participants most often cited the lesson not being fun (44.6%), weather problems (18.5%), and the lesson not teaching them something new (15.5%) as reasons why these lessons were their least

favorites. A sample selection of responses for question 5 and their category can be seen below.

- "My least favorite was when we were planting flowers. It was my least favorite because it was really hot." (Plants/Weather)
- "I don't have one. Every lesson you learn is important." (Nothing)
- "My least favorite lesson was the one about amphibians and reptiles. That was my least favorite because we were by a swamp and the lesson was sort of boring." (Animals/Boring)
- "Learning about recycling because I know it already" (Didn't learn)
- "The stream ecology because the water was cold" (Water/Weather)
- "All the lessons this week were both enjoyable and interesting. I don't have a least favorite." (Nothing)

Some lesson topics were overrepresented or underrepresented in student responses compared to the percentage of lessons given that pertain to that topic. Table 10 shows that although animal activities only counted for 5.1% of all lessons in 2012, they were represented in an average of 26.6% of responses for questions 4 and 5. Only 5.1% of lessons given were food-based, yet 32.4% of responses to question 4 pertained to these lessons. Furthermore, although 27.1% of activities were plant-based, only an average of 6.3% responses to questions 4 and 5 mentioned these activities.

Question 6: If your friend asked you about coming to this program: what would you tell them? Why?

The majority of participant responses to question 6 (91.9%) was that the participant would in fact tell their friend to enroll in the program. Most responses (62.3%) referenced the program as "fun" or "cool" as a reason why they would recommend the camp, while a further 25.4% referenced its educational nature. The breakdown of reasons

for recommending the SCIENCE program to a friend can be seen in figure 10. A list of sample responses and their categories are below.

- "I would tell them it was really, really, really, really, really fun because it was fun." (Come/Fun)
- "Yes because it was fun and you learn a lot about the environment!!!! ☺" (Come/Educational)
- "I would because I want him to know that we need to take care of the environment" (Come)
- "This is one of the best ones to learn and appreciate science. I had a great time and didn't feel bored and forced to learn about science." (Come/Educational)

Inter-rater Reliability Comparison

My categories and answers was compared with that of a colleague, Cathleen Anthony, who worked as an ESF SCIENCE instructor in the summer of 2013 and had already reviewed that summer's survey data for her own project. For the categories under each question that we both created separately that were similar, I made a total of 183 observations, whereas she made a total of 199 observations. The average percent similarity of the number of responses in similar categories is 86.9%. Table 11 shows the categories on which we agreed upon and our observations of survey responses in these categories.

Survey Timing

Figure 11 shows the percentage of responses in each year for question 1 ("What did you enjoy most about your experience this week?") that included a reference to the ice cream lesson. The average ice cream response for question 1 across all years except 2012 was 21.7%, but this dropped down to 0% in 2012. Delaying the liquid nitrogen ice-cream activity in 2012 until after the surveys had been completed reduced the amount of

responses about that particular activity amongst all questions for which food or ice cream was an emergent theme from an average of 18.7% to 7.1% (figure 12).

Discussion

Which aspect of the camp experience is the participant's favorite, and why?

Participants often referenced a specific activity or lesson when asked about their favorite part of the experience as a whole. Otherwise, they noted the fun and educational nature of the camp. SCIENCE participants have therefore realized that although they are learning, they are simultaneously having fun and enjoying themselves. Having fun in nature is highly important in fostering an interest in nature. This is especially true in urban children, who are more aware of nature in the city and feel more connected to a natural than an urban environment upon returning home from a nature camp (Dresner & Gill, 1994). Participants also noted that they enjoyed making memories, meeting new people, and spending time outdoors.

Which activities are the favorite by all participants, and why?

Favorite activities across the board were food- and animal-based. Water-based activities were also very highly rated. This is likely because putting on waders and using nets and other scientific equipment like the water quality testing kits is a highly memorable experience. It is also something most participants had not experienced before. The most important factor for participants that made an activity their favorite was if they found it to be fun, interesting, or cool. However, participants were also extremely aware of the educational nature of the camp. SCIENCE participants, as a result of the camp, realize that learning does not have to take place in a classroom. This is extraordinarily

important in getting children interested in science, or other typically classroom-based topics.

The activity that was mentioned the most overall in the survey responses was making ice cream using liquid nitrogen. In 2012, based on the number of high responses about this activity, we decided to distribute the surveys before this lesson. This allowed us to gain more information from the surveys about the other lessons. The tactic worked well to evoke responses from the participants about different activities. The first two questions of the survey in 2012 exhibited a very low rate of responses about food or ice cream. However, the third question ("What could your instructors work on or improve?") actually had a slightly higher percentage of food related responses than the average of all other years. None of these responses in 2012, however, were even about ice cream. There were a total of three food responses that year – 2 were about wanting more s'mores from the solar cooker activity, and one was a suggestion to bring candy next time. The fourth question ("Which lesson was your favorite? Why?") still had a moderate percentage of responses about food or ice cream, but it was significantly lower than the percentage of responses from other years. Most of these responses were about s'mores, but a few were still about ice cream, since participants were aware that ice cream would be following the surveys.

In the absence of a large number of ice cream responses, many of the food-motivated participants who might have otherwise written in responses about the ice cream activity wrote responses about the s'mores activity. Altering the timing of giving out the surveys to participants worked well to increase the amount of feedback about other lessons.

Which activities are the least favorite, and why?

Most participants reported that they did not have a least favorite activity. However, those that did tended to report an animal- or water- based activity – the same ones that were reported as favorites. It was found that these lesson topics were highly overrepresented in survey response as compared to their representation in the lessons conducted each week.

Activities that were least liked were deemed to be "not fun". The next two most popular answers for not liking an activity were as a result of uncontrollable factors, such as the weather and if the information in the lesson was not new material. A way to counteract these factors would be to plan back-up activities that are just as fun as the original activity, or to introduce another aspect into the activity, such as including a food item. Furthermore, activities can be modified slightly in extreme weather, such as decreasing a playing area on a hot day during a running game, or implementing a walking only rule, so participants are exerting less energy.

In order to decrease the chance of activities not introducing new material to the participants, and subsequently increase the "interesting" factor of a lesson, New York State learning standards can be researched to determine which topics have been covered in detail throughout the participants schooling experience, depending on their grade levels. Then, they can plan for activities that will build upon and enhance the knowledge of most participants, with redundancy at a minimum. However, some topics that students learn in school will vary from teacher to teacher, and participants that come to the camp multiple years in a row will still be learning similar things because of the ecological and environmental nature of the camp. In order to better assess where participant knowledge

lies before the camp, it might be useful to create a pre-camp survey asking participants to mark whether or not they learned about camp lesson topics during school. Alternatively, a rather informal survey can be taken at the beginning of some lessons just by asking the participants to raise their hands if they have previously learned about that lesson's topic in school. By planning and accounting for these uncontrollable factors, we can focus more on other reasons participants dislike an activity.

Representation of Topics in Survey Responses

Some activity and lesson topics were extraordinarily overrepresented in survey responses in relation to how often these topics were presented to participants. Table 10 shows the percentages for activity topics represented in responses as compared to their representations in the 2012 weekly schedule. These lessons were food- and animal-based, perhaps because they were the most memorable. Animals tend to be inherently interesting, and food is an all-around favorite base for an activity in every age group. Furthermore, water- and drawing- based activities were represented at the same rate in surveys as their representation in SCIENCE lessons. I thought water-based lessons would be more highly represented, since putting on waders and going in the water should be very memorable for all participants. Perhaps since this was often done in conjunction with macroinvertebrate surveys, more of the responses were counted under the animal category than the stream category based on the wording of the response.

However, there were also a few topics that were very underrepresented in survey responses. It is possible that games in general were extremely underrepresented in survey responses because of the survey's wording. The wording of the question meant to gauge student responsiveness to individual activities asked "which **lessons** were your most/least

favorites." Participants might not have thought that game-based activities were a choice for them in this category if they did not recognize an educational game as lesson because of their familiarity with typical lessons seen in schools.

Plant-based activities and lessons were also underrepresented in participant responses. This may be because there were not many plant games, with the exception of the Hart's Tongue Fern game. The lessons that were done on plants tended not to be as active, and therefore might not have been memorable. Using a field guide to figure out a tree species is inherently not as interesting as putting on large boots to stomp around in a creek and catch bugs. The Smithsonian Institute Press recently created a graphic novel as a means to create a more interesting and relatable lesson about a plant that was described by Darwin. They found the book's format to be easily adaptable to science writing, because they could anticipate questions on the material at different points in the story. In fact, although the text is light and easily read, it is dense with scientific information (Glass, 2013). Because their lesson was presented in the form of a story, it was more memorable.

However, the American Hart's Tongue Fern game that participants played in the summer of 2012 was also presented as a story. It was an augmented reality game played on smartphones that allowed each player to take on roles such as a conservation biologist or park manager. Yet the interactive, memorable, story-telling game did not show up often in student responses. This could be because it got overshadowed by other things that happened that week, such as a field trip to Onondaga Lake the next day to catch fish and the field trip to ESF the day after that to make ice cream.

There were also categories of activities that did not show up in the responses often enough to have their own category. As you can see in the sample weekly schedule (table 2), there were a fair amount of renewable energy and sustainability based activities throughout the week. Furthermore, one of the activities (s'more solar cookers) even had a food aspect, yet responses related to renewable energy were very sparse. These activities were evidently not memorable enough to elicit participant responses to them on the surveys. In future SCIENCE lesson plans, an effort can be made to make these activities more memorable and fun for the participants, if they want to focus on sustainability-related topics in their summers.

Inter-rater Reliability Comparison

The inter-rater reliability comparison shows some, but not a lot of similarities between categories and response rates per category between my data and that of my colleague, Cathleen Anthony. On the other hand, the inter-rater reliability comparison also showed some similarities between sets of categories. For instance, in table 11 it can be seen at each question had at least two categories that were mostly the same. The response numbers for all these categories were very close in number, indicating that we had similar criteria for these categories. Comparing our data showed that my data could be considered accurate, since the themes that both of us identified were very close in number.

Study Limitations

A big aspect of SCIENCE is that, for the most part, the instructors are responsible for creating and scheduling the activities and lessons for each summer. Many of the activities, save for a few staples such as macroinvertebrate surveying and liquid nitrogen

ice cream, change yearly. As a result, there is a high amount of variation in the lessons each year, and this translates into a lot of variation in survey responses. The standard deviation bars on bar graphs (such as figures 8 & 10) were long because of this, and it was not effective to quantify the differences in responses per year. I averaged responses from all years in order to get a more broad view of the survey answers.

Furthermore, In order to complete an inter-rater reliability calculation, it is necessary to know how many observations were placed in a category and the total number of observations that were viewed and categorized, to determine percentages. For this analysis, these numbers would not fit into the calculation, since some responses could be counted in multiple categories while others were not counted at all if they did not fit a category. Therefore, it would be impossible to get the accurate data needed to complete this calculation.

Moreover, the inter-rater reliability comparison was not as effective as it could have been because of a slight difference in objectives for category creation in the first place. I created categories while looking broadly at seven years worth of surveys, whereas her categories are more specific to only one summer (2013). I made fewer observations than her, as can be seen in table 11, simply because my categories were more general, whereas hers were specific enough for that summer to fit almost every answer into a category. Small nuances, such as themes that only showed up in that year's survey responses such as renewable energy, did not make as big of an impact on my categorization. For the fourth question (favorite lesson) she focused more on the specific lessons that were done that summer, while I looked broadly at activity topics. Additionally, on question 5 (least favorite lesson), she focused on the reason why the

activity was not liked, while I looked separately at activity topics and reasons for disliking the lesson.

How can this data be applied to SCIENCE programs in the future?

The results of this survey can provide baseline data that future SCIENCE instructors can reference for methods to alter their programs. For example, they can view the highest rated suggestions for improvement from the participants, and proactively address and plan for these suggestions. They can also analyze the participant's favorite activities and, depending on their goals and objectives, either increase the types of these activities or alter existing activities based on the factors that made those activities a favorite.

Furthermore, future SCIENCE instructors can apply these results on participant attitudes to maximize the camp's effectiveness in teaching and influencing environmental awareness. After an environmental awareness-focused summer nature camp, urban children were more aware of nature in the city and felt more connected to a natural than an urban environment upon returning home from a nature camp. They also expressed desires to visit natural areas near their hometowns. This fosters positive environmental values and eventual environmentally responsible actions (Dresner & Gill, 1994), an idea central to the mission of the ESF SCIENCE program.

Additionally, this data shows potential funders that the camp is successful in approaching informal science education in a way that is educational as well as fun for all participants and instructors. The high rate of participants that would recommend the camp because of either its fun or educational nature can attest to that, as well as the fact

that over half of the participants did not have any suggestions for improvements. Furthermore, many indicated in their responses that they wanted to come back next year or that they wished the camp would be longer in length, such as this response from 2008:

> "I would tell them that this is a complete blast and you will always enjoy yourself. Once you do ESF camp, you will want to do it every year. I would tell them this because there is basically never a boring moment. The instructors are energetic. I am definitely coming back next year."

Suggestions for a more Effective Survey

Surveys are a highly usable type of evaluation because they are easy and simple. Furthermore, many people are familiar with filling out forms and taking surveys. However, written questionnaires can be difficult for some young children. If the survey is long or there are multiple forms to complete, as is usually the case at the end of every camp week, the participant might not have the attention span to answer each question to the best of their ability.

Even though most of the participants in the SCIENCE program are at least middle-school age, a different evaluation type might be better suited to those on the younger edge of the spectrum or that have a hard time concentrating. For these participants, it might be more useful to have one of the SCIENCE instructors to pull them aside and ask the questions in an interview style, while also taking notes or recording the conversation. If the interviewee seems hesitant to respond because they might have a negative answer, the interviewer could be someone the participant does not recognize as being a part of the SCIENCE team. An interview-style evaluation requires more effort

and takes more time than creating and passing out a survey. However, the interviewer can ask for clarification or explanation on responses, so it can be useful to get answers that are more direct.

Because many of the questions were similar in nature, if one participant wrote their favorite activity in as what they enjoyed most about their experience, they would also write the same activity in as their favorite lesson. This also lent itself well to students answering “liquid nitrogen ice cream” to each question (except for least-favorite activity, of course). Another method to reduce the effect of the liquid nitrogen ice-cream activity crowding out responses could be to obtain some feedback on lessons and activities at the end of each day, restricting their answers to only the lessons given that day.

A more effective survey for obtaining specific data, as well as more information on non food-based activities and lessons, could include utilizing more specific questions, multiple choice questions and a Likert rating scale. More specific questions, or even a survey with a more specific objective than the general end-of-camp survey, would guide participants into writing more focused answers. It would also provide more data on the hypothetical survey’s objective.

Furthermore, a Likert scale would be able to provide more quantitative data about the camp experience, and statistical methods and calculations could be applied to this data. Likert scales are great tools used in conjunction with statements, and participants can swiftly and easily indicate the level to which they agree or disagree with the statement. They provide quantitative data because the scales are numbered, usually from 0 to 5. Therefore, it effectively converts a qualitative statement into quantitative data.

Statements that could be used for evaluating the ESF SCIENCE program with a Likert scale includes ones such as “I learned a lot doing the macroinvertebrate survey,” “I would recommend this camp to a friend because it is fun,” or even “I felt bored during the camp.” The degree to which the participants agree or disagree with each statement would provide simple, easily quantifiable data. However, scales and multiple-choice questions lack a sense of expressive freedom, since there is no room for participants to construct their own responses.

This survey in itself was very effective for its broad purpose of obtaining general knowledge about participant attitudes toward the camp and its lessons. A survey with specific objectives could utilize a few of the previously stated techniques to obtain information. Some specific survey objectives that could be done using SCIENCE participants include determining participant’s scientific knowledge coming into the camps, looking into reasons why some topics were underrepresented in survey responses, or collecting information on participant motivations for attending the program. Furthermore, pre-camp and delayed follow-up surveys could be effective at gauging changes in participant environmental awareness, by asking them how much they agree with environmental belief statements or how often they act in environmentally responsible ways.

Conclusion

Participants were aware of the educational nature of the camp, as indicated by the many responses about learning, but they also responded highly about having fun and referred to things as “interesting” or “cool”. SCIENCE participants are therefore realizing, as a result of the camp, that learning does not have to be boring and take place

in a classroom. They are also becoming aware that they can have fun while learning. Having fun and enjoying oneself while being in and learning about the outdoors are important factors in fostering an interest in nature. This is especially true in urban children who are more aware of nature in the city and feel more connected to a natural than an urban environment upon returning home from a nature camp. This fosters positive environmental values and eventual environmentally responsible actions (Dresner & Gill, 1994).

The inter-rater reliability comparison showed that although categorization objectives were slightly different between raters, similar identified themes were very close in number of responses. These results on participant attitudes can be applied by future SCIENCE instructors to maximize the camp's effectiveness in teaching and influencing environmental awareness. Additionally, it can show potential funders that the camp is successful in approaching informal science education in a way that is educational as well as fun. A more effective survey for obtaining specific data and information on a wider variety of activities and lessons could include utilizing more specific questions, multiple choice questions, a Likert rating scale, or an interview-style survey for younger participants.

References

Barnes, Roy A. (2007). *Essay on biodiversity education.* Retrieved from http://cnuw.scottsdalecc.edu/wp-content/uploads/2011/04/Essay_on_Biodiversity_Education.pdf

Beck, Larry, & Cable, Ted T. (2011). *The gifts of interpretation: Fifteen guiding principles for interpreting nature and culture.* Urbana, IL: Sagamore Publishing LLC.

Knudson, Douglas M., Cable, Ted T., and Beck, Larry. (1995). *Interpretation of cultural and natural resources.* State College, PA: Venture Publishing.

The Department of Environmental Conservation (NSW). (2011). *Does your project make a difference? A guide to evaluating environmental education projects and programs.* New South Wales, Australia: Author. Retrieved from http://www.environment.nsw.gov.au/resources/community/projecteval04110.pdf

Dresner, Marion, & Gill, Mary. (1994). Environmental education at summer nature camp. *Journal of Environmental Education.* 25(3), 35-41. Retrieved from Taylor & Francis Online.

ESF Outreach. (n.d.). *ESF SCIENCE* Retrieved from http://www.esf.edu/outreach/esfscience/

United States Department of Agriculture Forest Service (n.d.) *Evaluation & Monitoring.* Retrieved from http://www.fs.usda.gov/main/conservationeducation/programs/evaluation-monitoring

Ewert, Alan, Place, Greg, & Sibthorp, Jim. (2005). Early-life outdoor experiences and an individual's environmental attitude. *Leisure Sciences* 27, 225-239. Retrieved from Taylor & Francis Online.

Glass, D. J. (2013) Talking animals, silly jokes, and natural selection: Eugene Byre and Simon Gurr's Charles Darwin: A graphic biography. *Reports of the National Center for Science Education.* 33(4), 1-6.

Knapp, Doug. (2007). *Applied interpretation*. Fort Collins, CO: interpPress.

Louv, Richard. (2005). *Last child in the woods.* Chapel Hill, NC: Algonquin Books of Chapel Hill.

National Association for Interpretation. (n.d.) *Mission, Values, and Core Statement.* Retrieved from http://www.interpnet.com/nai/About/What_We_Believe/nai/_About/Mission_VisiVi_and_Core_Values.aspx?hkey=ef5896dc-53e4-4dbb-929e-96d45bdb1cc1

Multon, Karen D. (2010). Inter-rater reliability. *Encyclopedia of Research Design.* 627-629. Retrieved from SAGE Reference Online.

The Outdoor Foundation. (2012). *Outdoor Recreation Participation Report 2012*. Boulder, CO: Author. Retrieved from http://www.outdoorfoundation.org/pdf/ResearchParticipation2012.pdf

Palmberg, Irmeli E. & Kuru, Jari. (2000). Outdoor activities as a basis for environmental responsibility. *Journal of Environmental Education.* 31(4), 32-36. Retrieved Taylor & Francis Online.

Stapp, William B. (1969). The concept of environmental education. *Journal of Environmental Education.* 1(1), 30-31. Retrieved from Taylor & Francis Online.

Stokking, K., van Aert, L., Meijberg, W., & Kaskens, A. (1999). *Evaluating Environmental Education*. Cambridge, UK: International Union for Conservation of Nature and Natural Resources (IUCN)..

Taylor, Andrea F., & Kuo, Frances E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders*. 12(5), 402-409. Retrieved from Sage Journals.

Thomas, David R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation.* 27(37), 237-246.

Weber, Christopher L., & Matthews, H. Scott. (2008). Food-miles and the relative climate impacts of food choices in the United States. *Journal of Environmental Science and Technology*. 42(10), 3508-3513.

Appendix A: Tables and Figures

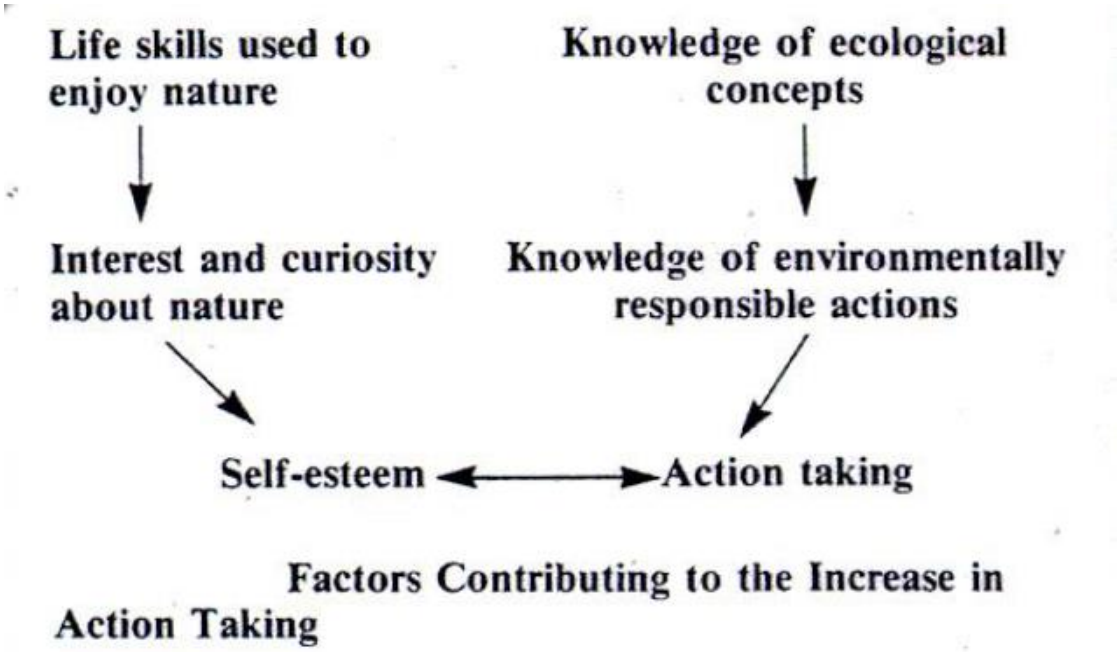

Figure 1: Factors contributing to an increase in environmental action taking (Dresner & Gill, 1994, p. 41).

Table 1: The average percent change of correct answers from the pre-test to the post-test in 2007

Question	Average % Change
1. What does urban ecology mean?	35.0
2. What does environmental science mean?	20.0
3. What is an ecosystem?	26.0
4. What does stewardship mean?	39.0
5. What are the 5 steps of the scientific method in order?	16.0
6. What are 2 or 3 environmental jobs that you could do to help the environment?	21.0
Total average	26.2

Table 2: A sample weekly schedule of lessons and activities from 2012.

Day	**Location**	**Lessons/Activities (roughly in daily order)**	**Science Concepts in each Activity**
Mon 7/9	Nottingham H.S. (Sustainability Theme)	Tennis Ball Name Game Blob Tag Intro to Consumption & Sustainability What's in Common? Miles per Meal Recycling and Composting Solar Cookers Water Relay Game Nature Journaling	n/a[1] n/a Sustainability/Recycling/Waste Natural Ingredients in Items Food Miles[2] Sustainability/Recycling/Waste Renewable Energy Renewable Energy Art & Nature Exploration[3]
Tues 7/10	Nottingham H.S. (Wildlife & Water Theme)	Animal Game Dichotomous Key Hike/Scent Trap Field Guides Nature Journaling Macroinvertebrates Water Quality Macroinvertebrate Mayhem	Wildlife Basic Science Wildlife Flora Art & Nature Exploration Wildlife/Water Quality Water Quality/Stream Monitoring Wildlife
Wed 7/11	Clark Reservation	AHTF game Tom Hughes Nature Journaling	Flora/Nature-based AR Game Naturalist-led Hike Art & Nature Exploration
Thurs 7/12	Onondaga Lake Day	Background on Onondaga Hooks and Ladders Fish game Trap net fish ID Water Quality Fishing Lessons Nature Journaling	Onondaga Lake History Wildlife/Fish Wildlife/Fish Water Quality Wildlife/Fish Art & Nature Exploration
Fri 7/13	ESF Day	Tour of ESF Quest Windmill (Dr. Abrams) Liquid Nitrogen Journal Entry	Campus Tour Interactive Campus Exploration[4] Renewable Energy Chemistry/States of Matter Art & Nature Exploration

[1] These activities were not science-based, their purposes in our schedule were to get-to-know the participants each week, learn their names, and break the ice.

[2] "Food Miles" is a term used to describe the relative distance food items travel from production to the consumer (Weber 2008).

[3] The nature journals

[4] A quest is an interactive treasure hunt, often acting as a self-guided tour. They usually have poetic clues and might have a small prize at the end for those who complete it ("Questing" – pg. 14 (ch. 2 = the story of questing)).

1. What did you enjoy most about your experience this week?

Table 3: Thematic categories for question 1 and descriptions of the qualifications responses needed to have to be included in each category.

Category/Theme	Types of Responses Included
Educational/Learning	Any reference to learning or studying during the camp, or calling it "educational"
Fun	Any references to having fun, playing, or "the games"
Specific Lesson	A specifically mentioned lesson, activity, or game, such as "Going to Onondaga and fishing"
"Everything"	An answer that included "everything", or an answer such as "all of it"
"Nothing"	An answer that specifically mentioned "nothing"
"Ice Cream"	Any answer that mentioned ice cream
Being Outdoors	Any references to spending time outside
People/Friends	Any reference to "hanging out," being with friends", or a specific person
General Activities/Lessons	Any very general or broad statement such as "all the activities/lessons" or "doing experiments"

2. What did your instructors do that you really liked?

Table 4: Thematic categories for question 2 and descriptions of the qualifications responses needed to have to be included in each category.

Category/Theme	Types of Responses Included
Taught	Any reference teaching, answering questions, or explaining concepts
Played Games	Any reference to playing games
Made it Fun	Any reference to making things fun, having fun, or telling jokes
Specific Instructor	Any reference to a specific instructor
Ice Cream	Any reference to liquid nitrogen ice cream activity
Listened/Helped	Any reference to instructors listening, encouraging, or being helpful
Conversational	A reference to talking, having conversations
"Everything"	An answer of "everything" or was of a similar nature
"Nothing"	An answer of "nothing" or was of a similar nature
Were Nice	Any response specifically stating that the instructors were nice

2.1. What was the most important thing you learned about the environments in our city?

Table 5: Thematic categories for question 2.1 and descriptions of the qualifications responses needed to have to be included in each category.

Category/Theme	Types of Responses Included
Protect/Take Care of it	Any response of similar nature to protecting or taking care of the environment
Don't Litter/Keep it Clean	Any response about littering or keeping the environment clean
Recycle	Any response about recycling
Animals	Any reference to something learned about animals
Plants	Any reference to something learned about plants
Pollution	Any reference to something learned about pollution
Water Quality	Any reference to something about water quality, including stream testing

3. What could the instructors work on or improve for the next group?

Table 6: Thematic categories for question 3 and descriptions of the qualifications responses needed to have to be included in each category.

Category/Theme	Types of Responses Included
Nothing/Don't Know	An answer such as "Nothing" or "I don't know"
Improve Games/Activities	Any response including better, new, or more games/activities
More Fun	Any response about making camp more fun or having more fun
Teach about…	Any response that makes a suggestion on something alternate to teach about
More Food	Any response referencing more food such as ice cream, candy, or s'mores
Attitude	Any reference to having a better attitude, such as being more relaxed or improving patience
Organization/Scheduling	Any reference to using time wise, being more organized, or having better scheduling
Less Talking	Any reference to less talking, lecturing, or teaching
Specific Activity	Any reference to a specific activity to be improved

4. Which lesson was your favorite?

Table 7: Thematic categories for question 4 and descriptions of the qualifications responses needed to have to be included in each category.

Category/Theme	Types of Responses Included
Water	Any water-based activity, such as stream sampling or macroinvertebrate surveys
Food	Any activity that included food, such as Liquid Nitrogen (Ice Cream) or Solar Cookers (S'mores)
Plant	Any activity or lesson about plants
Animal	Any activity or lesson about animals (including fishing & macroinvertebrate surveys)
Hiking	Any reference to hiking
Journals/Drawing	Any reference to nature journaling or drawing
Everything	An answer of "everything" or any answer of similar nature
Nothing	An answer of "nothing" or any answer of similar nature
Games	An answer referencing the games that were played in general
No Favorite	An answer of not having a favorite
Why?	
Fun	Any answer similar to "It was fun"
Educational	Any answer explaining the educational nature of the lessons, such as answers that begin with "I learned…," "It taught me…," or "Now I know…"
Experience	Any answer reflecting on the lesson as a good or new experience
Going in the Water	Any answer referencing going in the water or getting wet
Interesting/Cool	Any answer referring to the activity as interesting or cool

5. Which lesson was your least favorite? Why?

Table 8: Thematic categories for question 5 and descriptions of the qualifications responses needed to have to be included in each category.

Category/Theme	Types of Responses Included
Water	Any water-based activity
Plant	Any activity or lesson about plants
Animal	Any activity of lesson about animals
Hiking	Any reference to hiking
Journals/Drawing	Any reference to nature journaling or drawing
None	An answer of "none" or any answer of similar nature, such as "I liked them all"
Don't Know	An answer of "I don't know" or any answer of similar nature
Why?	
Not Fun	Any reference to the lesson as boring or not fun
Weather	Any reference to weather problems during the lesson, such as "It was too hot" (for a running/outside game)
Didn't Learn	Any answer referencing that the student already knew the information or didn't learn anything during the lesson
Talking	Any reference to too much talking/lecturing
Difficult	Any reference to the lesson being too difficult or hard, or requiring too much thinking
Not Hands-on	Any reference to the lesson not having a hands-on component

6. If your friend asked you about coming to this program, what would you tell them? Why?

Table 9: Thematic categories for question 6 and descriptions of the qualifications responses needed to have to be included in each category.

Category/Theme	Types of Responses Included
Come	Any answer indicating that they would tell their friend to come
Don't Come	Any answer indicating that they would not tell their friend to come
Don't Know/Maybe	Any answer indicating that they are not sure
Why?	
Fun	Any reference to having fun or a response including the word "cool"
Educational	Any reference to a learning or educational aspect
Specific Activity	Any reference to a specific activity such as those that begin with "You will…"
Activities/Games	Any general reference to games or activities

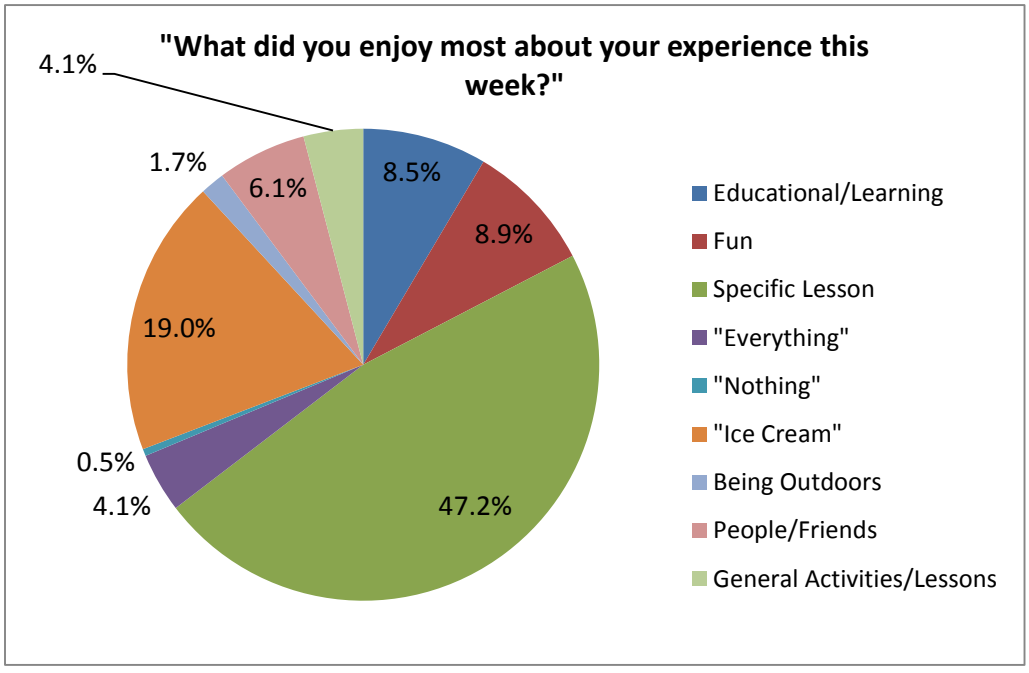

Figure 2: Question 1 emergent themes & average response rates in participant surveys from 2006-2013.

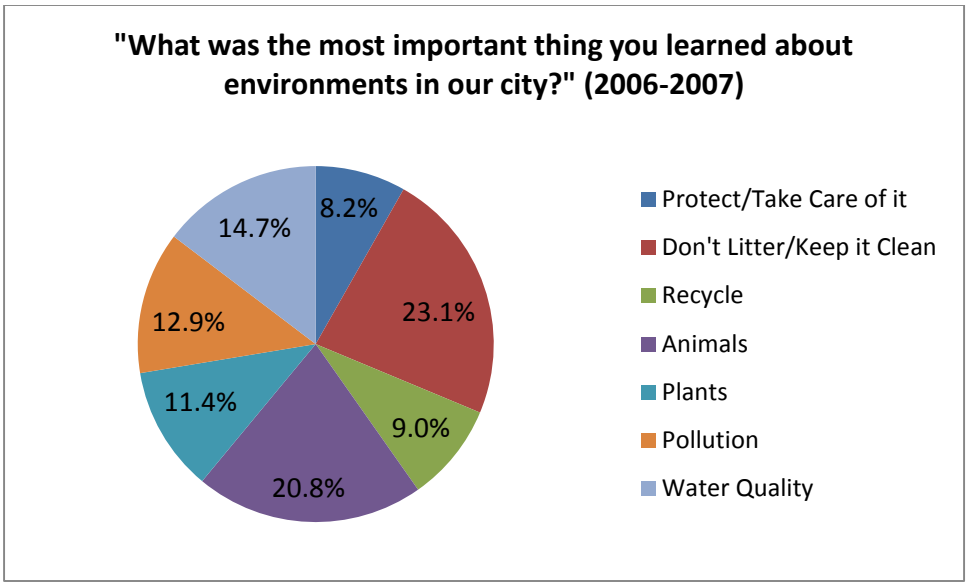

Figure 3: Question 2.1 emergent themes & average response rates in participant surveys from 2006-2007.

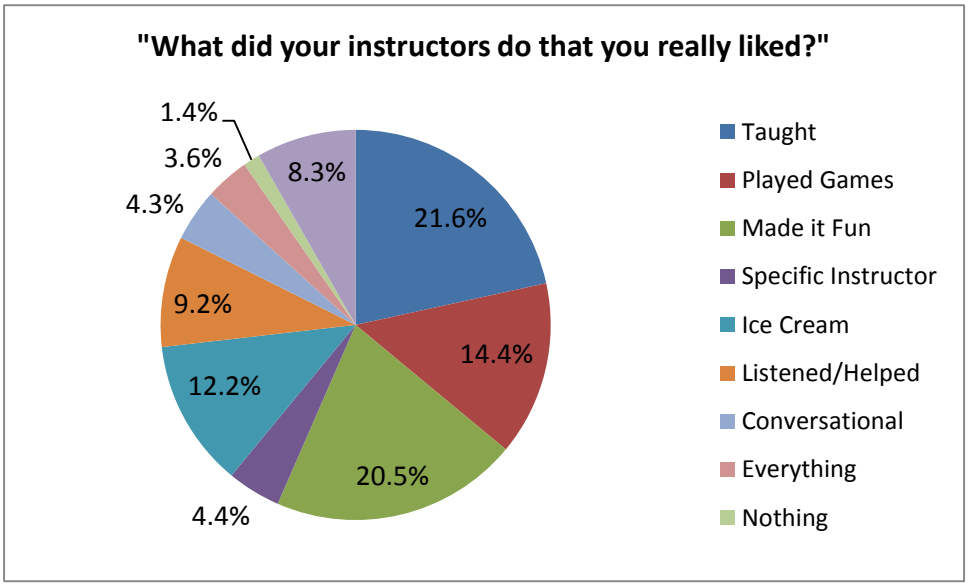

Figure 4: Question 2 emergent themes & average response rates in participant surveys from 2006-2013

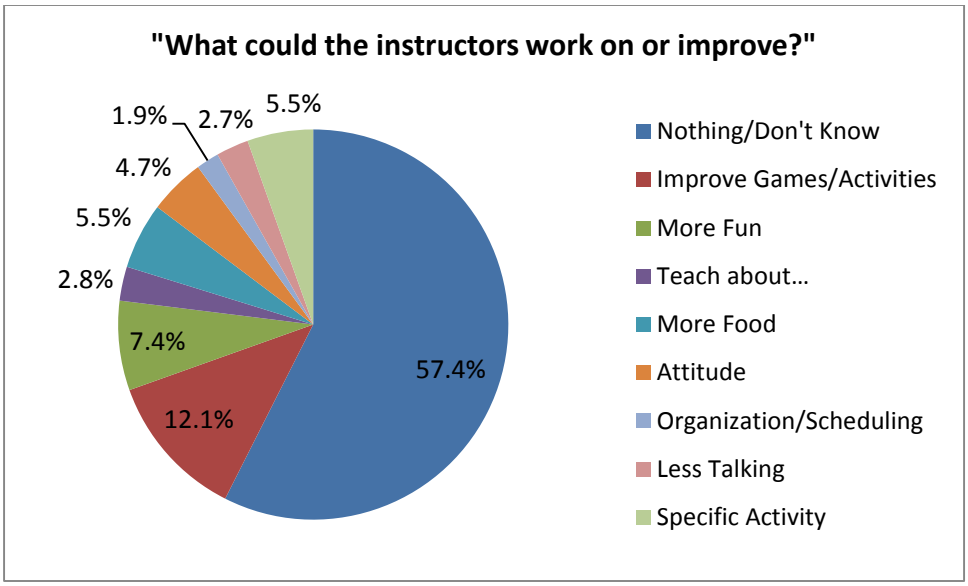

Figure 5: Question 3 emergent themes & average response rates in participant surveys from 2006-2013

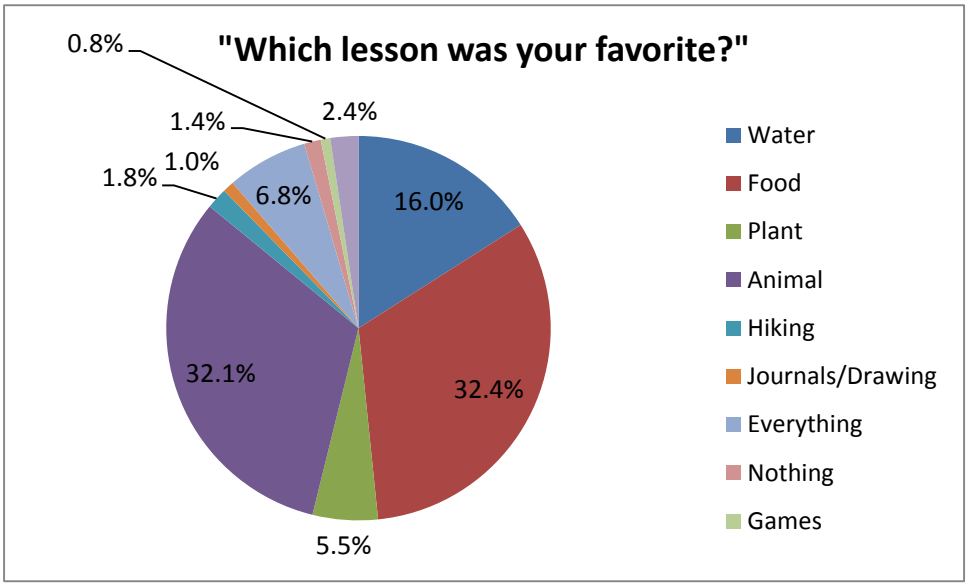

Figure 6: Question 4 emergent themes & average response rates in participant surveys from 2006-2013

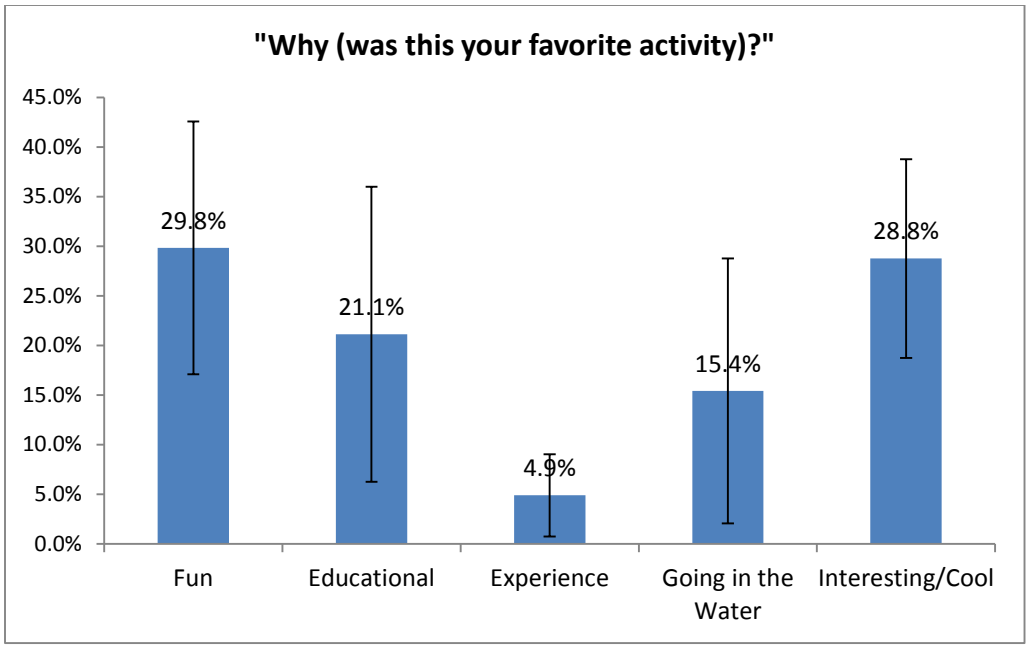

Figure 7: Emergent themes for the second half of question 4 & average response rates in participant surveys from 2006-2013 (1SD).

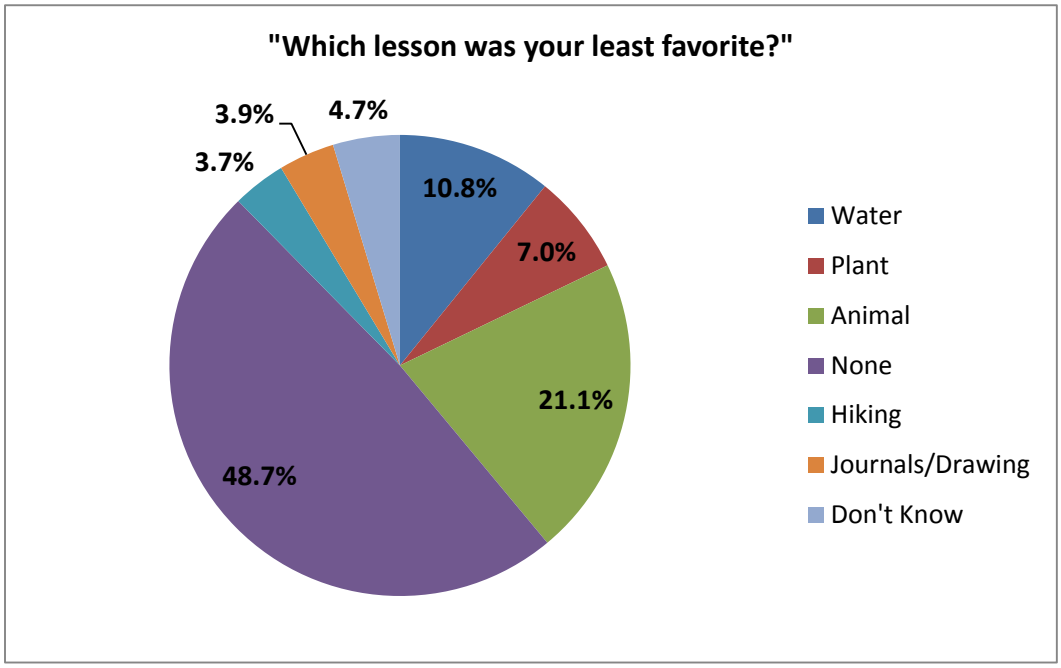

Figure 8: Question 5 emergent themes & average response rates in participant surveys from 2006-2013

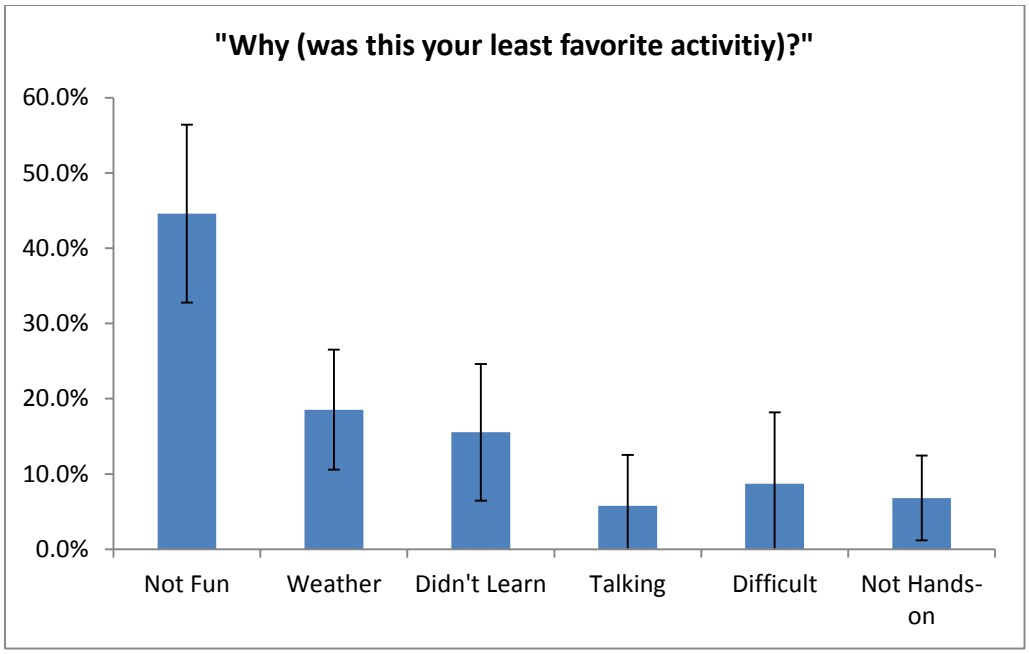

Figure 9: Emergent themes for the second half of question 5 & average response rates in participant surveys from 2006-2013 (1SD).

Table 10: Representation of activity topics presented overall in 2012 as compared to representation of activity topics in 2012 survey responses as favorite or least favorite activities (questions 4 & 5).

Topic	Avg % of Activities/Week	% Favorite Activities	%Least Favorite Activities	Average Representation in Reponses
Water	15.3%	16.0%	10.8%	13.4%
Food	5.1%	32.4%	0.0%	**16.2%**
Plant	27.1%	5.5%	7.0%	6.3%
Animal	5.1%	32.1%	21.1%	**26.6%**
Hiking	15.3%	1.8%	3.7%	2.8%
Drawing/Journals	6.8%	1.0%	3.9%	2.5%
Games	25.4%	0.8%	0.0%	0.4%

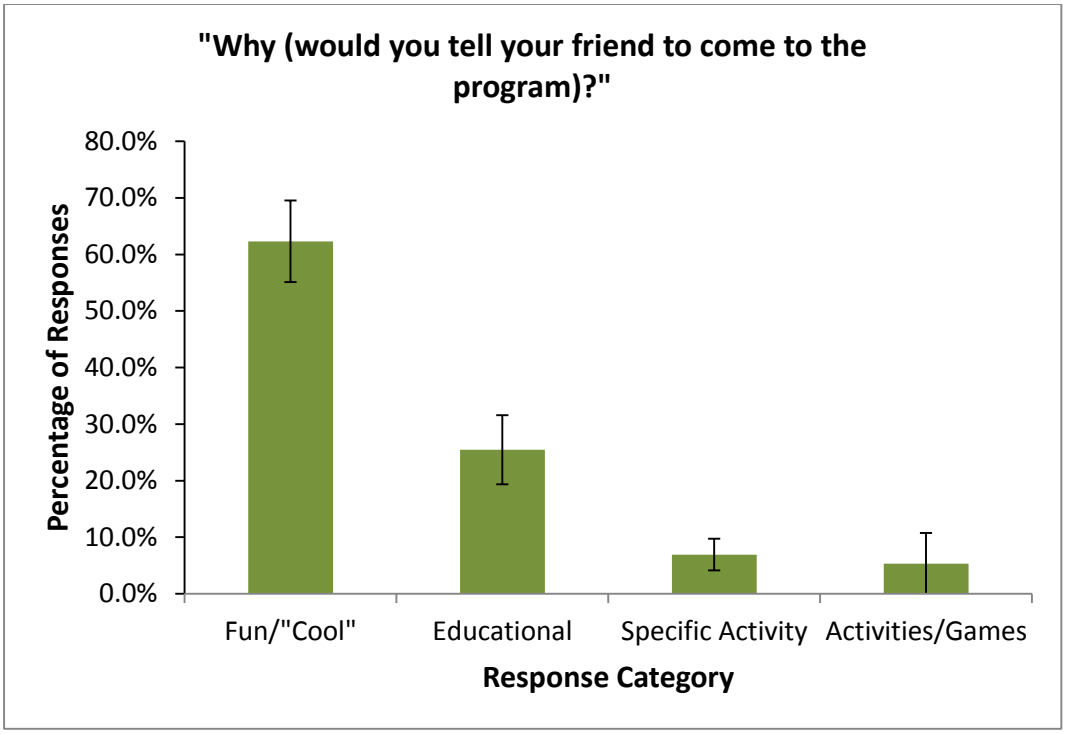

Figure 10: Emergent themes for the second half of question 6 & average response rates in participant surveys from 2006-2013 (1SD).

Table 11: Inter-rater reliability comparison of survey response observations in similar categories with 2013 survey data between observations taken by me (IG) and my colleague, Cathleen Anthony (CA). Percent similarity = (# responses in common)/(# of responses).

Question	Category	IG	CA	% Similarity
1	*Food/Ice Cream*	16	17	94.1%
1	*Learning*	6	5	83.3%
2	*Food/Ice Cream*	13	14	92.9%
2	*Everything*	4	5	80.0%
3	*More Food*	10	9	90.0%
3	*Nothing*	28	32	87.5%
4	*Food*	15	17	88.2%
4	*Water*	3	3	100.0%
4	*Animals*	10	11	90.9%
4	*Everything*	4	4	100.0%
5	*Didn't learn*	4	4	100.0%
5	*None*	15	18	83.3%
6	*Yes/Come*	44	43	97.7%
6	*Maybe*	2	5	40.0%
6	*No/Don't Come*	9	12	75%
Total		183	199	Avg. = 86.9%

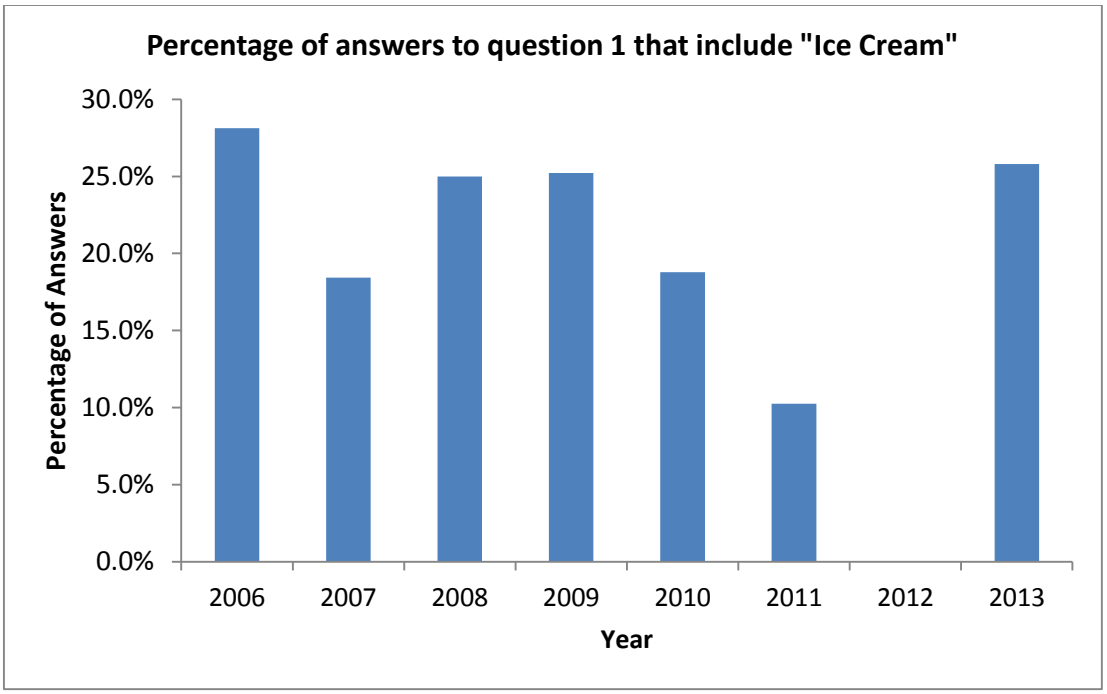

Figure 11: Responses to question 1 that included "ice cream" over all years.

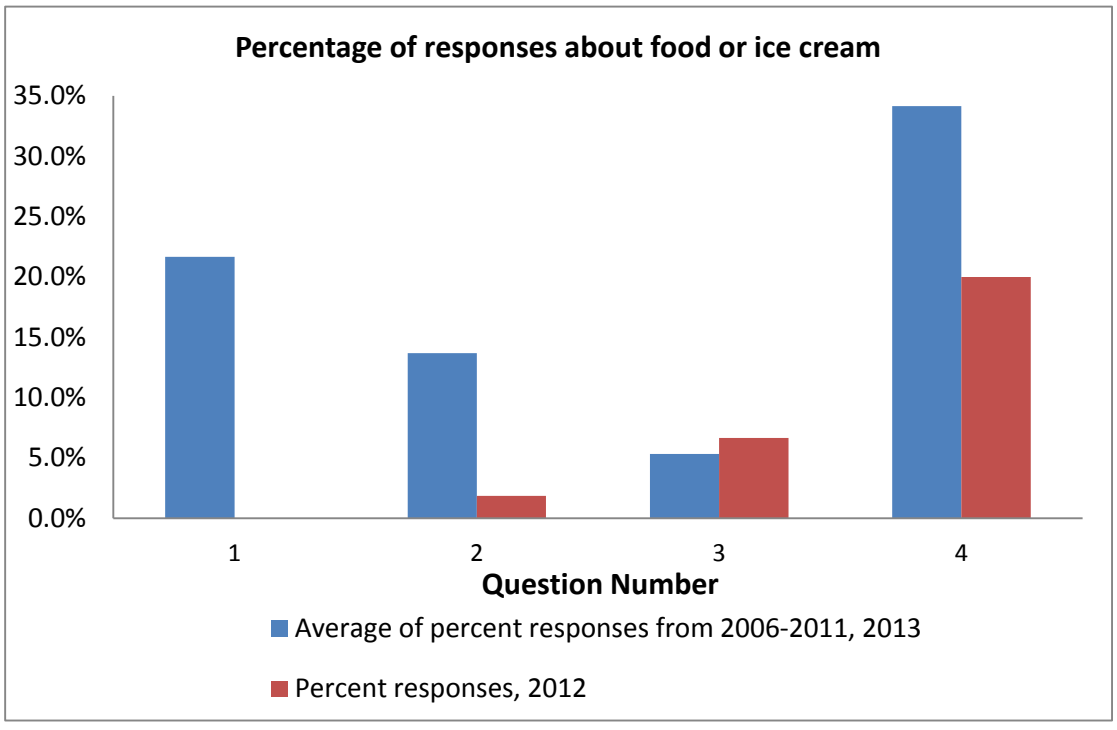

Figure 12: Percent responses per question about food or ice-cream related lessons.

Appendix B: The Survey

ESF SCIENCE

Summer **C**amps **I**nvestigating **E**cology in **N**eighborhood and **C**ity **E**nvironments

ESF SCIENCE serves our communities' urban youth through scientific exploration and environmental stewardship.

- What did you enjoy the most about your experience this week?

- What did your instructors do that you really liked?

- What could the instructors work on or improve for the next group?

- Which lesson was your favorite? Why?

- Which lesson was your least favorite? Why?

- If your friend asked you about coming to this program, what would you tell them? Why?