

SciGirls 2009

Executive Summary

2009 was the fourth year for the SciGirls program and the third year in which we had two camps. The demographics of the camps can be found below.

General Data

Race/Ethnicity	Number	Percentage (N=33)
White/Caucasian	22	67%
African American	5	15%
Asian	3	9%
Latina	1	3%
Would rather not say	2	6%

School Type	Number	Percent (N =33)
Public	24	73%
Magnet	6	18%
Private	3	9%

Grade level (for next school year)	Number	Percent (N=33)
6 th	11	33%
7 th	10	30%
8 th	9	27%
9 th	2	6%
10 th	1	3%

Average grades in math and science (self reported)

Grades	Number	Percent (N=32)
A's	18	56%
A's and B's	9	28%
B's	4	13%
C's	1	3%

Although high grades in science and math is not a requirement, most of our participants did well in their math and science classes (all but one student received A's and/or B's in their math and science classes).

Demographics separated by camp.

Grade level	SciGirls I (N=17)	SciGirls II (N=16)
6 th graders	65%	0%
7 th graders	35%	25%
8 th graders	0%	56%

9 th graders	0%	13%
10 th graders	0%	6%

Race and Ethnicity	SciGirls I (N=17)	SciGirls II (N=16)
African American	24%	6%
Asian	18%	0%
Latina	0%	6%
White	53%	88%

Grades in science and math classes	SciGirls I (N=17)	SciGirls II (N=16)
A's	53%	56%
A's and B's	29%	25%
B's	12%	13%
C's	0%	6%

Based on the above data, the camps were not very different in terms of school type and success in math and science in school. SciGirls I was slightly more diverse in terms of demographics than SciGirls II. Another difference was that more of SciGirls I (29%) reported math as their least favorite subject compared to only 13% of SciGirls II. Another difference between the two camps was that 29% of the SciGirls I students did not mention math or science as a favorite subject, whereas all of the SciGirls II participants claimed that one or both of these subjects was their favorite.

Survey Pre Data

Self Reported Reasons for Attending the Camp (The participants could select more than one reason).

	Hands on Activities	Learn more about science	Meet new people with similar interests	Gain confidence to become a scientist	Learn more about science careers
Number	13	30	10	1	8
Percent (N=33)	39%	91%	30%	3%	24%

Expectations or goals for the camp

	To do science	Make new friends with similar interests	Learn more about different aspects of science	Learn more about careers in science	Share experiences
Number	8	24	33	12	4
Percent (N=33)	24%	73%	100%	36%	12%

Based on these survey responses most of the students (91 %) wanted to attend the camp to learn more about science. And all of the campers expected to learn more about different aspects of science and 73% wanted to make new friends with similar interests.

Data that speaks to strong interest and knowledge of science before beginning the camp.

Most of the students who apply and eventually attend the camp already have an interest in science. This is evident from our survey data where 85% (28/33) of the participants claimed that science and/or math were their favorite subject in school. Interestingly, 21 % of the respondents claimed that math was their least favorite subject. This data depends on their experience with math and science at school, for example some students may love science but dislike their science class in school because of a teacher or surrounding students. Therefore, these percentages do not provide the full picture of students' interest in science. This information supports their application and pre-survey open ended responses that further explain their interest.

Over half of our students had met a scientist in their lifetime.

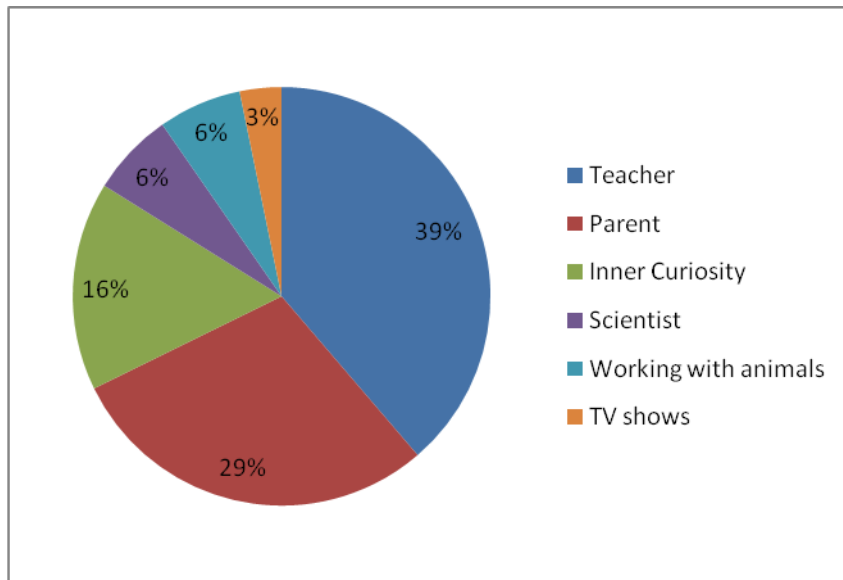
Have you ever met a scientist?		
No	13	46%
Yes	15	54%

All of these participants, who had met a scientist, spoke positively about these individuals (i.e. very smart, nice, or fun). And despite 46% of these participants having never met a scientist, 79% (26/33) of the girls claimed that they have had either a mentor or role model related to science (including science teachers and/or parents).

Science Interest

Our pre-data survey indicates that teachers and parents are the most influential in these participants interest in science.

What experience, person, or aspect of yourself has influenced your interest in science?



Based on the survey responses, it appears that students are finding out about the camp through word of mouth. Less than 25% of the students had heard about the camp through the website, newspaper or tv/radio commercials.

How did you hear about the program?

	Parent	Teacher	Website	Newspaper	WFSU/TV	Friend who attended camp	Parent who works with sponsor of camp
Number	9	10	3	2	3	5	5
Percentage (N=33)	27%	30%	9%	6%	9%	15%	15%

Views of science, the nature of science, and scientists

The VNOS is a qualitative open-ended survey that was given to all of the participants. Because it is qualitative there is no number score that you can give to each respondent, however, there are categories or types of responses that can be categorized based on the scoring guide.

What is science?

This response should include science as content, a body of knowledge or a process. Students that gave one or both of these were assigned a level one on their understanding of science. Student who mentioned more than one of these and gave more detail were assigned a level two for this response. And finally students who referred to science as a way of knowing were assigned a level 3 for this response. Students, who responded that science is everything or fun, were not assigned a level because this type of response was too broad to fit into any of the VNOS categories for science.

	Number	Percent (N= 33)	Types of responses
Level 1	16	48%	Science is a study of many different things. There are many different types of scientists in the world.
Level 2	10	30%	Science is the study of how things work in our surroundings or just anywhere really.
Level 3	3	9%	Science is how things work. Science educates people about things, and there are a bunch of different types of science that people can learn about. Science also tells about how things are made and what things they are made of.

How is science different from the other subjects you are studying?

For this question, students who responded that science relies on data from the natural world and/or requires systematic/organized data collection making it different from other subjects were assigned a level one understanding. Those students who saw science as tentative and not just series of facts were assigned a level two understanding. We also wanted to see how many students held the misconception that science involves a single scientific method.

	Number	Percent (N= 33)	Types of responses
Level 1	17	51%	science is discovering facts about one's self or their environment other subjects and finding ways to communicate or solve problems
Level 2	8	24%	science is not set in stone like rules in math, it keeps changing as more studies and discoveries are made.
Misconceptions	5	15%	science is different because it is very exact and

			there are no short cuts.
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Scientists produce scientific knowledge; some of this knowledge is found in your science textbooks. Do you think this knowledge may change in the future? Explain your answer with an example.

For this question, students were assigned a level one understanding of the tentative nature of science for claiming that science changes because new data becomes available. Those students who claimed that science can change because scientists look at the same data in a different way were assigned a level two.

	Number	Percent (N= 33)	Types of responses
Level 1	25	76%	Yes I do think it will change in the future because there is always more that Scientists can discover.
Level 2	4	12%	I think science will always change in the future as more things are discovered and theories are further investigated. Archeologists are always discovering knew things and later finding a different explanation to why they found that. The dinosaur's extinction is being looked into right now with multiple possibilities.

How do scientists know that dinosaurs really existed?

For this question, students who discussed evidence and observations as a reason were assigned a level one understanding. Those students who explained that these observations/evidence lead to inference were assigned a level two. The concept of facts proving conclusions was viewed as a misconception as these students saw the conclusions as facts instead of inferences.

	Number	Percent (N= 33)	Types of responses
Level 1	32	97%	they have found fossils and pieces of bones that they could place together and make a creature that doesn't exist now.
Level 2	0		
Misconceptions	3	9%	because they found fossils to prove that dinosaurs existed

How certain are scientists about the way dinosaurs looked? Why?

For this question, students who referred to data as evidence were assigned a level one understanding. Those students who discussed data and inferred conclusions were given a level two. And those students who mentioned data, inferred conclusions, and how these involve

human creativity and subjectivity were assigned a level three. Misconceptions in this response were viewed as the belief that scientists are 100% certain of their conclusions.

	Number	Percent (N= 33)	Types of responses
Level 1	18	54%	They piece together the entire skeleton. The skeleton shows how their body was supported.
Level 2	7	21%	Scientists can't be a 100% certain about how dinosaurs looked, but I guess they can have a good idea because of what they have found. But it is not a 100% because they have never actually see one alive, and they just have their skeletons and they base their predictions on that.
Level 3	2	6%	By looking at their fossils and imagining what they would look like with skin over their fossils.

In your view, what is a scientific model?

For this question, students who described a model as an inference and not an exact copy or the real representation were assigned a level one understanding of science. Those students who described the model as an inference that also involved subjectivity and can change were assigned a level two. Misconceptions were viewed as comments related to scientific models as proof or truth.

	Number	Percent (N= 33)	Types of responses
Level 1	10	30%	a scientific model is a smaller less accurate version of something bigger and more complex
Level 2			
Misconceptions	4	12%	A scientific model is a something detailed that the scientist knows is true and can prove that.

Do you think that scientists use their imagination & creativity in their investigations / experiments?

For this question the answer that represents the highest understanding of the nature of science would be yes. In our study, all but one (97%) of our participants responded affirmatively. The one student who responded “no” to this question explained her response as: “They may but science normally does not incorporate guessing, but guesses (hypothesis) with and observation or some evidence.”

If you answered yes to question 7, in what part of their investigations do you think they use their imagination & creativity?

For this second part of the question, students were assigned a level one understanding if they claimed that scientists used their imagination/creativity in only one phase of their investigations, a level two if they claimed that scientist use their imagination/creativity in two phases, and a level three if they claimed creativity was used during all or most stages.

	Number	Percent (N= 33)	Types of responses
Level 1	22	67%	planning they have to come up with ideas on how to test their ideas
Level 2	5	15%	Not everything has to be done a certain way so I think the scientist can bring their own personality into their experiments trying to figure out different ways to complete things.
Level 3	2	6%	I think the use their imagination in all parts of it but have to be careful not to create bias in their experiments.

Qualitative survey portion

To understand students' views or stereotypes related to scientists, we added a survey questions that asked them to describe what they thought of when they pictured a scientist. The resulting responses fell into four categories: stereotype reference (i.e. works in a lab, white lab coat, goggles), male, neutral (i.e. anyone likes to observe the world), positive connotation (someone who is smart, really cool, nice, friendly).

	Number	Percent (N= 33)*	Example of responses
Stereotype	14	42%	a woman in a lab coat holding a beaker of green liquid wearing safety glasses
Male	1	3%	I picture a man in a white lab coat experimenting with different chemicals to see how they mix and if they cause a chemical or physical reaction with each other.
Neutral	13	39%	I think of someone out to discover something or working in a lab- or on a dig site. I think of a man or a woman (or possibly an animal experiment) out to find something and recording there data.
Positive	5	15%	I think of a smart, funny, charming person.

*Students' responses could fall into more than one category.

Post Survey Data

General Data

An important indicator of a successful camp are the number of participants who would tell others to attend and since most of the SciGirls participants heard about the camp via other people, these recommendations are crucial. All of this year's participants said that they would recommend this camp to a friend. All but one student claimed that their expectations for the camp were met. (The one outlier did not respond to this question.) The campers were asked to explain why they felt that their expectations were met. Below are a few comments.

I wanted a camp that did not just do the ordinary text book. Throughout SciGirls I forgot that I was actually learning which, to me, is a sign that it is a good camp.

My expectations were met for SciGirls because it was the most exciting thing I have done this summer. It was like no other science camp.

I learned much more than I would have in school and they let you work at your own speed and they made science fun

I was exposed to a wide variety of science in action.

Not only were they met, they were exceeded. I came the first day not all the excited, and will be going away not wanting to leave.

This is the best camp ever. I love that this camp showed many different fields of science through fun field trips.

To triangulate and support the campers' survey responses, we also surveyed parents on the final night of the camp. Parent surveys were handed out to parents/guardians as they walked into the reception. Of the 30 campers who were present, 25 (83%) parents completed a survey and returned it to the researchers. Based on these responses, we were able to identify the following:

- All of the parents surveyed felt that the application process met their expectations (88% strongly agreed).
- All of the parents surveyed felt that the information regarding the camp calendar and activities was well organized and arrived in a timely manner (92% strongly agreed).
- 83% of the respondents felt that the length of the camp was just right, the remaining 17% wanted the camp to be longer.
- All of the respondents felt that the cost of the camp was reasonable (88% strongly agreed).
- 72% of the parents said that their perceptions of WFSU had changed (more positive) as a result of the camp. The remaining 28% already had positive views of WFSU)

I had no idea how community involved they were!

At first I had no opinion of WFSU-TV, but now I know about its wonderful projects and programs.

The community involvement was great. Having the opportunity for the kids to learn about documentation of experiences was unexpected and appreciated.

We were already strong supporters of public radio and TV but our support is even stronger now after our daughter's SciGirls experience.

- 65% of the parents said that their perceptions of NHMFL had changed (more positive) as a result of the camp. The remaining 35% already held positive views.

NHMFL afforded my daughter the opportunity to discover herself

They are a great resource for the community.

I have always had a wonderful perception of NHMFL and this is yet another example of how to only expect excellence from such an outstanding establishment.

What I saw largely as an adult academic facility I now see as an organization dedicated to passion in science regardless of age.

Got to learn more about the lab and the wonderful people associated with it.

We're fairly new to Tallahassee, so this was our family's first time in the Mag Lab. We're looking forward to coming back for a formal tour.

Favorite Activities

The participants were asked to list their favorite activity and explain their reason. The results are below.

	Number	Percent (Students could list more than one activity)
SATS	12	40%
Wolf Preserve	7	23%
Animal Shelter	4	13%
FSU (Chemistry/Physics)	3	10%
Tubing/Swimming	3	10%
Quarry	2	7%

Gem Dig	1	3%
Water Testing	1	3%
Zero Emissions building	1	3%
All of the activities	1	3%

Changes in Science Interest

Based on the post survey responses, the majority of the participants felt that the camp had increased their interest in science (77%) and science careers (90%).

Has your interest in science changed?	Yes	No (b/c I already had a high interest)	No
Number	23	5	2
Percent (N=30)	77%	17%	6%

When the participants were asked to explain why they felt that their interest had changed, here are some of the comments that they wrote:

Yes because at first I didn't know that science could be so much fun.

Yes now I like science and I think I might get a career in science.

My interest in science has changed a bunch after doing SciGirls! I learned that after you go to college and get your degrees, you can sometimes just play around when you are doing a specific type of science. You can explore the world and its creatures all at the same time when you are doing science!

I liked science before but not nearly as much as I do now. Now I want to become a Marine Biologist and I used to want to become a doctor. After seeing all of the things they do I am interested in the subject more!

SciGirls has helped me learn fun ways to study science and to learn all the great things about the world we don't know.

Yes, I am now even more so interested and I am so amazed that there are so many possibilities and fields in science.

I say no because my interest hasn't really ever wavered. Experiences in the camp have only strengthened my interest in science.

I was not originally thinking of a career in the field of science but since the FSU day I have been intrigued by the

chemistry and physics demos.

My interest in science has changed since I began the program. Now I am way more interested in it. Since we got to go to so many places and meet a lot of scientists I got a better idea of what it really is like to be a scientist. By seeing all of this, and going to all the different places I got a lot more interested in it and saw that I like it even more than I thought.

Activities that had largest impact on students interest in science

In response to the question: Which activity affected your interest in science the most? Why?, we had slightly different rankings than the previous question related to favorite activities.

	Number	Percent (Students could list more than one activity)	Comments
Animal shelter	6	20%	<i>they all did but I think the animal shelter did because the surgery on the dog really taught me a lot about being a vet</i>
SATS	6	20%	<i>I think Saturday at the sea affected my interest in science the most because I didn't really think that I wanted to be a biologist but after spending just two days with one, I think its really fun now.</i>
FSU (Chemistry and Physics)	4	13%	<i>Probably the FSU day. We got to see 3 different areas of science, and it really got me thinking about my future.</i>
Wolf Preserve	3	10%	<i>Going to the wolf preserve and the animal shelter because it helped me realize what more i can do to help animals.</i>
Quarry	2	7%	<i>The Quarry because you learned all about rocks and minerals.</i>
Everything	2	7%	<i>I really don't know, it was all very thrilling and entertaining. I think they were all great.</i>
Geochemistry demonstration	1	3%	<i>when we made magma because it was a great experience</i>
Antarctic Research Facility	1	3%	<i>The Antarctic Research Facility because I learned that even in the freezing cold weather</i>

			<i>you can still have fun!</i>
Leon sinks/water testing	1	3%	<i>Leon Sinks, because of the water testing.</i>
Zero Emissions	1	3%	<i>The zero emissions house, it sparked an interest of what I want to do when I grow up!</i>
PBSJ day	1	3%	<i>The engineering day made me realize that engineering isn't all sitting in a cubicle all day typing on a computer. It can take field work and other more hands on stuff.</i>
Planetarium	1	3%	<i>Watching the movie in the planetarium really confirmed my interest in astronomy!</i>

Parent's Perceptions of Changes in Daughters' Interest in Science and Science Careers

Twenty three of the participants' parents completed and returned the parent survey. All of the parent respondents felt that the camp had increased their child's interest in science. And all but one of the parent respondents felt that the camp had increased their child's interest in science careers. (The parent, who was not sure, wrote that her daughter already had a high interest in science before the camp).

(N=25)	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
My daughter's experience at the camp increased her interest in science	22 (88%)	3 (12%)	0%	0%	0%
My daughter's experience at camp increased her interest in science careers	21 (84%)	3 (12%)	1 (4%)	0%	0%

Changes in Views of Scientists

Before the camp, few of the girls had a positive view of scientists (15%). Based on the post survey responses and subsequent comments, we saw a large improvement in participants' views of scientists with 77% of the respondents discussing a positive view.

	Changed from a stereotype/neutral view to a positive	Maintained positive view	Maintained stereotype of scientists	Maintained neutral view
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Number	16	3	4	7
Percent (N=30)	53%	10%	13%	24%

The four individuals who maintained a stereotypical view of scientists may be good candidates for a follow up interview to determine their reason for this response. The other students who responded positively said the following:

With my dad being a scientist I understood what lab scientists do but SciGirls showed other choices of science and what one can learn from them

I learned that scientists are just regular people that have amazing jobs.

Scientists have harder, but fun job than I thought

They taught me scientists are not just in a lab they work with animals, weather, and ocean life.

I didn't think scientists would be able to have so much fun in what they do, I had thought that they had to follow certain procedures. Instead they do what they need and are still able to enjoy it.

I realized that scientists do a lot more than just sit and research. They actually go out into the world and do stuff.

I already knew that scientists could be anybody but what did surprise me was the number of scientists that care about woman in science.

All-Girls Camp

Ninety three percent of the participants said that they liked the camp being just for girls. They gave the following responses:

It's important to keep girls motivated in science.

Because many people think only boys can do science.

It is promoting getting girls into science and showing them they are just as able to do what guys can.

I think that it helps everyone concentrate on the science aspect more.

I like the camp with just girls because we relate to each other better being just girls

All of the parents (N=25) thought that the single gender aspect of the camp made a difference for the campers.

I think it's very helpful for the girls to bond and support each other being "smart" without boy distractions.

At this age boys would be a distraction and the girls would be less apt to perform to their best abilities

I believe it was very valuable that it is girls only at this age. Gave the girls an avenue for confidence positive peer contact without the usual teenage sexual insecurities and pressures.

An interesting difference this year from previous years was that many of these participants seemed aware of gender differences in science fields, i.e. there are more men in certain fields and the historical discrimination women have experienced in many science fields. In previous years the comments always focused on how boys would be a distraction and the girls felt more comfortable. This year, 28% of the respondents were aware of gender differences in science fields.

	Felt more comfortable	Less distracted	Stereotype response	Gender issues in science
Number	10	10	1	8
Percent (N=29)	34%	34%	3%	28%
Example of student comment	<i>I felt less self conscious of my actions and I felt like I could open myself up more to the people in my camp.</i>	<i>I really think if there had been boys in the camp it would have been a distraction for everybody.</i>	<i>boys are more into sports</i>	<i>I think science the boys got ahead first [and now] it's time for the girls [to have a] turn.</i>

The two participants who did not like that it was an all-girl's camp gave the following reasons:

"I'm torn. I love the idea of getting more girls in the science field. I love how we become so comfortable with each other. I also like the boy/girl thing too. That's sort of an 'explains-itself thing'."

"I think some guys would have been okay. I mean, sometimes I felt like I was in henhouse or something. Everyone was all up to date on the newest songs and stuff, with memorized lyrics. I was kind of the only one not screaming at the sight of a giant spider or reptile."

The first comment shows that this particular student enjoyed the all girls atmosphere but felt it would have been nice to have boys there as well. The second comment shows another side of the gender stereotype that this participant has projected onto her peers at the camp. As observers

of the camp, we did not see all of the girls behaving as described. This participant could be an interesting choice for a follow up interview to determine the source of this comment.

Changes in Views of the Nature of Science

Although this camp did not focus on the nature of science, we thought it might be interesting to see if exposure to science and science careers changed students' views of the nature of science (NOS). Nine students either filled in a response that they had previously left blank or changed their responses to the qualitative VNOS questionnaire in their post survey. These responses were in the level one of NOS understanding. This small number may be due to the survey format. Students were given a hard copy of their original survey and asked to make any changes they felt appropriate. Few students did this, none of the SciGirls I made changes to their surveys. Perhaps, there were actually few changes in students' views of NOS or perhaps we should have had students re-answer the questions, thereby forcing them to respond.

To have more sources for this data, we also gave the students a quantitative survey pre and post camp. The responses were based on likert scale choices of strongly agree, agree, not sure, disagree, strongly disagree. The statements on the survey that participants responded to can be found in the table below. Each statement represented either a misconception related to the nature of science or a stereotype related to scientists. The number of participants holding these misconceptions or attitudes pre and post camp can be found in the far right columns.

Survey Statement	Explanation of Statement Rationale and Misconception	Number of pre-participants who held misconceptions	Number of post-participants who held misconceptions
a) Scientists mainly work on machines and computers.	This statement implies the misconception that scientists do not work with other people or outside of a lab setting. Those students who strongly agreed/agreed to this statement (held misconception) appear in the pre and post columns.	8 (27%)	4 (13%)
b) Scientists mainly work with other people to solve problems.	This statement implies the community of science. Those students who strongly disagreed/disagreed with this statement (held misconception) appear in the pre and post columns.	10 (33%)	9 (30%)
c) Scientists work on things that help the world.	This statement implies the altruistic nature of science. Those students who strongly disagreed/disagreed with this statement (held misconception) appear in the pre and post columns.	5 (17%)	2 (7%)

d) Scientists mainly work in sterile laboratories.	This statement implies the stereotype that scientists work in laboratories at all times. Those students who strongly agreed/agreed with this statement (held misconception) appear in the pre and post columns.	12 (40%)	6(20%)
e) Scientists mainly work alone.	This statement implies the misconception that scientists do not work in a community. Those students who strongly agreed/agreed with this statement (held misconception) appear in the pre and post columns.	0	0
f) Scientists make a lot of money.	This statement was given to determine participants' perceptions of scientists.	22 (73%) believed that scientists do not make a lot of money	22 (73%) believed that scientists do not make a lot of money
g) Scientists are typically men.	This statement also highlighted participants' perceptions of scientists. Those students who ascribed to the stereotype that scientists are male appear in the pre and post columns.	3 (10%)	4 (13%)
h) Scientists mainly work on things that have nothing to do with me.	This statement highlighted participants' perceptions of science and its relationship with their own lives. Those students who strongly agreed/agreed with this statement appear in the pre and post columns.	3 (10%)	0
i) Scientists always follow the steps in the scientific method	This statement highlighted the misconception that scientists follow a standard format for problem solving (i.e. scientific method). Those students who strongly agreed/agreed with this statement appear in the pre and post columns.	24(80%)	18(60%)
j) Scientists' conclusions are definite and indisputable.	This statement highlighted the misconception that scientific theories and conclusions are absolute truths and cannot change. Those students who strongly agreed/agreed with this statement appear in the pre and post columns.	3 (10%)	3 (10%)
k) Scientists do not discuss their conclusions before reporting them.	This statement highlighted the misconception that scientists do not work in a community where conclusions are discussed. Those students who strongly agreed/agreed with this statement appear in the pre and post columns.	1 (3%)	0

1) I don't know what scientists do.		0	0
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Based on this data, we can observe various findings. First, students coming to the camp knew that scientists do not work alone and all of the participants had some concept of what scientists do. Second, by the end of the camp all of the participants felt that they had learned about some aspect of science that related to their life and they all knew that scientists discuss their conclusions before reporting them.

Third, based on the pre survey data the statements where the most (higher than 10%) students held misconceptions before camp were “i) scientists always follow the scientific method” (80%), “d) scientists work in sterile laboratories” (40%), b) scientists do not work with others to solve problems (33%), “a) scientists mainly work on machines and computers” (27%), and c) scientists do not work on things that can help the world (17%). On the post survey all of these percentages improved (decreased) which is evidence that the camp affected some students’ views of NOS. All but the statement regarding scientists working with other people, showed an improvement of 50% or better (meaning half of the original misconception holders changed to the accepted view of science).

And finally, there were two statements that raise some concerns. First, three participants believed that science conclusions are indisputable before camp and after camp. These results highlight the need for some qualitative follow up with these students to determine where their misconceptions stem from. Perhaps they are so deep rooted that two weeks of a science camp could not overcome them. Second, before the camp three students thought that scientists were mostly male, then at the end of the camp this number increased to four. This result raises concern because the goal of the camp is to expose young women to female scientists and careers in the sciences. The majority of our presenters and science volunteers were women, therefore, it is strange that these four participants would still feel that scientists are mainly male. Again, this result requires some qualitative follow up to determine where these beliefs stem from.

Increased Confidence

Although increasing participants’ confidence levels is not a primary goal of the camp, each year, parents indicate anecdotally that their child’s confidence has increased. Consequently, this year we included it on the post parent survey. All but one of the parents indicated that participation in the camp had increased their daughters’ confidence in meeting new people and confidence in succeeding in science. (The parent who was not sure, indicated that her daughter already had high confidence.)

(N=25)	Strongly	Agree	Not Sure	Disagree	Strongly
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	Agree				Disagree
My daughter's experience at the camp increased her confidence in meeting new people	18 (72%)	6 (24%)	1 (4%)	0%	0%
My daughter's experience at the camp increased her confidence in succeeding in science	23 (92%)	1 (4%)	1 (4%)	0%	0%

This increase in confidence was also supported by teacher surveys and by camper comments as well.

Teacher survey responses:

The girls were much more talkative in the end of the camp than in the beginning. Some of the girls who barely spoke, even at the end of the first week, started to open up and participate actively in conversation.

Most of the participants' confidence levels grew within the camp. They were asking more questions of the scientists near the end and they were more willing to participate. I was very impressed that all of the girls could stand in front of such a large, esteemed crowd and give presentations as well as they did.

The biggest change I noticed in the participants from start to finish was the level of communication and social interactions between the participants and with the teachers, scientists, and experts.

Throughout the last few days of camp I was impressed by the conversations I witnessed the girls have with one another and with the adults. It was like a completely different group of participants than what I witnessed during the first few days of camp.

The confidence level of the girls increased over the two weeks of camp. This can be seen in the increase in communication level and social interactions of the participants with one another and the teachers, scientists, and experts they met during the camp.

As the camp moved on, they became more confident in being more engaged (academically) with each other, our guests and us (the teachers).

Camper comments:

The scientists showed me that if you're determined then you can do it.

Some really have inspired me to do whatever I want to do. They have really opened my eyes to all the possibilities. In the future, maybe even more of a role model.

I saw the women scientists as people who could do things men could and that boosted my confidence in me and my capabilities.

Scientists as Mentors

Before the camp, 46% of the participants had never met a scientist. This camp provided them with not only the opportunity to meet and talk to scientists but to learn more about what they do. By the end of the camp, all but one student said that they had met a person during the camp who could serve as a science role model or mentor (one student did not respond). One of the goals of this camp is to help students learn more about science and science careers, it is wonderful to see that an unintended consequence of this goal is exposing girls to science role models and mentors. To conclude, we chose to let the students and parents speak for themselves.

Student comments:

They were great people and worked well with us. I think most of the SciGirls enjoyed and appreciated their time with us and that's all I can ask for in a role model or mentor.

They care a lot about science and know what you have to do to learn about and get a career in science.

I saw the women scientists as people who could do things men could and that boosted my confidence in myself and my capabilities.

They can teach me things my school teachers can't.

Parent comments:

We have enjoyed seeing [our daughter] experience many different science fields. I think the diversity you provide is outstanding.

Great camp! She loved it. I am so glad she was accepted and able to attend. Her biggest problem is that she is now interested in lots of different science areas.

The field trips in the camp made up for a lackluster school year. Thanks so much!

I really wish you could do this more than once a year. It is highly motivating for the girls and keeps them engaged in science. It was very informational and wonderfully organized. I truly appreciate all your effort and can't thank you all enough, to what it has provided to my daughter "Experience of a lifetime" Thanks.

keep on going, the program is very broad which is great! If there is any way that our dept. Biomedical Science, Women in Math Science and Engineering, Computer Science can help out please let us know

"Best. Summer. Camp. Ever." Direct quote from our soon-to-be-sixth grader, and believe me we've heard it often over the past two weeks.

Thank you so much! Excellent diversity of experiences, exposure. Excellent hands-on experiences--hooks girls and makes it fun and interesting.