2006 Sisters4Science Program Report

"I know that I can be a leader because of Sisters4Science. S4S means everything in the world to me."

S4S students learning how to perform a proper breast exam with Dr. Bellamy-Peyton.
Photo M. Joseph © Project Exploration

S4S students using teamwork at the 2006 Leadership Retreat in Lake Geneva.
Photo M. Joseph © Project Exploration

"I used to think I was never going to be excited about science and that it was just another subject, but now I know that it's possibly the best subject ever and is very important."

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S4S students admiring Field Museum zoologist Dr. Reddy's bird collection.
Photo M. Joseph © Project Exploration

Rana comparing a cat bone to a bone on the mounted cat skeleton.
Photo M. Joseph © Project Exploration

Jasmine, Rashawndria, Domonique, and Brandy busy writing in their journals at the Leadership Retreat. Photo M. Joseph © Project Exploration

Karis doing a chemistry experiment with chemist Dr. Laurie Parker watching the outcome.
Photo M. Joseph © Project Exploration

S4S students from Young Women's Leadership Charter School enjoying the 6th Annual Girls' Health and Science Day.
Photo M. Joseph © Project Exploration

Shania, Maria, and Jennifer working on their final projects.
Photo M. Joseph © Project Exploration

Project Exploration is a nonprofit science education organization that works to make science accessible to the public—especially minority youth and girls—through personalized experiences with science and scientists.

Project Exploration specifically works to

- create opportunities for meaningful interactions between science and the public—especially populations least likely to have direct access to science;

- equip minority youth and girls with the inspiration and tools to transform their lives by offering opportunities to interact with scientists, as well as hands-on experiences with the wonders of science;

- connect students, teachers, and families with authentic science and practicing scientists in order to support lifelong learning, equal access to opportunity, and scientific literacy.

Project Exploration meets its mission through youth development programs, services for schools and teachers, and public programs such as exhibits and online initiatives.

In 1999, Project Exploration created Sisters4Science (S4S), a weekly after-school and field program that combines science exploration with leadership development for minority middle and high school girls. The primary mission of S4S is to provide a safe place for girls to come together and learn about science and practice their leadership skills. Field trips and other Project Exploration events complement the girls' S4S experience.

The sessions are held weekly at each school site for two hours and typically involve 8-14 girls per session. Each class includes a reading/writing and discussion component and a science exploration activity with a woman scientist or Project Exploration facilitator. Girls co-create the curriculum and have chosen in the past to investigate such topics as genetics, chemistry, and engineering. Girls are also given the opportunity to attend field trips and special Project Exploration events, which have included visits to the Northwestern University Engineering Career Day, ReptileFest and the Fall Leadership Retreat in Lake Geneva. In addition, all Sisters4Science girls in grades 6 and above are given the opportunity to attend our annual Girls' Health and Science Day where over 90 girls come together to meet scientists and attend workshops on topics such as building strong relationships, sex education, and self defense.

Sisters4Science began with Triumphant Charter School in the Auburn-Gresham neighborhood in Chicago as the first school partner. Three years later in 2002, S4S expanded to Young Women's Leadership Charter School in the Near South Side neighborhood in Chicago.

The 2005-2006 school year marked another period of program growth and expansion for Sisters4Science. Barbara Sizemore Academy, formerly known as Triumphant Charter School and Young Women's Leadership Charter School (YWLCS) continued their strong relationship with Project Exploration, and two more Chicago Public Schools were added as Sisters4Science school partners: Nettelhorst School in the Lakeview neighborhood on the north side and Perspectives Charter School on the Near South Side.

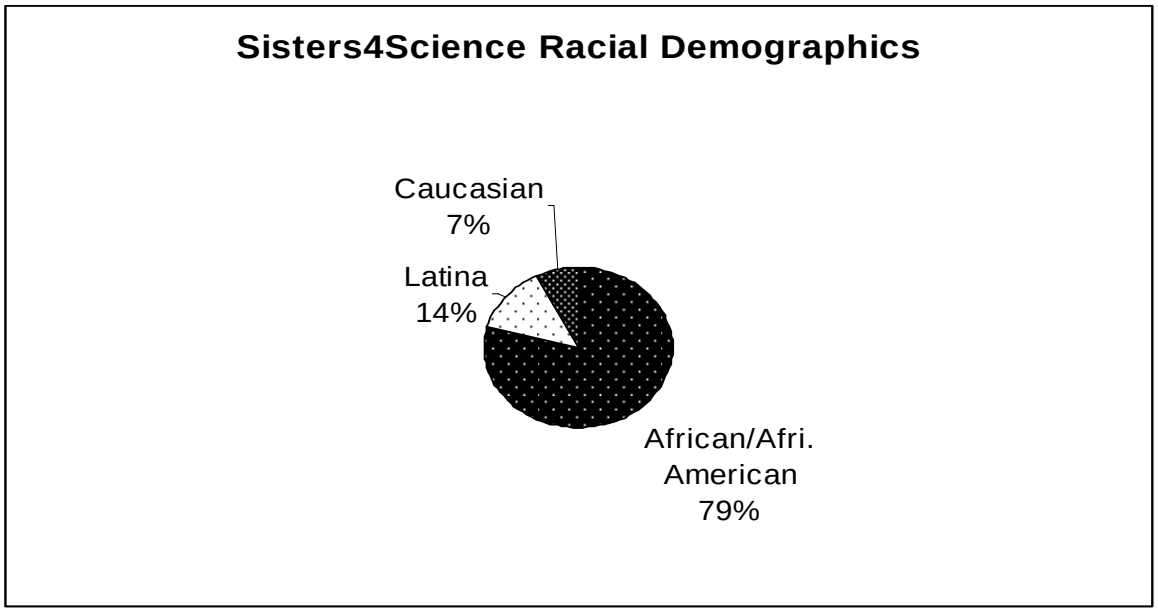
Sisters4Science completed a full school year of programming at Nettelhorst School and ran a 7-week pilot program at Perspectives Charter School from March 14, 2006 to May 2, 2006, with the intent of running a full year of programming beginning in Fall 2006. The program

expansions and continued presence at Barbara Sizemore and Young Women's Leadership Charter School have generated interest and excitement among the program participants and will help strengthen the Sisters4Science school presence next year.

This year, 96 girls attended at least one S4S after-school session, a 41% increase in students served from the previous year! An average of nine girls from each school attended the weekly sessions. Due to holidays and various other special days off, the S4S partner schools had different numbers of S4S sessions: Barbara Sizemore Academy led with a total of 25 sessions, Nettelhorst had 23 sessions, Young Women's Leadership Charter School had 21 sessions, and the pilot program at Perspectives Charter School had 7 after-school sessions.

Seventy-nine percent of the girls who attended a S4S session were either African or African American, 14% were Latina, and 7% were Caucasian students. (See Figure 1 below.)

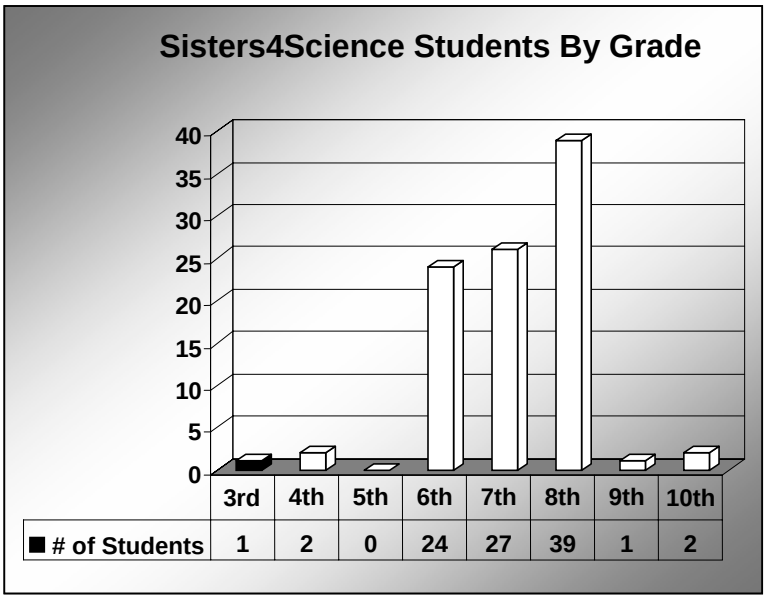
Figure 1



Project Exploration strives to provide programming to students that reflect the overall racial demographics of the Chicago Public Schools, in which 49.8% of its students are African-American, 38% are Latino, 8.8% are Caucasian, 3.2 % are Asian/Pacific Islander and .2% are Native American. (Source: http://www.cps.k12.il.us/AtAGlance.html).

In the past, Sisters4Science typically has targeted 7-8 grade students; however a dedicated group of sixth graders and the youngest Sisters4Science students to date, a small group of third and fourth graders, regularly attended the weekly sessions. Figure 2 illustrates our success at providing programming for 7th and 8th grade students; giving the lower grade students an opportunity to participate in Sisters4Science will allow Project Exploration a chance to have a longer personalized relationship with the students and thus hopefully have a greater impact on their leadership development and interest in science.

Figure 2



The S4S program year begins as participants complete a needs assessment survey where they indicate how they enjoy spending time, the areas of science they are most interested in learning about and what they would like to learn in Sisters4Science. For the three partner schools who participated in Sisters4Science for the entire school year, the needs assessment was used to create three distinct areas or units of focus: 1) *Body Systems and Comparative Anatomy*, 2) *The World of Engineering*, and 3) *Life Through Time*, from the perspective of the geologic timeline. Each area of focus lasted approximately 3 months. Because the program at Perspectives Charter School took place over a seven week period, the students focused on the third unit, *Life Through Time* which was in step with the other three partner schools.

In the *Body Systems and Comparative Anatomy* unit, students learned about the different human body systems and how human anatomy is similar to the anatomy of dinosaurs, cats, and snakes. A pediatrician talked frankly about body changes and demonstrated how to perform a proper breast exam. The highlight was having each girl feel for potentially cancerous lumps on breast models. A paleontologist helped the girls assemble scattered cat bones into a full skeleton while observing the relationship of the cat to the human skeleton. A field trip to Project Exploration's dinosaur GIANTS:African Dinosaurs exhibit at the Gail Borden Public Library in Elgin was used to put the S4S classroom experiences into context.

Akilah assembling a cat skeleton with paleontologist
Dr. Allison Beck looking on. Photo M. Joseph © Project Exploration

While focusing on the second unit, *The World of Engineering*, students were exposed to various disciplines of engineering. A computer engineer worked with the girls to design a web page. An industrial engineer worked with the girls to 'act out' a production process of a factious item and had them calculate the cost of materials and identify the pros and cons of manufacturing the product. A mechanical engineer had the girls design a paper car that could travel the farthest distance with one puff of air by using a designated set of materials. As a wrap-up activity to the engineering unit, many girls attended the Northwestern University School of Engineering annual career day for girls. They were able to visit various engineering labs, see engineering professors and students doing real science experiments, and were able to participate in various hands-on design activities which required them to use their critical and analytical thinking skills.

In the *Life Through Time* unit, the girls learned about units of time and specifically the history of the Earth. They made personal timelines which served as a starting point for their more in depth discussion of the Earth's formation 4.6 billion years ago. An evolutionary biologist and zoologist from the Field Museum helped the girls understand the specific eras in the Earth's history by allowing the girls to make casts of fossils millions of years old, in addition to having an up-close and personal encounter with a live turtle. Many of the students attended the ReptileFest event at the University of Illinois at Chicago and were able to make further connections between where reptiles and humans fit in the geologic timeline.

Field Museum zoologist Dr. Sushma Reddy explaining where her turtle Charlotte fits in the geologic timeline.
Photo M. Joseph © Project Exploration

S4S girls holding a snake at ReptileFest.
Photo M. Joseph © Project Exploration

To fulfill our mission to connect students with practicing scientists and provide engaging authentic hands-on activities, we strategically identified a group of female scientists who could present and attend Sisters4Science sessions. As a result, a total of sixteen women scientists were selected to attend the S4S sessions in order to support the above mentioned three areas of focus. On average, each school had the opportunity to meet and practice science with seven different scientists throughout the school year.

Before programming began in October 2006, a push was made to recruit a more racially diverse group of women scientists who could join the Project Exploration scientist network. Thirty-five new scientists were added to the list of sixty-one scientists already in the Project Exploration database. As Sisters4Science expands to other partner schools, building a solid and diverse female scientific community will be key to providing high quality and authentic science experiences.

Women scientists who had lunch with students at the 2006 Girls' Health and Science Day
Photo S. Mann @ Project Exploration

During the school year, a total of twenty-one scientists participated in S4S sessions or engaged with girls during field trips or other Project Exploration events such as Girls' Heath and Science Day. This number reflects those women who could not present at an after-school session, but who could attend an activity such as a Saturday field trip. In addition, several of the scientists donated their honoraria back to the program, enabling books and science kits to be purchased for the girls and their science classrooms. The girls were fortunate to have at least one scientist attend each of the seven field trips and special events during the school year. This desire of the scientists to 'give back' illustrates the positive experiences they had with the girls and makes a strong statement about their commitment to inspiring the girls through personal interactions.

Sisters4Science Program Goals and Words from the Sisters

The following section outlines the core Sisters4Science program goals and uses the program activities and the girls' own words to illustrate the impact the program has had on their lives.

GOAL: Create a safe space for girls to explore science and develop leadership skills.

A key goal of S4S is for girls to feel safe in the S4S environment so that they feel comfortable practicing their leadership skills and confident in being more inquisitive about science. The first several sessions are used to build a sense of community and team spirit among the program participants. The girls work on developing a Code of Conduct which is used to outline behavior expectations and helps to create a shared sense of values.

Below are some responses when girls were asked why they came to S4S and if S4S had been a safe place for them to learn about science:

"Sisters4Science feels like home."

"S4S gives me the chance to see the fun side of science."

"Sisters4Science means learning to be yourself and being confident."

"S4S space is a place where I can bond with new friends; it is a place for me."☺

"I come to Sisters4Science to learn something new and to extend my knowledge of science."

GOAL: Expose girls to the wide variety of roles played by women in science and the women who play them.

The following is a list of fields of study represented by scientists who presented at after-school sessions: chemist, pediatrician, pharmacologist, industrial engineer, mechanical engineer, computer engineer, packaging engineer, industrial engineer, chemical engineer, scientific illustrator, environmental engineer, zoologist, paleontologist, and evolutionary biologist. Eight of the women scientist presenters during the 2005-2006 school year were African American, whereas there were no African American scientists who presented at a S4S session the previous year. Continued efforts to attract a racially and professionally diverse group of scientists will strengthen Project Exploration's ability to expose girls to a wider range of roles played by women in science.

Hear how the women scientists influenced the girls' perceptions of science and the role of women in science:

"Because I have met so many scientists, when I grow up, I may want to be one."

"S4S showed me that I can make a difference as a woman; I am a part of something important."

"I used to think there was only one career in science, but now I know that there are <u>so</u> many scientists and I would like to explore them all."

"Sisters4Science means meeting different scientists and learning what they do."

"I enjoyed the pediatrician because she tells young girls about birth control, safe sex and healthy and unhealthy relationships. This is important because this information prevents pregnancy and all types of illness, and making the wrong choices. It's about your life."

GOALS: Help girls develop self-awareness/identity/role in society self-esteem about their thoughts, feelings, experiences and decisions.

Girls' interests shape the curriculum.

During the journaling portion of each session, girls are usually given a prompt to write about and then asked to read and discuss the journal entries as a group. This process validates the girls' thoughts and encourages them to become more confident in expressing their emotions and feelings. Inevitably the discussions lead to issues surrounding identity, self-awareness, self-esteem and other issues affecting the girls' lives. These open and honest conversations are used to shape the content focus of each session.

The following quotes give insight into how the girls felt they had been influenced by S4S:

"Sisters4Science showed me that I could be anything I set my mind to."

"Sisters4Science means expressing myself through science."

"I used to be a little impatient, but now I am willing to wait until I get my chance."

"Because of S4S, I can talk about science without being embarrassed or scared."

"I used to be mean and mad and have a bad attitude, but now I am nice, funny and have a good attitude."

GOALS: Create an alternative educational model that combines science with leadership development.

Improve girls' overall school performance by developing goal setting, decision making and communication skills.

Although Project Exploration does not currently track the grades of its S4S participants, each after-school session and field trip experience is designed to expose the girls to science and give them the maximum opportunity to practice their decision making, communication, and leadership skills. It is Project Exploration's belief that through these personalized experiences and highly structured activities that the girls will develop more confidence in their academic ability and learn practical knowledge that will ultimately translate into better grades and proficiency in their school classes.

An annual leadership retreat sets the tone of the group of girls by encouraging and challenging them to explore unfamiliar things and provides them with tools to be a better team player. This year's retreat was held in November 2005 in Lake Geneva and facilitated by Aurora University's

School of Experiential Leadership. Eleven girls had the opportunity to learn and practice team building and leadership skills through challenging group exercises. Chemist Dr. Laurie Parker also attended the retreat as a chaperone and resident scientist, which allowed the girls to ask questions about science and provided them with personal access to a practicing female scientist.

The comments below illustrate what the girls took away from the retreat experience:

"What I enjoyed the most about this leadership retreat is meeting new people and learning how to be a better team player and leader."

"I learned that when doing an experiment, try more than one idea."

" I learned to express my ideas more because they might be good ones."

"I learned that everywhere you go there is science, whether its food, cars, lights…"

"I learned that sometimes I'm acting like a leader, but I don't even know it."

GOAL: Raise public awareness of issues facing girls' science education.

Project Exploration's Girls' Health and Science Day (GHSD) is a one day annual conference that brings together approximately 100 girls and their teachers and parents from various Chicago Public Schools to talk and learn about issues facing girls. A goal of the conference is to provide a forum for girls and the adult chaperones to talk and get medically accurate information about otherwise sensitive and uncomfortable topics such as sex and how to identify an abusive relationship. This year's event took place on April 28 at the University of Illinois at Chicago. The adult participants attended a professional development track facilitated by Girl's Best Friend Foundation and the Chicago Girls' Coalition. The focus was to discuss practices and activities that support leadership and strong relationships among girls.

The student participants had the opportunity to attend three workshops from a selection of five different presenters focusing on topics such as *self defense*, *gender and sexuality*; the facts about *sex and sexually transmitted diseases; healthy and unhealthy relationships; and understanding the changing body*. Thirteen women scientists representing various scientific disciplines joined the girls for lunch, many of whom had presented at a Sisters4Science session.

The following are comments made by some student participants on what they had learned during the days' activities:

"Before attending GHSD, I used to think that I was worthless, but now I think that I am worth something."

"Before attending GHSD, I used to think that being a woman wasn't something to be proud of, but now I think that being a women is something to be proud of."

"Before attending GHSD, I used to think that science was interesting, but now I think that it's even more interesting."

"Before attending GHSD, I used to think that many people didn't feel some of the same things I did, but now I think that I'm not alone in my curiosity."

"Before attending GHSD, I used to think that I didn't have much say in my relationship, but now I think that a relationship isn't a relationship without my say."

Showcase of Knowledge

At the end of every school year, Sisters4Science students have the opportunity to showcase what they have learned and taken away from their S4S experience. This year, the girls were charged with creating a final project that somehow represented their experiences in S4S and included one aspect of how science is done. The girls could work as a team or individually. Some chose to make posters using photos from the year, one student made a diorama, another student created a poem, and several students made scrapbooks. The projects were presented at the last Sisters4Science after-school session, and several parents and teachers attended the presentations.

To celebrate the year of learning and discovery across schools, Project Exploration annually organizes a Sisters4Science culminating event called the Showcase of Knowledge. This year's event was held on May 23 at the Adler Planetarium, overlooking beautiful Lake Michigan. Students, their families, teachers, scientists, Project Exploration staff and supporters were invited to come celebrate the girls' achievements. The evening began with a show in the Sky Pavilion and after the show guests were ushered to the Adler café which had been converted into a mini museum. Guests were encouraged to view the girls' final projects, the numerous photos of the year's sessions on display throughout the café, and quotes taken directly from the Sisters.

Sisters4Science, Junior Paleontologist and Dinosaur Giant alum Kendra Smith delivered a touching and inspirational keynote address. The highlight of the evening was the student presentations, where the girls got an opportunity to share with the 60+ guests what S4S had meant to them.

S4S students celebrating at the 2006 Showcase of Knowledge
Photo G. Lyon © Project Exploration

Sisters4Science on the Horizon

The 2006-2007 program year of Sisters4Science will be another exciting period of learning and exploration. In addition to sustaining our partnerships with Young Women's Leadership Charter School, Barbara Sizemore Academy and Nettelhorst School, we plan on running a full year of programming at our fourth partner school, Perspectives Charter School. Our intent is to expand to other partner schools as our capacity increases.

The new program year will be an equally exciting time for our Women in Science initiative. We will continue to reach out to our existing pool of women scientists and continue to recruit new scientists into our growing network. We plan to host a strategic planning session for key scientists and students to begin developing the framework of a formalized relationship with our Women in Science. Ultimately, we will provide training to the scientists on working with minority girls and classroom management skills. We will continue to expand and improve our Women in Science luncheon so that the student time spent with the scientists is informative and engaging. We will also continue to develop a summer field component that will provide girls with immersive field experiences.

Project Exploration hopes that you have enjoyed a journey into the program year of Sisters4Science. If you have any questions or would like more information about Sisters4Science or Project Exploration, you may contact Kristin Atman, Manager of Science Programs at 773-834-7662 or at katman@projectexploration.org. You can also visit us online at www.projectexploration.org.