

## **“Math is hard, Mom”: What one parent did to prevent her daughter’s metamorphosis into Barbie**

Laura Reasoner Jones  
Fairfax County Public Schools  
[Laura.jones@fcps.edu](mailto:Laura.jones@fcps.edu)

It was an eye-opening experience for me:

In 1995, at the open house for the new science/technology magnet school where my ten-year old daughter had been invited to attend, we joined other parents and students for an exciting two-hour session observing and participating in computer simulations, science demonstrations and language arts projects. Afterward, my excitement about the coming school year was dampened by the realization that every time Julie went to try one of the math/science/technology activities, she had been pushed out of the way by the boys, or had not been called on by the group leader. She had not been willing to try the new activities, and she, too, was aware of her reluctance. Back in the car, she said, “Math is hard, Mom.” I felt like I was talking to the recalled Barbie doll.

Apparently it wasn’t going to be enough to provide a good education and an enriched home environment for her. Something had to be done to make her feel more confident about math and science.

I knew that I had to act, and act quickly. So, I began to read and plan.

I pulled the Legos out of the basement closet. I stopped belittling my own math skills. And, I didn’t enroll my daughter in the magnet school, deciding instead to fight this battle on her own turf. She returned to her neighborhood elementary school, where I started an after-school math-science club for girls only. I enlisted her fifth-grade teacher who leaped at my suggestion and our club was born.

The elementary school where GEMS (Girls Excelling in Math and Science) began was a “special needs” school, so designated because of the diversity of students’ cultural and socioeconomic needs. The girls who enrolled were always mixed in fifth/sixth grade levels. Because we felt strongly that this should not be a remedial or a gifted program, we had a wide ability range, also. Many girls’ English was not at the standard proficiency level.

We chose activities we thought would be fun and interesting and used whatever resources we could find. My favorites came from Scientific American and from Mensa publications. My co-leader drew from her many years of experience and her attendance at Virginia Science Museum weekends. We explored geometry with hedrons and topology with moebius strips. We

developed our own mazes and codes. We participated in the Internet M & M survey and in the Estimation Olympics. We learned several number games and strategy games and we explored optical illusions.

My co-leader said, "I wanted to make it [GEMS] so much fun and special that girls would feel good about coming and other girls and boys too would be envious and wish they could be in GEMS."

The second year included activities in chromatography, culminating in making GEMS T-shirts with chemical reactions. We had a guest speaker, a female cartographer from the National Geographic Society, who led us into maps and a topography scavenger hunt. We did an estimation activity with drops of water on pennies and experimented with movement and flight with rocket pinwheels and balloon trolleys. We tried new things each year. Over the last ten years, I have consolidated the favorites for access from the club Web site: <http://www.gemsclub.org>

Over the years, my goals crystallized and I was better able to articulate them. I wanted the girls to try new, challenging activities and to try them in a place where they would not experience failure in the typical school sense, but would know that it was part of growing to take risks and make mistakes. In addition to experiencing new math/science activities, I wanted them to trust and respect each other.

Each semester I tried to point out that math and science are made up of many different types of skills within the subjects. I tried to show them that they might intuitively grasp logic/strategy problems, but not have a clue, for example, how to visualize and build a structure that would support a can of Coke. This disparity in skills in school could result in a lower grade, but in GEMS, it meant that you should seek a partner who needs your skills and who has the skills you need. My goal was to help these girls realize and celebrate their potential.

After three years, I decided to measure the effects of the club on the girls and their attitudes. I did this again after seven and eight years, when the original group of girls was ready to graduate from high school.

## **Findings**

I collected data by:

1. taking anonymous surveys before and after the 8-9 week sessions
2. asking questions of the classroom teachers
3. interviewing parent-child teams
4. completing a research log of my feelings and ideas

The surveys completed anonymously at the beginning and ending of each group of sessions revealed that the GEMS club meetings were important to the girls. They wanted to be challenged and they wanted to do well in math and

science. I always asked them what subjects were hard and easy for them in school. The only subject consistently mentioned as "hard" was spelling. Some girls said science was hard and math easy; some said the reverse. One girl reported that all subjects were easy, but that "thinking" was hard.

Their goals were exciting. Their dreams for future occupations ranged from dentist to archaeologist to marine biologist to botanist to physical therapist to mom to secretary to cellist. One girl answered "either pro athlete, actor, doctor, or all."

The fifth and sixth grade teachers saw a difference at the end of the year. Many girls shared their experiences in class or in animated discussions before school. Some of the boys became interested in the activities.

The teachers indicated that they had seen more risk-taking by "borderline" girls. "A few have blossomed" was another comment. One example of this occurred during the third year. Before this session began, the counselor added the name of a girl who had expressed an interest in GEMS. The counselor implied that she wasn't sure the new girl, Eliza, could keep up, but that Eliza wanted to try.

I observed her during the first few sessions. Because of her apparent limited English proficiency, Eliza sat quietly and talked to few other girls. She participated in the activities but rarely spoke. One day we played a strategy game where the girls had to work in pairs. Whoever won two out of three games went on to play the winner of another pair. At the end, the last two players played the game on the chalkboard for everyone to see. Eliza beat the entire group! She seemed to show an intuitive grasp of the strategy involved. We saw many smiles as we left that night.

I wrote an article for the school newsletter and listed her as the winner. Eliza received many congratulations from teachers and children in the school. According to the ESL teachers, Eliza changed after that time. She showed more confidence in herself and began to excel.

The fifth and sixth grade teachers also felt that the girls looked forward to Thursday afternoons. They indicated that some girls had developed more independence and that others were beginning to show respect for each other. The principal felt that GEMS had increased the comfort level of girls in math and science. She said that "anytime we can provide an opportunity to expand horizons, we should do it."

### **Parent/Child Interviews**

During the fourth year, I also interviewed six girls and their parents in order to explore the impact of the GEMS program on girls and families. Girls were chosen by age: one or two from each grade level (currently fifth, sixth, seventh, and eighth.)

Six mothers and one father participated in the interviews. The memories of their daughters' experiences were very positive. One mother said her daughter

was "always late leaving the building" and "always had a good time." Another mother remembered that her daughter was "thrilled" when she was invited to join GEMS by her teacher. One parent reported the pride in her daughter's voice when she showed her mother the structure she had designed and said, "We built that."

These parents enrolled their daughters in GEMS for different reasons. One mother said that she had had trouble in math and wanted to take steps to prevent problems for her daughter. Other parents said that their daughters had asked to join; they had talked with their friends. No parents indicated that any pressure was placed on their daughters to join.

Several parents complimented the caliber of their daughters' math and science teachers, particularly at the Middle School (seventh and eighth grades.) These parents were convinced that their daughters were receiving excellent instruction and were being challenged.

This group of parents was asked how their daughters were doing now in math and science. One mother reported that her daughter, a two-year member of GEMS, figured out the experiments and "runs" her science lab group. The girl attended a private middle/high school. Her mother saw more creativity in her daughter's approach to problem solving, especially in science, which she loves.

Both eighth graders interviewed were taking ninth grade Algebra. One girl struggled at the beginning of the year but was now doing well; the other girl was excelling.

One girl who was interviewed was visually impaired and used an array of technological devices to help her in her schoolwork. Her mother reported that her daughter was doing very well and had a strong self-concept about all academic areas except science. This girl's visual impairment made lab work difficult.

I asked parents if participation in GEMS had any effect on their daughters' attitude toward math and science. One mother described her child as frustrated at her ability to solve problems, but said that her daughter now seemed to have higher expectations of her own ability and less frustration. She said she never saw the "I don't understand" panic she saw before. Her daughter "could figure things out now", and also knows it is "OK not to know how."

Another mother stated that GEMS engendered a contagious excitement that "math was cool." The girls were excited about the activities and enjoyed being with "just girls."

One parent reported that the group identification "We are GEMS" made a positive difference. Her daughter had made an active choice to join, thereby making a statement about herself: "I choose to spend time on math and science." She believed that her daughter's participation helped her gain admission to summer enrichment programs and into a private girls' high school, where she will start in the fall. Another girl chose "advanced math" as her after-school activity when GEMS stopped.

My own daughter began to describe herself as someone who was “good at math” and seemed to take this for granted. She never studied for math tests and exuded confidence. She attended “Girls in Math and Science” conferences at her own request and gravitated toward the presenters from the Air Force.

As a contrast, I asked the parents what their experiences had been in math/science/technology. Most of the women’s responses were laughably similar:

“Oh, God!”

“If only someone had said, ‘this can be fun.’ ”

“I was terrified.”

“Math made me sick to my stomach.”

“I struggle.”

“Cuneiform tablets constituted my technological experience”

“I took Statistics six times.”

“I failed Algebra.”

“I took Geology for my science requirement.”

“My only success was Geometry.”

“My lab partner in nursing did the math for me.”

Each of these women has at least one college degree; all are working in professional jobs.

One mother said, “I was an oddity; I was good at math and science. But it never crossed my mind to go into math or science for a career. I became a librarian.”

Another mother’s response was interesting: “I got pushed through school in math and science and didn’t take the advanced math in high school or college. I don’t use them (math/science) now.” Her job? As part of a publishing company, she does budgeting and forecasting for her entire department. She learned these skills on the job.

The father who was interviewed said that he had always regretted not becoming a math teacher. Math was his one good subject and he loves physics now.

Another mother, a teacher, said that she wanted to do well in math until she hit algebra. She said she ‘squeaked by’ in college, only taking the minimal amount. She laughed now and said, “It’s never too late to feel good about math.”

I asked the parents about their daughters’ futures: what they saw their daughters doing and if they had any concerns. Several parents expressed anxiety about financial stability for their children. They were concerned that even with a good degree, the girls won’t be paid what they’re worth. One mother (with three girls) said, “It’s much harder [to think about futures] than if we had had boys.” She cited family members whose equally talented and qualified girls had experienced more difficulty than their brothers finding jobs in business.

Another mother said that girls have a tougher road. She was very concerned about how her daughter will reach her goals. She emphasized the need for mentors for these young women "to keep the spark going."

But another mother saw her daughter as having "enough confidence to push herself. The school [the private girls' high school] will bring out her strengths and support her."

One observation I made after these interviews was that parents whose girls were heading toward a liberal-arts/writing/theater career apparently had fewer concerns about their daughters' futures. But parents whose daughters were leaning toward science or technical careers were very concerned. Each one of these parents apparently felt a need to push and support their daughter's career goals; they were not optimistic about the future. They respected their daughter's talents and abilities, but feared that society would not.

When asked if they felt girls and boys are treated differently in school, three out of the seven parents said "No." One mother said she never thought of it as a problem. But the other four said an emphatic "Yes," citing instances they had observed and had reported. One mother who worked in a school stated that even the language used with boys is different.

Another mother said very succinctly, "It is expected that a boy will do well." She described the "Math Meets" at the high school, where in a crowded classroom packed with boys, there were only four or five girls. She felt that nothing was being done to change that. Another mother contended that the louder, more aggressive boys were heard and attended to more.

The parents interviewed welcomed the opportunity to discuss this portion of their daughter's life. One mother strongly supported the need to find mentors for 'our girls.' She mentioned that the GEMS conference sponsored every year by AAUW was just a beginning, but thought that more should be done. "Girls should be able to see women at work and learn about other occupations. They should hear the women describe their career paths: 'How did you get where you are? Was it worth the struggle?'"

Another parent felt that her daughter's high school did nothing to encourage girls in math and science and that peer pressure still said, "It isn't cool to be mathematical." One mother said, "My goal is for my girls to be successful and to be happy in what they're doing. I would like them to be supported [in their workplace] rather than every day fighting the fight."

As a final question, I asked them if they would enroll their girls in GEMS again. "In a heartbeat," said one mother. "I can't imagine any parent not jumping on this opportunity," said another. A third parent said, "GEMS was the only outlet available to give her a different positive attitude."

The same parents were interviewed four years later to survey their recollections of the GEMS experience and their perceptions of their daughters' progress and futures.

One parent said that her daughter said, "I still remember GEMS." She said that she felt the GEMS experience taught her daughter to "think outside the box" and that it helped her to "look at math and science as it applies to life, not just as a class."

Another mother, whose daughter was a senior in a private, all-girls, school, describes her child as "very successful" in math and science and "very comfortable" with technology. While this girl has never had any intention of going into a math/science/technology career, she took 4 years of high school math and science. This mother says that her daughter has "integrated technology into her life."

A third mother feels that GEMS "built up her [daughter's] confidence. She said that in 8<sup>th</sup> grade, she and her daughter watched other girls struggle in Algebra 1 and repeat it in high school. She describes her daughter as "excellent" in math.

Another mother felt that GEMS "had a lasting effect" on her child. She felt that the club, with its emphasis on math/science/technology, did a good job of beginning a necessary process. She feels very strongly, however, that the schools fell short of providing any meaningful career directions for girls. More of her comments are included with her daughter's interview.

Another mother described her daughter's success in advanced math and science as a junior, and her plans to continue those courses next year. She commented on her daughter's increased confidence in these technical fields and is encouraged for her future success.

In the fourth year of the club, I also interviewed six girls separately from their parents. When asked why they joined GEMS, most of the girls said that they liked math and science and they thought the experiments would be fun. One girl said, "A lot of kids have a negative view of math and science. But it can be a lot of fun if you think of it that way."

They all mentioned at least one or two memorable activities that they especially enjoyed:

- A deer/food/predator habitat game
- Hex (a strategy game)
- Chromatography
- Making tee shirts
- Building bridges out of candy
- Building structures out of newspaper to touch the ceiling

When asked about their own experiences in math, science, and technology, every girl mentioned computer games she enjoyed. Some of these were math/science related: Eco-Quest; The Search for Cetas; Math for the Real World. Other girls liked trivia games such as Jeopardy, Super Solvers, and the Carmen Sandiego series. One of the eighth grade girls enthusiastically described her work in science this year drawing Bohr models of elements in the periodic

table with computer graphics programs. It was interesting that every student mentioned computer games when asked the question: "Describe your experiences with math/science/ technology."

I asked the girls to tell me how they were doing in math and science now. Most girls indicated they were doing well. The eighth graders were enrolled in Algebra, the more advanced of the available math classes. One of these girls said that Algebra had been hard for her in the beginning because it was so abstract, but that she was doing better now. She said, "Thinking in logic is hard." Another girl said that her biggest difficulty in science was in drawing conclusions after the experiment was completed.

I asked them if participating in GEMS made math or science any different – any harder or easier. Each girl said that these subjects were easier now. One girl said, "Science has been an adventure." Another said, "GEMS enriched my sixth grade." A third girl said that she was more equipped to attack strategy and logic problems.

The girls answered the question: "What do you see yourself doing in the future?" One girl wants to be a marine biologist. Another wants to be a mystery writer. A third wants to be a pilot in the Air Force, a flute player, a basketball player, and a writer. Another girl plans to be a movie critic. The other two don't have specific goals yet, but both expect to be working in a scientific or technology field.

I asked each girl if she had any last comments she wanted to share about GEMS, or about being a girl:

- "GEMS is a good opportunity. [Without it] I would never have been enthusiastic about science."
- "GEMS is exciting. It's fun to see what the teachers came up with."
- "It's fun to show your parents what you learned."
- "It's easier with just girls around – a lot more focused – it makes things clearer."
- "Girls can do as much, if not more, than boys can."

At the second follow-up, four years later as the girls were in high school or preparing for college, these six girls had grown into mature young women with definite ideas about past experiences and their futures.

When asked about their memories about the GEMS club, they each mentioned one or two activities they remembered and enjoyed: making bridges out of candy, making chromatography T-shirts, playing math card games, problem-solving in groups, Estimation Olympics, and the deer/food/habitat game. They also expressed positive feelings: that the club was "something fun-- to be involved in an after school club" and that "GEMS made math more fun." One girl expressed delight that she was part of the first all-girl program at her school. She said that it gave her a chance to "putz around and fiddle and not be made fun of." She also loved the articles in the newspaper about GEMS.

I asked them if they remembered why they enrolled in GEMS.



Although two of the girls said their mothers “made” them, one girl said that math was one of her favorite subjects—“I wasn’t interested in sports.” Another girl said, “I thought it would be fun, and it was!”

In interviewing the girls, I found their stories so interesting that I decided to describe them individually, rather than summarize. They each have important things to say, or to omit.

The youngest girl, currently a freshman, reported that she “really hadn’t done anything extracurricular in math/science/technology” since GEMS. But then she remembered that she had been in a summer coed computer camp at the school district’s technology magnet high school. She learned basic programming and Power Point. She said she used the computer “all the time” for Internet research, homework, and talking to her friends on Instant Messaging (IM).

She felt that she was well-prepared for her math/science classes in high school—she was currently taking Biology and Algebra 2 (normally a sophomore or junior level class). Plans for her sophomore year included Honors Geometry and AP Chemistry. An A student, she was also in the advanced English/History block, but described herself as “not very good at studying.”

This young woman’s plans had changed from writing mysteries to becoming an actress. Her long-term goal was to become a Broadway star. She said that she had always wanted to be in plays, and currently had a small part in the high school production of *A Midsummer’s Night Dream*.

I asked her if she had ever considered a career in math/science/technology. She said, “No, not really. Science isn’t my subject.” (See above for her course selections) She added that she knew it was important to take the math/science/technology courses, even though she wasn’t planning to go into these fields.

The sophomore girl interviewed had a visual impairment that had spurred her to use technology as a tool for learning. When asked about her experiences with math/science/technology, she laughingly said, “Well, I can’t program a computer yet!” But she said she used the computer for word processing, Internet research, IM and email, and games. And then she added, “I’m really enjoying my TI-83”, her graphing calculator.

An A student, this young woman was currently taking Algebra 2 Honors, and Chemistry, having taken Honors Biology as a freshman. She planned to take Physics and Trigonometry as a junior. She was planning to become an elementary education teacher, concentrating on younger children, based on her work on her church nursery.

When asked if she had ever considered a career in math/science/technology, she said that she had thought about teaching algebra but wasn’t sure. Four years ago, she had been unsure too, but had felt that math/science/technology was going to be her field.

The third young woman was a junior at a private coed school. She said that she used her GEMS experience to help her in the private school interview in 7<sup>th</sup> grade—it made her “stand out” and “the interviewers were very interested.” A

B+ student, she said that she felt her math/science/ technology skills were “still a little rocky” but “my fundamentals were good because of GEMS.” She wished there were still special programs for girls.

At her private school, this girl was currently taking Trigonometry. Last year, as a sophomore, she took Physics, and planned to take AP Chemistry and Pre-Calculus as senior. She reported that she was getting As in her math and science classes.

From wanting to be a marine biologist in 7<sup>th</sup> grade, she had moved to planning to double-major in Special-Ed-Multiply Handicapped and Physical Therapy. She even had chosen her college. Her major influence in this decision was her school’s community service requirement. She spent this time at a therapeutic riding center and loved the work. She saw her work in the PT field as her “way to use technology to research and find better ways to help children.”

The fourth young woman was attending the local public high school as a junior. A B+ student, she reported that since GEMS, she “started to like math more.” But then she said, “Science stinks. I’ll never like it. I make good grades, but it’s not my strongest class.” She went on to say, “Math I do well in, but I don’t like technology. It gets more confusing every day.” She reported that she uses the computer when she has to—to do “typing”, play games, email and IM. She was the only girl of the six who did not mention using the Internet for research, although she does use it both at home and at school.

This junior girl was enrolled in Physics and Trigonometry, getting B+ grades. As a senior, she was planning to take AP Calculus and another year of science. When asked about her math and science classes, she said, “I was very good in Algebra 2, but I didn’t understand Geometry. The teacher made Biology very interesting, but I didn’t understand Chemistry.”

Previous career plans for this young woman had been to be “a pilot in the Air Force, a flute player, a basketball player, and a writer.” Her current plans were leading her toward becoming a mechanical engineer. When asked why, considering her feelings toward science, she said, “It sounds like an interesting field. I like math.” She said that her major influence in her decision-making was her mother. “She (her mother) makes me think about what I’m good in. She (her mother) says ‘If I like a subject, it might make it easier to like the job.’” When asked if she had ever considered a career in the math/science/technology field, she said, “In a way I am—engineering. I’ll just have to learn to use the computer.”

The fifth young woman, one of two seniors interviewed, said that she remembered the games we played in GEMS, particularly the Estimation Olympics. She also recalled the conference for girls and female mentors.

Of all the girls interviewed, this girl had taken the most practical of the computer courses available: Computer Graphics- “It was lots of fun”-and Information Systems-Using Microsoft Excel and Access. As for math and science classes, she took four years of math through Math Analysis, and five years of science including Physics, Astronomy and Geosystems.

I asked her what her math and science classes were like. Her answer was unequivocal: "Bad." She said, "I just dealt with Chemistry class." This was the girl who, in the eighth grade, had raved about constructing Bohr models of elements in her science class.

She planned to attend a large state university and major in Business Management. When asked if she had ever considered a career in math/science/technology, she said, "Not really. I just don't want to do math or science for the rest of my life." In the eighth grade, this girl had firmly stated that she expected to be working in the math/science/technology field.

The last young woman interviewed was a senior at an all-girls private school. She also stated that used the GEMS experience to help her gain admission to this exclusive school. When asked about her experiences at this school in math/science/technology, she said, "Fairly good, but I'm not a math person." She then went on to describe her four years of high school math and three years of science. Her school requires four years of P.E. and has few electives due to the unique community experiences build into the curriculum.

This young woman's plans had solidified but not changed significantly since eighth grade. She wanted to be a movie critic then, and now she planned to attend a large Southern university to major in history and minor in film. She planned to do analytical film criticism and possibly become a professor, "an authority."

When asked if she had ever considered a career in math/science/technology, she said flatly, "No", but then added wistfully, "I wonder what it would be like."

## **Summary of Findings**

### **First follow-up—three years after the GEMS experience:**

- Teachers believed that participation in GEMS made a difference through interest shown and participation in math and science.
- Teachers observed some girls making positive changes in behavior, attitudes, and independence level.
- Club meetings were important to and valued by the girls and their parents.
- The parents saw the importance of exposing girls to more math and science activities.
- Some parents were concerned about their daughters' futures, particularly those whose daughters' interests and talents lie in math and science.
- All mothers interviewed had had negative experiences in math and science as students.
- The girls interviewed then experienced math and science with less difficulty as a result of their GEMS experience.

## **Second Follow-up seven years after the GEMS experience**

- The girls still seemed to think that their participation in GEMS had been of value, and had made a difference in their attitudes.
- The mothers interviewed also had very positive attitudes and memories of the GEMS experience.
- The girls all took the difficult math and science courses and did not avoid them, even though these were not their favorite subjects.

## **Third follow-up, eight years after the GEMS experience**

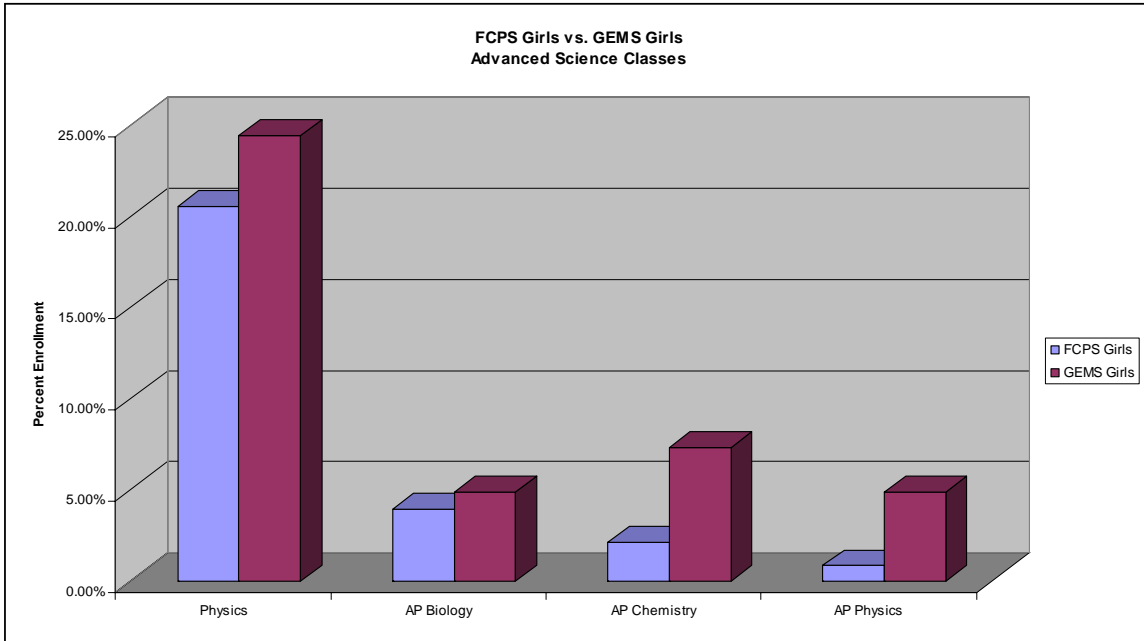
My original purpose for starting GEMS was to see if a club could make a difference in attitudes toward math and science. The research at the time of implementation showed that girls were opting out of the harder math and science classes in high school. My plan was to see if I could keep them interested in math and science so that they would choose to take these harder classes, even if they did not choose these fields for careers. The research at the time also showed that girls earned more money after college if they had taken high level math and science classes--their opportunities were not as limited. I defined a higher level math or science class as one that was more advanced than that required for a standard diploma, or one that was tracked by the Fairfax County Office for Women Task Force on Girls and Technology, no longer in existence due to "other funding priorities".

As the first group of GEMS girls prepared to leave high school, I contacted 41 of the original members who were juniors and seniors. I asked them about their course selections and their career plans. In addition, although this was not my original focus, I asked about their enrollment in technology classes and compared that to enrollment of all of the girls in the county. I found that indeed, these GEMS girls had chosen a higher percentage and many more of the higher level math and science classes offered by FCPS. The findings were fascinating.

The results are summarized in the charts below. In every area of measurement, the girls who participated in GEMS took more in quantity and more advanced math, science and technology classes.

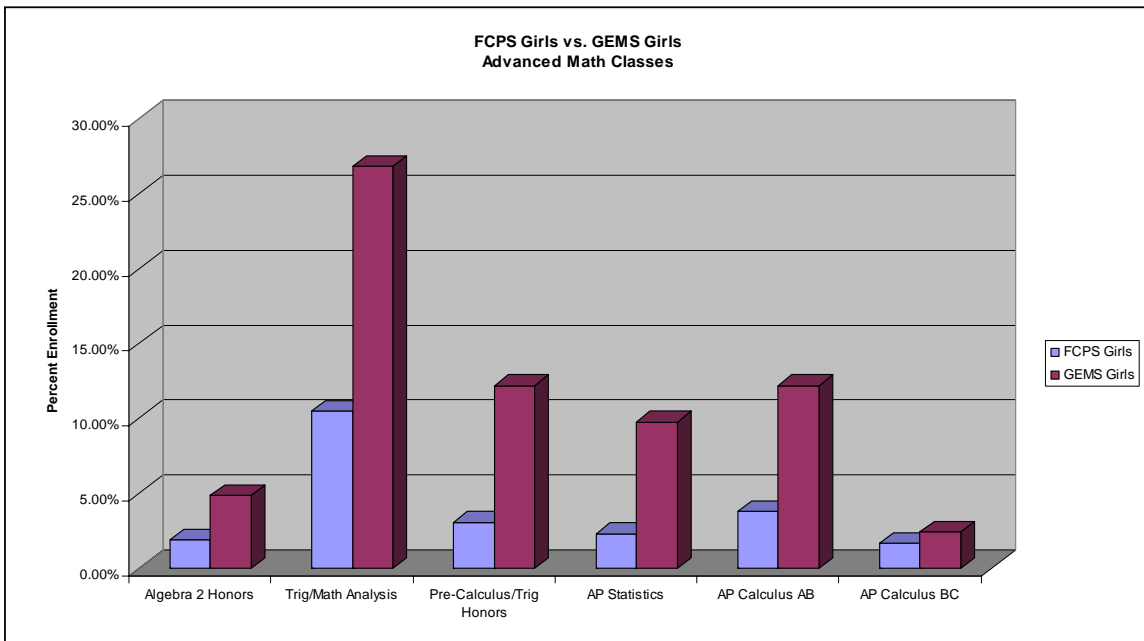
In the area of Science, proportionally more girls from GEMS took the Physics and AP Biology, AP Chemistry, and AP Physics than all of the girls in this county. (See chart 1)

### CHART 1



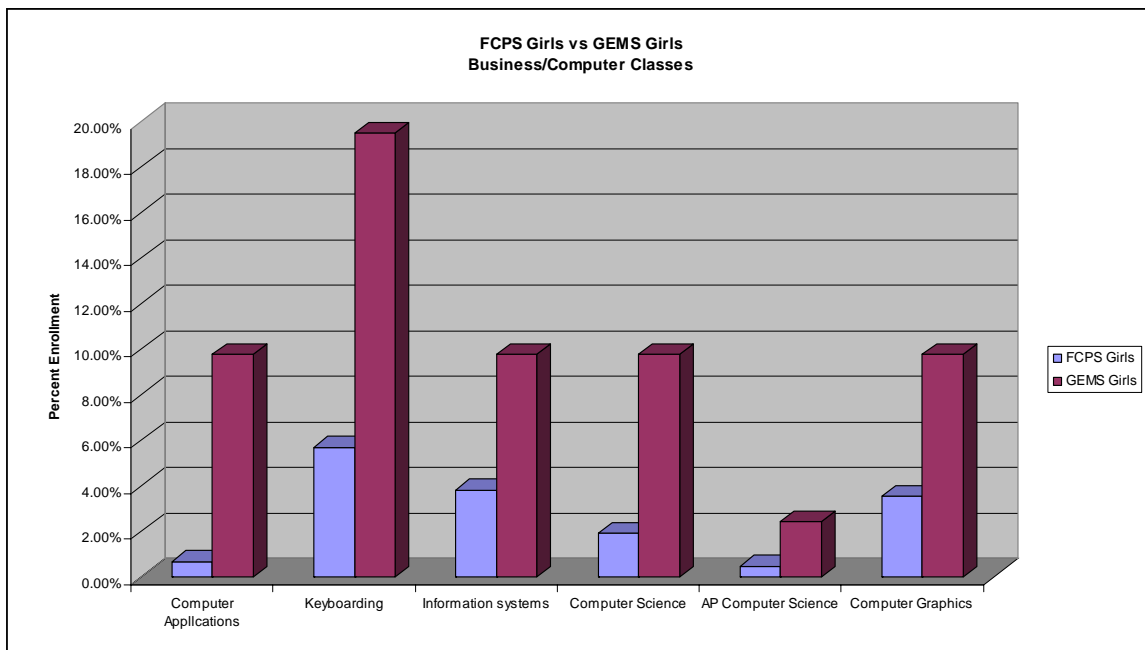
In Math, similar results happened. A much higher percentage of GEMS girls enrolled in the higher advanced math classes, including the AP Math classes and the Honors Algebra classes. (See Chart 2)

### CHART 2



And interestingly, perhaps reflecting the change in technology from 1995 when the GEMS club started, and 2002, when I did my most recent follow-up interviews, the girls in the GEMS club enrolled in significantly more technology classes than the girls in the county at large. This had not been an emphasis in the GEMS activities at the beginning, although it is now. The girls clearly saw the connection between math, science and technology and moved into those courses as a matter of course. (See Chart 3)

**CHART 3**



**Summary:**

Girls need guidance and mentors to help them see themselves as a part of the world of math, science and technology. I provided mentors and good experiences that led them to challenge themselves academically, and I hoped to change their lives. But now I wonder.

Yes, with no additional intervention, my GEMS girls took significantly more high-level math/science/technology classes than the average FCPS female student. But these girls still have little interest in math/science/technology careers, and they continue to say "I'm just not a math person," "Computers get more confusing every day," and "Science is not my subject." Yes, they have taken the classes, so their options are more open than before. But have we done anything to change the perception of careers in math/science/technology?

I was the recipient of an AAUW Educational Foundation Grant, turning AAUW's research report "Tech-Savvy Girls" into a video and Viewer's Guide. These have been distributed free of charge to every FCPS school, every AAUW branch nationwide, and were shown across the country via the Fairfax Network. We also were the recipients of an NSF grant to distribute them for free to other schools.

[http://www.aauw.org/research/girls\\_education/techsavvy.cfm](http://www.aauw.org/research/girls_education/techsavvy.cfm)  
<http://www.fcps.edu/cpsapps/fairfaxnetwork/videostore/level2.cfm?ProductID=23>

The central purpose of this video was to put the concerns in front of the stakeholders: If we're on the "Information Highway" and the girls can't drive, our journey may not take us in the direction that benefits everyone. Without the female perspective and talent bank in the continued progression of IT, what will we lose? What perspective and new directions will be lost?

These perspectives benefit everyone. Can we afford not to have that in Information Technology? Girls in the AAUW report, in my club, and in the video focus group are all saying: "We can, but we don't want to." They see that they need the background knowledge, the advanced math/science/technology courses, but after years of subtle pressure, they make active choices not to choose those careers.

My GEMS club goes on. (<http://www.gemsclub.org> ) We explode things, create chemical reactions, grow crystals, and build robots with Society of Women Engineers student members. We provide role models and early success in non-threatening environments. What more can be done?

I challenge us all as teachers: to make the math, science and computer experiences more girl-friendly, to encourage female enrollment in advanced classes and clubs, and to encourage discourse and cooperation, not competition.

And I challenge us all as teachers, parents and community leaders: to start early with our girls, to encourage and support risk-taking, to avoid rescuing, allow sweat and dirt, and to praise and recognize the girls for their skills, ideas and successes, not for appearance, neat products, or quiet behavior.

Catch them young and put them in the driver's seat. Make that "Information Highway" a girl-friendly place and we will all reap the results.

<http://www.sciencedaily.com/releases/2003/05/030526104537.htm>  
<http://mathforum.org/~sarah/Discussion.Sessions/biblio.attitudes.html>

**Unlocking the Clubhouse: Women in Computing (Hardcover)**

by Jane Margolis and Allan Fisher