Do You Want Your Daughter to Excel at Math and Science? Get a Little Help From GEMS

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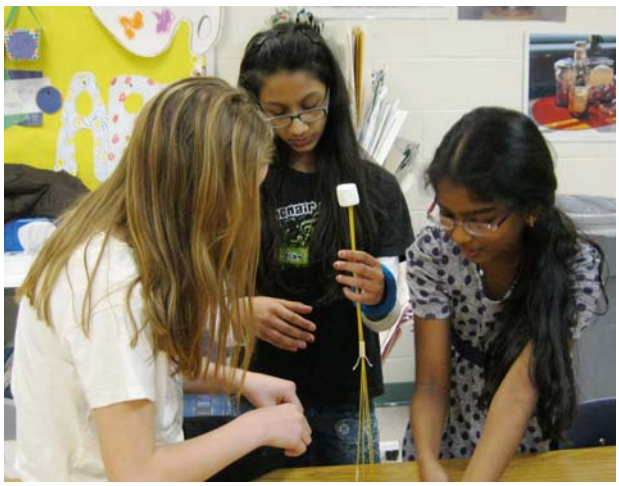

GEMS (Girls Excelling in Math and Science)

GEMS (Girls Excelling in Math and Science) are clubs for girls in grades 3-8 with expansions into high school. The organization was founded in 1994 by Laura Reasoner Jones when her younger daughter was interested in attending a local magnet school for the Arts and Sciences, but chose not to go because she felt "Math is hard." Math was not hard for her; she excelled in it, but seemed to be feeling peer pressure.

Laura began to do research on this phenomenon and found that there was a great deal of research on girls opting themselves out of the math and science fields due to low self-esteem, peer pressure, and lack of support from teachers and families. Laura is a National Board Certified Teacher in Special Education, and worked as the Teacher in Residence at the National Board for

Professional Teaching Standards in Arlington. There, she created the first ever digital video library of accomplished teaching practice called the Digital Edge Learning Interchange in conjunction with Apple Computer.

With that as her background, Laura started GEMS to address the well documented but underserved problem of girls not taking high-level math and science classes in high school, thereby limiting their college and career options. It evolved over the years into a full-focus STEM program, addressing the dearth of female engineers and computer scientists, in addition to the workforce problem of low numbers of female workers in these fields.

The clubs are run by volunteers and paid teachers who want to help girls become interested or stay interested in STEM fields as education or careers. Estimated at having over 8,000 members over its 20-year history, there are GEMS clubs in every state and some international clubs. The organization is expanding age groups, adding more girls, adding more countries, all while continuing the experience for its many members.

I talked with founder Laura Vandenberg about the organization, where it came from, where it's going, and how you can get involved.

GeekDad: Why do you think there's the perception that math and science are not for girls?

Laura Reasoner Jones: This is an age-old problem that is not going away. Just last week there was research published about what parents search for on the Web, and it turns out that parents care about their sons' intelligence and their daughters' looks.

There is bias in the schools and the homes. Girls who are good at STEM seem to be seen as the unusual, not the norm.

People expect boys to do well in STEM and girls to do well in Language Arts and Social Studies. And children to live up to expectations.

This is hard to write about. Why? People just think that it should be this way. And it doesn't matter if they have daughters who are engineers or programmers. They just don't generalize. And this isn't data, but look at all the flurry about the GoldieBlox commercial, and now the Volkswagen one where all the engineers are male. It just doesn't go away.

Back when I started GEMS, the statistics were appalling. In my very academically-oriented county alone (Fairfax, VA), the vast majority of girls opted out of the higher-level math and science classes, and took no computer science, pre-engineering or other technology/engineering classes, even though they were offered.

My goal in offering GEMS was to change this—to get the girls to see themselves as successful in these fields, so that they would take the harder classes, thereby not limiting themselves when they go to college.

GeekDad: How are you changing that perception with GEMS?

Laura Reasoner Jones: Well, we are trying on an individual basis every day when a girl joins, thereby stating to herself and the world that she is good at STEM.

And then as she leaves the meeting, she has experience success that she can take home and take back to school with her.

And then as she grows up and has good memories of experiences in STEM.

On a larger scale, we try to get our name out there all the time to show that girls can do anything. We show our successes, we write grants, which we have won many, and we just walk the walk all the time.

And when the boys ask why there isn't a club for girls, I say: "Have your mom call me." This is a girls-only group.

When I did my first follow-up study in 2002, I found that GEMS had made a difference for the GEMS girls—they took the hard classes.

I also found that they were slowly changing their career choices. But this was with a very small group. Now you will find statistics from NSF and other large groups such as SWE (Society of Women Engineers) and NCWIT (National Center for Women and Informational Technology) that show that getting girls and young women into these fields and keeping them there is even more difficult.

I did a small seven-year follow-up study on the girls in the original GEMS club at my daughter's school. The girls in that club took more and harder math/science courses in high school than did the rest of the county's girls. Statistically significant? Probably not. But informative, nonetheless.

GeekDad: What do you do in GEMS?

Laura Reasoner Jones: There is no set curriculum for GEMS, which makes it fun for the girls and the leaders. The Web site and the Facebook page offers many ideas, but we have found that when the leaders choose things they or the girls like, everyone enjoys it more. Also, we almost insist that GEMS meetings do not follow the math/science curriculum for the state, as that would make it too school-like.

We recommend that if leaders want to use school topics, that they go up a couple of grades and use things that the girls will not have learned yet. This offers many benefits, two of which are that it is new material, even sometimes introduced as "you are not going to learn this until middle school—they think it is too hard" and it gives the girls familiarity, confidence and expertise when the topic

comes up years later—"Oh, yeah, we know how to do that!"

A typical GEMS meeting has snack and talk—girls need that—discussion of the last meeting, introduction with a challenge, and hands-on activities. Many times a guest will come who is a female professional in the field, but GEMS clubs can run very successfully with no guest speakers at all. There are a multitude of videos online that can demonstrate successful women to the girls. Then, after much reflection and discussion, the girls receive take-home material made by the leader with activities to carry on the learning at home and links to career exploration sites.

Most of all we have fun. This is a no-risk environment. No one fails here. There no tests and we work to be sure that every girl walks away feeling like she can "do this."

Many clubs get grants for field trips and supplies. Living outside of DC of course was a gift, and we got grants to take the clubs to the USA Science and Engineering Festival, the National Building Museum's Engineering Day and more. Other clubs take trips to factories or high-tech companies. Last year my club got a grant from Women in Technology in Northern VA and we presented our projects at the Lockheed Martin Center—somewhere no regular person would ever be allowed to enter.

GeekDad: What involvement have you gotten from teachers?

Laura Reasoner Jones: Most of the GEMS leaders are teachers, and 95% or more of them are unpaid. I wish we had funding for paying them, but I am incredibly grateful for the service they do for the girls in their schools.

I find that it is usually very easy to ask teachers to start or help with GEMS clubs. The resources are out there, so they don't have a lot of additional planning to do—I would never ask teachers these days to plan more. They are way too burdened with it already.

I also find that most teachers, especially the female teachers, are very concerned about the issue and want to do something. They see their girls falling behind, or opting out of harder work because they do not want to appear smart. They are not sure what to, and GEMS is a ready-made solution to address at least part of the problem. Girls like being part of an all-girl group. When they ask why there are no boys, I usually just say "What do you think?" And I invariably get an answer something like: "It's more fun this way—we can talk without them shouting out." Or, "I never get to do things—I always have to be the secretary." Girls see the problems.

Many teachers over the years who have not taught GEMS have written us that they see a big difference in the girls after a 10 week session. Again, not hard data, but they will say, "Wow! What did you do to _____?" She has always got her hand up to answer the questions now!" Or, "My student ____ who is an English Language Learner is really coming out of her shell. She has made some friends who are in a different class and I see a real difference."

That is one of the big things. It has been an uphill battle in Virginia to keep this **not** a gifted program. Many of the wonderful teachers of the gifted students recognize right away how this would serve their girls, and start clubs. But we firmly believe that this club is for any girl who is interested. The activities may be grade levels above them, but they learn it and succeed right along with the girls who are identified as gifted. I also feel that we may have contributed to some quiet girls being either identified as gifted, or at least being perceived differently by themselves, their peers and their teachers and parents.

GeekDad: Who are the teachers in GEMS?

Laura Reasoner Jones: Teachers of GEMS can be school teachers or parents or volunteers. We have successful clubs run by each of these and by combinations of these. I have the credibility to say that I started GEMS as a parent for my child, and I think that helps. Yes, I was a teacher,

but at that time I was teaching developmentally delayed preschoolers, so I believe that anyone can do it. The resources are readily available and incredibly inexpensive.

GeekDad: What are a few of your success stories?

Laura Reasoner Jones: Well, there is my one little girl from Julie's school who braved GEMS against her sister's recommendation, enjoyed and excelled in the club, went on to become the captain of the award-winning high school Robotics team (the first girl ever), and then to UNC to study engineering.

And then there were my little third and fourth graders who made LED Throwies right before Christmas one year and put on a light show for the school.

And then the time we learned about binary systems as part of a couple of weeks learning about robots, and we made binary necklaces of our names and made one for the principal, and presented it to her on TV. That year the GEMS girls convinced her to change the Internet clock shown to all the classrooms on the closed-circuit TV to a binary one for Computer Science Week.

GeekDad: How can I start a GEMS club?

Laura Reasoner Jones: Well, all you have to do is download the Toolkit from the Web site and start one. Ideally, leaders will email me or Elizabeth through the Web site at info@gemsclub.org and let us know, as I am available to help connect them to resources and grants and information. There are no fees or registration.

When parents ask me, I recommend that they take the Toolkit or the link into the school and talk with the principal. The odds are good that there are at least one or two teachers who will help or run the club.

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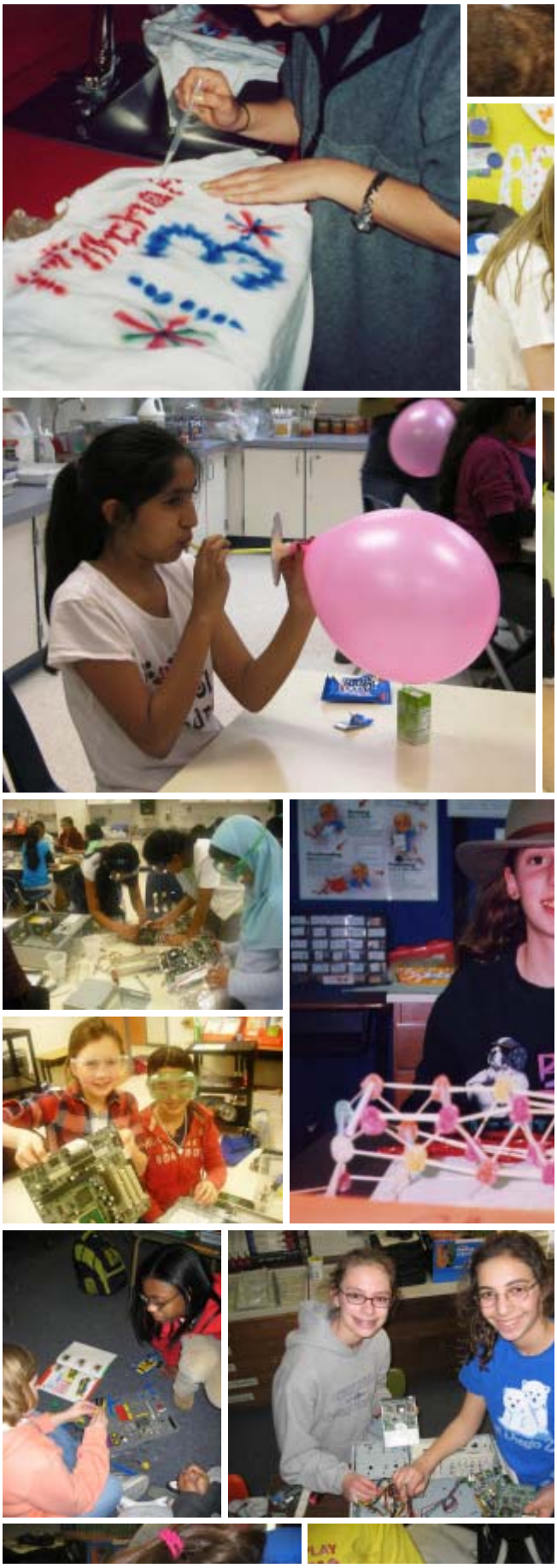

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About Jason CranfordTeague

Jason spends his time playing video games with his wife and kids, designing web sites (like GeekDad), and writing books about the aforementioned topics. His most recent book is *CSS3: Visual Quickstart* available at finer book stores everywhere.

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