Although it's not widely known outside the organization, the Girl Scouts have all sorts of programs designed to attract girls to engineering and science.

BY LYNNE SHALLCROSS

GIRL POWER

What does it take to be an engineer? On PBS's new "Design Squad" TV show, scheduled to debut this month, eight teenagers discover it takes teamwork, some creative thinking, a little money, a few power tools—and lots of peanut butter.

In one episode, the red team competes against the blue team in an effort to build a machine that will make as many peanut butter and jelly sandwiches as possible. "We have to think of something that will have this motion," one girl says, opening and closing her hands like two pieces of bread. "Who says a sandwich has to be two slices of bread?" asks another in a brainstorming session with her team.

By the end of the day, the teams' machines appear to make more of a mess than appetizing PB&J's, but the conveyor belts, peanut butter-dispensing funnels and bread-folding gizmos have given these teens a firsthand try at engineering.

The red and blue teams might not have been wearing green Girl Scout uniforms, but Girl Scouts of the USA is one of the organizations supporting this new engineering show, produced by WGBH Boston. For almost 100 years, the organization, which is doing outreach for "Design Squad," has been encouraging girls to explore engineering, science and math. The Girl Scouts was founded in 1912, and by 1913, members were earning Electrician badges and Flyer—later renamed Aviation–badges. By the 1980s, there were badges in Computer Fun; today, it's Aerospace and Discovering Technology.

Supporting the TV show is just one of the many ways Girl Scouts is encouraging its young female members—in all levels from Daisies up through Senior Girl Scouts—to embrace a career path that's traditionally underrepresented by women. Over the past two years, more than 8.6 million Girl Scout STEM-related (science, technology, engineering and math) earned recognitions (badges, etc.) have been sold. With just under 3 million members in the organization, that means almost every girl is participating in a STEM-related activity.

That's no coincidence. "Girls are not coming out of school and studying engineering," says Ruthe Farmer, project manager of technology and engineering education for the Girl Scouts. "We can fill this gap for girls by providing them with additional STEM opportunities beyond school in an all-girl environment where they're getting female role models and they're not competing with boys for attention from the teacher."

One of the biggest ways the organization is introducing engineering to girls is through a program called "Fair Play: Design & Discovery." Started in 2001, Fair Play offers girls in 54 councils across 28 states a chance to take part in residential or day camps, leadership institutes and after-school programs. While the themes and topics vary, Fair Play programs follow a curriculum of engineering fundamentals, hands-on activities and project-based learning in a girl-focused environment. Each of the programs culminates with the girls designing an engineering solution for a problem in their own lives. These are no make-believe solutions, either—some girls are pursuing patents for their projects.

This past summer, Kelly Baron, 14, of Byram Township, N.J., headed out to Oregon for two weeks to take part in a Fair Play program called "Design & Discovery Destination." Baron and the other girls learned about the different disciplines of engineering and the careers they could lead to. They took apart old alarm clocks, designed improved, user-friendly phone booths and took field trips, shadowing engineers at Intel and visiting the Tillamook Cheese Factory—a favorite of Baron's. "We looked at the machinery and saw how important efficiency and layout was—and then we got ice cream," she says.

The best part of the camp, Baron says, was when she and the other Girl Scouts got to choose real-life problems and design their own engineering solutions, which they later presented to an audience of engineers at Intel. Baron, who was tired of soggy lunches and broken paper bags caused by sweaty ice packs, developed a condensation-free ice pack, which she's still perfecting at home with her dad. "After I can work out the kinks, I hope to get a patent," she says.

The part that Courtney Nash, 15, of Muskegon, Mich., liked best about the two-week program was shadowing an engineer at Intel. At lunch, she and her mentor talked about what engineers do at Intel and how they do it, and then Nash sat in on a conference call to India. "It was just kind of like whoa, they talk to people all around the world to figure this one problem out," she says. "It was neat to see it in action instead of being in a class hearing about it."

Made possible through grants from Intel and the U.S. Department of Education, these Fair Play programs are aimed at showing girls ages 12 to 16 how a career in engineering or technology can be both attainable and fun. They range in price from free to $250, but scholarships are always available, and Farmer says no girl is turned away for lack of money. The programs are open to all girls; non-Girl Scout members pay the $10 yearly membership fee to participate.

Getting girls interested in engineering goes hand in hand with the U.S. effort to stay competitive in an ever-flattening global environment, says Cathleen Barton, U.S. education manager for Intel. "Quite frankly, the reality is, women are 50 or 51 percent of the population, and with this big challenge of U.S. competitiveness, we cannot afford to leave untapped the interest, the creativity, the potential of any student."

Thanks to Fair Play, girls in Mobile, Ala., learn environmental science and engineering at the "Over the River and Through the Woods" 10-day resident camp, where they get hands-on experience by visiting local estuaries. The Pioneer Valley Council in East Longmeadow, Mass., offers a "Design It Yourself!" workshop for primarily African-American and Hispanic-American girls living below the poverty level. The program, whose mission is to help girls discover the fun of engineering with activities like tearing apart VCRs and designing paper clips, is eight weeks long and takes place after school. And in Newfield, N.J., the "Endless Possibilities" program from the South Jersey Pines Council lets girls spend a full day shadowing professional female engineers from fields including aviation, meteorology, electrical engineering and architectural engineering.

Dream It, Do It

About 10 years ago, Girl Scouts teamed up with Lockheed Martin, their oldest STEM funding partner, to create the Lockheed Martin Science Career Exploration Fund. The program allows local Girl Scout councils to apply for "innovation grants" to fund creative STEM programs. Unlike Fair Play, there is no curriculum to follow—the councils come up with their own curricula and programs and put them into action with the Lockheed grants.

"The Girl Scouts is an outstanding organization that encourages girls to set high educational and career goals," says Barbara Reinike, senior manager of community relations at Lockheed Martin. "These grants provide opportunities for thousands of Girl Scouts to have stimulating learning experiences using math and science."

A recent grant to the Girl Scout council in Broward County, Fla., allowed "Mentor Me!" to come alive. The program brought 20 girls to the Museum of Discovery and Science in Fort Lauderdale, where they worked with mentors to create five educational programs that they would later teach to peers and adults. The girls learned about and developed lesson plans for programs like "Detective Widget and the Case of Who Done It?" which used chromatography and DNA in a forensic science mystery, and "Wacky Weather," which explained how to use clouds to forecast weather patterns.

Girl Scout members of the Western Pennsylvania Regional Alliance took part in "Robotics in a Camp Setting," thanks to a Lockheed grant. In teams, the fifth through ninth graders used Lego Mindstorms software to build autonomous robots, which they programmed to perform challenges like rescuing stranded scientists or building city skyscrapers.

NASA is yet another partner in the Girl Scout effort to give young girls a firsthand look at where a STEM education can lead. Brownies earn Space Explorer and Earth and Sky "Try-its," Junior Girl Scouts earn Aerospace and Sky Search badges and Senior Girl Scouts earn Interest Project Awards in Space Exploration. NASA also offers training for Girl Scout leaders so they are comfortable with the topics they're teaching to the girls.

Beyond the programs and badges, Girl Scouts also brings engineering and technology education to a place no young girl is a stranger to these days: the Internet. On its Web site *www.GirlsGoTech.org*, girls can play online games teaching them about cryptography or composing digital music. They can learn about writing HTML or they can see the pictures and stories of women engineers, pharmacists, urban planners and computer programmers.

Will the Girl Scouts' endeavors such as these fill at least half of the seats in engineering classrooms across the country with women? Probably not, Farmer says. But will they open the eyes of more girls to the benefits of a career that might have gone otherwise unnoticed? Absolutely. "It's not important that every girl becomes an engineer," she says. "It's important that every girl knows she could be an engineer if she wants to—that it's an option for her."

Lynne Shallcross is senior editor of Prism.

LEFT: A group of girls from the Girl Scouts of San Gorgonio Council work on the the materials testing section of a Design & Discovery day camp hosted by the University of California, Riverside College of Engineering. MIDDLE: Kelly Baron, 14, of Byram Township, N.J., deconstructs a clock radio to learn more about its function. RIGHT: Girl Scout members work on the One Problem, Many Solutions activity at the Design & Discovery Destination camp in Oregon last summer.

IMAGES COURTESY OF GIRL SCOUTS