

techbridge talk



For families and friends of Techbridge

Winter 2010



Amgen Foundation Helps Inspire Future Scientists

How does a solar panel convert solar energy into mechanical energy? How does biotechnology help people in the fight against illnesses? These are questions that Techbridge students are asking (and answering) through the newly developed activities made possible with generous support from the **Amgen Foundation**.

In the fall, Techbridge girls experimented with various chemicals to better understand what chemical engineers do. Dressed in lab coats and safety goggles, girls tested different combinations of baking soda, vinegar, water, soda, Mentos, and Alka-Seltzer to create the best fuel to launch their rockets furthest into the air. Every girl successfully launched her rocket, with a few even hitting

We may have inspired a future Amgen scientist!

the classroom ceiling!

Most recently to celebrate the holiday season, girls followed step-by-step directions using names of various chemical compounds to



Girls from Oakland Unity High School learn about forensic testing.

mass produce something that every holiday season needs... Variegated Disaccharide "J" Tubes, more commonly known as candy canes. Many girls were surprised to learn that scientists are needed to produce many of our every day products, from soaps and medicines to candy canes and rocket fuels.

After activities and conversations about how engineers and scientists make a difference in the world,

Techbridge girls at **Montera** and **Frick Middle Schools** and **Arroyo** and **Oakland Technical High Schools** all agreed that science could be in their future.

Thank you to the **Amgen Foundation** for providing Techbridge with the financial support to develop engaging hands-on activities to continue introducing girls to more career options. Who knows? We may have inspired a future Amgen scientist! ■

Chevron Inspires Holbrook Girls to Go Green

Finding smarter, cleaner ways to power the world begins with each one of us. Techbridge girls from **Holbrook Elementary School** had the opportunity to visit **Chevron** headquarters in San Ramon. On this field trip the girls learned about Chevron's "Human Energy" program and were introduced to the different ways Chevron is going green including the use of fuel cell power in the data center and solar power to drive a mail cart. "Every time we work with the Techbridge students, they demonstrate an enthusiasm to learn that embodies what Human Energy is all about," said **Matt Lonner**, manager of Global Partnerships and Programs at Chevron. "The creativity these girls showed with their home designs, even after just a brief amount of training on Chevron's energy efficiency practices, is truly inspiring."

Informed by the green initiative they learned about on their Chevron field trip, the Holbrook girls returned to Techbridge excited to take action and build green houses of their own. The girls learned

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Chevron Inspires Holbrook Girls to Go Green

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about green materials that can help save energy such as jean insulation and bamboo flooring. Next they designed floor plans, created interiors, and built green roofs complete with solar panels, wind turbines, and water collection stations.

Once the girls completed their rooms they labeled the green elements they incorporated into their designs. Their houses were Techbridge Award in Green Design (TAGD) certified by **Melanie Lapointe** and **Valeria Vences Tyndall**, role models from **Swinerton Builders** in San Francisco. The girls were excited to share their

knowledge of green building materials and proud of the rooms they had created. During their visit, Melanie and Valeria described some of the projects that they've worked on along with the rewards of working in green design and construction.

The many green elements in the girls' houses showed just how much they learned from their visit to Chevron. We'd like to thank Chevron for its continued support of the Techbridge program in Mount Diablo Unified School District. In addition, Chevron has increased its support so that Techbridge can serve even more girls in Oakland. ■

While visiting Chevron, girls from Holbrook Elementary School learn about the rocks the oil comes from.



Yahoo! Opens its Doors to Lincoln Elementary School

How many fifth graders can say that they have visited a technology giant or had a power lunch with a computer engineer? The girls from **Lincoln Elementary School** can. This fall they were treated to a behind-the-scenes tour of **Yahoo!** headquarters. The girls were warmly welcomed by volunteers from the Yahoo! Women in Tech group, which organized the event. The day began with a game of Yahoo! trivia that put the girls (and volunteers) at ease and also introduced fun facts about Yahoo! Did you know that the Yahoo! website is translated into 20+ languages? The Lincoln girls were surprised to learn that if they searched "Lincoln" on Yahoo!, they would come up with 500 million web pages.

The Yahoo! role models led the girls through three interactive stations designed to build skills and knowledge around computer science and Internet safety. The girls and role models giggled their way through Algorithm Workout, where girls were challenged to write a step-by-step algorithm for exercises like jumping jacks and lunges, and then try to follow those directions. During an Internet Safety game, the role models shared tips for safely navigating the Web. When the group was asked if it was safe to share personal information online, their resounding "No!" reassured us that the girls had learned important lessons. One girl commented, "I liked the games we played because it helped me to learn what Yahoo! does."

◀ *Yahoo! role model, Olivia Franklin, talks with girls from Lincoln Elementary School about Internet safety.*

After a busy morning of networking and learning about Yahoo!, the students relaxed with their role models during lunch. In small groups, the girls peppered their role models with questions about their jobs, personal lives, and hobbies. Those conversations continued during the afternoon tour, where the girls got to visit the office space of CEO, **Carol Bartz**, and the Accessibility Lab, where products are

The field trip helped encourage me to study hard and pay attention in school so I can work at Yahoo! one day.

designed to make Yahoo!'s services accessible to people with impairments. The girls were amazed by the scope of the campus, and learned that there are many different jobs at a company like Yahoo! "My favorite part was that we got to meet the women who work there, and we got to ask them all about their career," a Lincoln girl shared.

As the day ended, the girls were presented with their very own gold Yahoo! stars personalized with their names to take home and save as a memory of their visit to a place where technology rules. After a collective Yahooooooo! yodel, the girls chattered about their experiences and the lessons they had learned from the role models. One girl reflected, "The field trip helped encourage me to study hard and pay attention in school so I can work at Yahoo! one day."

Thank you, Yahoo!, for inspiring Techbridge girls to work hard and aim high! ■



At the alumnae luncheon, Cindy Bayley and Juliana Velez show off the candy canes they made in a chemistry mystery challenge.

Techbridge Alumnae Get Together and Give Back

Techbridge hosted its third annual luncheon for 16 alumnae this December. In true Techbridge style, the afternoon started with an icebreaker. After catching up on their busy lives over lunch, the young women worked on a winter-themed mystery activity which involved chemical engineering. After some careful measurements of ingredients and preparation, the group carefully molded home-made candy canes. The afternoon was a true success. Not only did the group learn a new activity, but they had the chance to connect with Techbridge again.

Many of these alumnae are making time in their busy schedules to return to Techbridge after-school programs as role models. They remember how important role models were in their lives and want to give back to Techbridge. What better way than to complete the circle and serve as role models? During visits to our after-school programs these alumnae share their passion for science, technology, and engineering, and also describe their personal interests and life stories.

Sylvia Chang, an undergraduate student at UC Berkeley, visited the **American Indian Public Charter School II**. Sylvia shared with the girls her passion for environmental engineering. Along with **Dana-Nicole Samuel**, an undergraduate studying civil engineering at UC Berkeley, Sylvia led the girls through an engaging activity about wetlands. The girls got their hands dirty and learned how wetlands help protect bodies of water, like the San Francisco Bay, from pollution. Sylvia said, "This was my first time going to Techbridge as a role model, so it was a rewarding learning experience!"

Sarah Lee, another undergraduate from UC Berkeley, visited **Allendale Elementary School** and led an activity on structural engineering. Sarah is studying civil engineering and is in her fourth year of studies. Sarah recounted how Techbridge helped her decide to pursue a career in engineering. The Allendale girls couldn't stop asking questions, wanting to know Sarah's favorite Techbridge activity and her favorite field trip. It was an inspiring afternoon. ■

Family Resources Spark an Interest in Science



Parents, you are the most important and influential people in shaping your daughter's future.

As a parent, you can spark, sustain, or renew your child's sense of discovery and excitement in science and engineering. Here are some tips and resources to encourage learning and family fun.

- ▶ **Look for learning opportunities in everyday activities.** Take an extra five minutes to study how the gears on a bike work, involve your daughter in cooking or repair projects that require measuring and mathematics, and ask her open-ended questions like "How do you think the gears work together?"
- ▶ **Encourage your daughter's curiosity by pursuing the questions she asks.** Don't know the answer? Don't worry. In fact, seeking the answers by looking in books, searching the Internet, or asking someone who knows are powerful ways to model how you find out.
- ▶ **Try setting a dinner-time tradition of asking each family member to share a question** she asked herself that day, or something he wondered about in the classroom or on the job.
- ▶ **Watch a documentary, an educational video, or TV show** that relates to what's being learned in school or in Techbridge, and talk about it together.
- ▶ **Involve your daughter in planning a family activity** such as designing a garden, thinking through a household repair, or planning a family trip.
- ▶ **Broaden your selection of family outings.** The San Francisco Bay area is filled with science museums and technology centers. Include them in your next day trip. Many have free admission days. Check online to find the most up-to-date information.
- ▶ **Role models matter!** Find someone whom your daughter can talk with to learn more about colleges and careers. Speak with a teacher or school counselor if you need help finding one.
- ▶ **Approach the world with curiosity** and this can help spark a new interest in your daughter. Provide her with many avenues of interest and this may encourage her to be an astronomer, computer scientist, or civil engineer.



Girls Scouts learn about careers while using the "Power it Up" box.

Techbridge Partnership with Girl Scouts Expands

It's been a busy second year for the Girls Go Techbridge project, which is a partnership between Techbridge and Girl Scouts. Through this effort, Techbridge has expanded nationally and is now partnering with four Girl Scout councils. **Girl Scouts of Northern California** and **Girl Scouts of Central Texas** continue to experience hands-on science and engineering with our programs-in-a-box. These boxes include some of Techbridge's favorite projects and come with lesson plans and materials for soldering Blinky robots, designing green rooms, and building catapults.

Over the summer Techbridge staff trained two new councils, **Girl Scouts of Central Maryland** and **Girl Scouts of West Central Florida**, which are now leading trainings for their volunteers and leaders. Over 100 Girl Scout staff and leaders in Maryland and Florida have been trained to deliver the Girls Go Techbridge programs. One leader shared, "I can't wait to show off my projects to get everyone excited" and another commented, "It is one of the best trainings I have been to."

With feedback from the Girl Scouts of Northern California and Central Texas, we worked with the **Center for Hands-**

On Learning in New Mexico to revise the programs-in-a-box. The new layout and format is making it easier for the programs-in-a-box to be used in a variety of Girl Scout settings—from after-school programs to daylong events on college campuses to summer camps. Linda Kekelis, Techbridge Director, shares, "We appreciate the support of the **Noyce Foundation** and the **Gordon and Betty Moore Foundation**, which has allowed us to share our curriculum and lessons learned with the Girl Scouts. This partnership has benefited Techbridge and Girl Scouts and is introducing thousands more girls to science and engineering."

We developed three training DVDs, which give Girl Scout leaders the background they need to prepare for using the boxes with Girl Scouts. The DVDs are included in the programs-in-a-box and are available online for Girl Scout leaders. One Girl Scout leader shared, "I love the [Make it Green] DVD. I can do it from home at my own pace."

The coming year promises to be exciting as we share our activities with thousands of Girl Scouts across the country. We hope to inspire many more girls as they discover and pursue their passion for science and engineering. ■

Techbridge Delivers

There are lots of exciting developments underway at Techbridge. Our staff puts much time into planning projects for the after-school programs and we learn what works (and what doesn't) as we deliver lessons and get feedback from the girls and teachers. For favorite projects like Green Design, we have four years of experience in different settings and lots of lessons learned for how to introduce girls to engineering and help them think green. We also have a decade of experience working with role models, and have a recipe for success for outreach based on many classroom visits and field

Techbridge has grown over the years to become a program with national reach.

trips. We enjoy working with girls and role models in our local community, and are also committed to sharing our work with others.

Techbridge has grown over the years to become a program with national reach. We are partnering with organizations to disseminate our resources and expand our impact. During the summer and fall, our staff presented at several national

conferences. We presented strategies for encouraging girls in technology at the **National Education Computing Conference** in Washington, DC and shared our resource guide for role models with teachers from across the country. With **Chevron, Google, and Intel**, we presented our best practices for collaborating in outreach at the **Society of Women Engineers** conference in Long Beach.

"How can I be engaging and inspiring for the next generation of computer scientists? How do I connect with a 7th grader?" Techbridge and **Google** facilitated a workshop on outreach that helped address these questions at the **Grace Hopper Celebration of Women in Computing Conference** in Tucson. These dissemination efforts were supported with funding from the National Science Foundation.

Conferences give us a chance to network and meet new partners with resources and ideas to bring back to Techbridge. We look forward to continuing to get the word out about Techbridge and help others support girls in technology, science, and engineering. ■

Oakland Technical High School girls work on a design challenge that builds community.





Careers with a Bright Future— Biomedical Engineering

Biomedical engineering is not a common career choice for most high school students, but for a group of girls from **Arroyo High** it may be. These girls learned about the benefits of biomedical engineering on a visit to **Intuitive Surgical** in Sunnyvale organized by role model, **Katie Anderson**.

This exercise helped the girls understand how complex the human body is and how important biomedical engineering is to medicine.

The girls began their tour of Intuitive Surgical with a presentation that introduced them to how the company's da Vinci Surgical System has revolutionized the way surgeries can be performed. Robotic assisted surgery makes it possible to make small incisions, resulting in shorter recovery times and fewer complications. The girls also learned that the da Vinci system is named after Leonardo da Vinci who invented the first robot.

Role models, **Katie Anderson** and **Denise Vaccaro**, showed the group how the da Vinci system works. It's one thing to hear about the surgery breakthroughs designed by Intuitive Surgical, but even better to use the machine and experience first-hand what it would be like to

be a surgeon. Each girl had the opportunity to dress up like a surgeon and use the da Vinci machine to unwrap a Starburst candy. This experience allowed the girls to experience how precise and user friendly the da Vinci machine is.

During the second half of the visit the girls became biomedical engineers and helped create a tool for the da Vinci machine. After they received a basic anatomy lesson, the girls were invited to design a tool made of surgical plastics and metal to help move the liver on a model to access the stomach without damaging the organ. This exercise helped the girls understand how complex the human body is and how important biomedical engineering is to medicine.

For the Arroyo High girls this trip was an eye-opening experience they will never forget. In her reflection, one of the girls shared, "This place is awesome. How can I work in a place like this?" Techbridge girls will be happy to learn that not only is bioengineering a field where they can make a difference and help others, but also a career in which they can earn a good living. The Bureau of Labor Statistics estimates 3,000 new careers will be created in the industry through 2016. And, biomedical engineers earn on average nearly \$80,000 a year. ■

Arroyo High School girls meet role models during their field trip to Intuitive Surgical.



Girls learn about animation at American Indian Public Charter School II.

Techbridge Welcomes American Indian Public Charter School II

Techbridge is pleased to announce the start of a new after-school program at the **American Indian Public Charter School II (AIPCS II)** in Oakland. Students at this school responded enthusiastically to the invitation to participate in Techbridge, which meets Friday afternoons in the school's cafeteria.

With the addition of AIPCS II to the Techbridge program, an important pipeline is being created. Lincoln Elementary, located just around the corner from AIPCS II, has been a strong elementary level program. The start of this new program allows Techbridge to continue to provide after-school science programming for the many Lincoln graduates who attend AIPCS II. A joint Techbridge session involving both schools is planned for the spring. This will give the older girls a chance to mentor the younger girls.

The girls at AIPCS II have participated in a variety of projects. After starting with a series of design challenges that helped the girls think like real engineers and practice teamwork, the program launched into a 4-week

animation project. The girls wrote storyboards and created characters and sets from clay. They learned about the technology and patience that is involved in making animations as they shot their movies frame by frame using **Tufts University's SAM Animation**. Their animations ranged from ghost stories to love stories, and some even featured dinosaurs and aliens. The girls felt like real directors when they shared their creations with the rest of the school.

Techbridge welcomes the support of the entire school community. The school's director, **Mr. Glover**, who visits the program regularly, notes, "Techbridge has been a great addition to our after-school curriculum. The girls are participating more during science classes, working better together in teams, and enjoying the discovery-based learning that motivates all scientists to continue searching for solutions to complex problems."

The girls at AIPCS II have thrived with the hands-on activities Techbridge brings every week, and their innovation, creativity, and curiosity is impressive. ■

Cal Engineers Give Back

Only 11% of today's engineers are female. If we want to change these numbers we need to start early and expose our youngest students to engineering. Techbridge is doing just that by introducing engineering to girls in elementary school all the way through high school. Maybe that's why 94% of Techbridge students agreed that engineering is a good career for women this past year. These girls have

I was really glad to see this kind of program specifically for girls. I would have loved this when I was young!

such positive attitudes about engineering because of the partnership that Techbridge has developed with **UC Berkeley's College of Engineering**. Now in its third year, this partnership brings undergraduates and alumnae from UC Berkeley's College of Engineering to Techbridge after-school programs. The project is a success for everyone involved.

Role models from Cal expose Techbridge girls to a range of engineer disciplines—from structural engineering to environmental engineering

to computer science. After participating in training that shares the Techbridge recipe for success, the Cal teams prepare hands-on activities related to their work and studies. While engineering is their passion, the role models also share the passions they have outside work. Hearing about hobbies, family, and friends helps dispel stereotypes and lets the girls know that engineers lead interesting and balanced lives. The girls enjoy meeting the role models and listen eagerly to their stories about college life and career experiences.

Bioengineers, **Ken Luy** and **Kathleen Lo**, came to **Allendale Elementary School** with a challenge: the girls had to build a prosthetic arm with K'NEX building kits. The girls were all successful in this design that got them thinking like engineers. Their favorite part was when they tested the arms to see how well their designs could pick up items like a pencil and paper clip. Students don't always see the connection between engineering and making the world a better place. Meeting Ken and Kathleen and working on the design challenge helped the Allendale girls see the importance of engineering in helping people.



Kathleen Lo, UCB role model, teaches the girls at Allendale Elementary School about bioengineering.

At **Washington Manor Middle School**, **Sol Solorzano** and **Yasemin Salavateioglu**, both industrial engineers, lead a project where the girls designed a web store, similar to eBay or Amazon. The girls enjoyed this activity which combined engineering with their love of shopping. Each student had to choose a selection of shirts for their new web store that they felt would make the most profit in a week. Techbridge girl, **Karrin Huang**, was so taken by the activity she later reflected, "You've inspired me to become an engineer!"

It's not just the girls who benefit from these visits. The role models find the

experiences rewarding too. **Dana-Nicole Samuel**, an undergraduate who is studying civil engineering, reflected after her visit to **American Indian Public Charter School II**, "It was one of the best experiences I have ever had. I loved it!" Kathleen Lo, Cal student, shared, "I was really glad to see this kind of program specifically for girls. I would have loved this when I was young!"

Thanks again to all the Cal women (and men) who give their time and get involved in Techbridge as role models. We look forward to continuing to work with Alumni Relations at the College of Engineering at UC Berkeley. ■



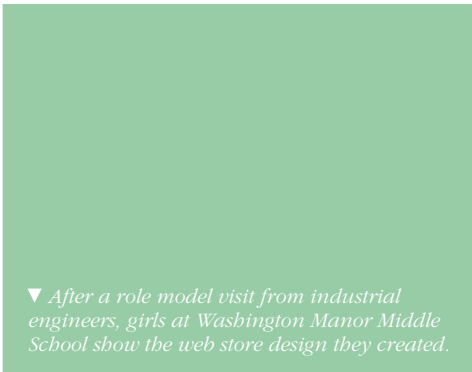
◀ *Sylvia Chang, UCB role model and Techbridge alumna, explains wetlands to the girls at American Indian Public Charter School II.*

▶ *UCB role model, Jennifer Cheung, talks with the girls at Montera Middle School about structural engineering while helping them build graham cracker bouses.*





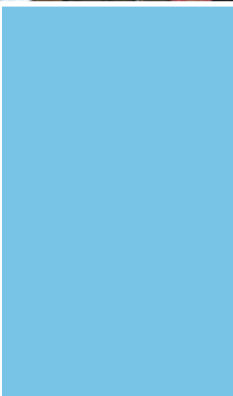
▲ Girls at Bobannon Middle School learn about gears from UCB mechanical engineering students.



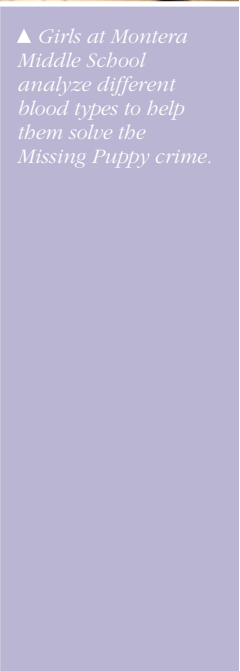
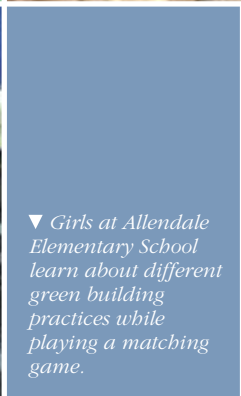
▼ After a role model visit from industrial engineers, girls at Wasbington Manor Middle School show the web store design they created.



▲ Girls at Montera Middle School analyze different blood types to help them solve the Missing Puppy crime.



▼ Girls at Allendale Elementary School learn about different green building practices while playing a matching game.



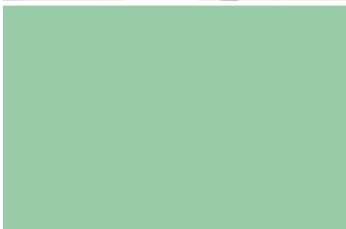
▲ After testing different chemical reactions the girls at Madison Middle School get ready to test their rockets.



▼ The girls at Holbrook Elementary School worked hard to complete green rooms that achieved Platinum TAGD Certification.



◀ Girls at Frick Middle School have to keep detailed notes on the formulas they are testing as they work on a chemical engineering project.





Director's Note

This year we are hosting 16 after-school programs and serving 450+ girls in Techbridge across 3 school districts. While there are lots of after-school programs, what sets Techbridge apart is the participation of teachers who team up with our program coordinators to co-host the programs. It's an incredible win-win situation. When I visit the programs, I often hear from the girls that it was a teacher who encouraged them to join Techbridge. A personal invitation from a teacher is especially important to girls who lack confidence or who think that they aren't techie enough for the program.

In addition, we hear about the spill-over effect that

Techbridge has. Teachers appreciate the resources and support that Techbridge offers and use the icebreakers and hands-on activities in their science classes. Like the girls, teachers are also inspired by the role models and field trips which are introduced by Techbridge. Participating in the program helps increase teachers' knowledge of careers in science and engineering and helps them engage girls (and boys) in technology and science projects.

I'd like to thank each and every teacher who is involved in Techbridge for helping us change lives, one girl at a time. ■

Linda Kekelis



Melissa Avignon encourages the girls at Washington Manor Middle School to persevere at building simple machines.

Become a Techbridge Fan on Facebook!

To see photos from Techbridge programs, field trips and role model visits, learn about upcoming events or connect with alumnae become a fan of Techbridge on Facebook. You can find our page at <http://www.facebook.com/pages/Techbridge/87282378378>.

We invite you to join Techbridge as a Cause and help support our programs to encourage girls in technology, science and engineering. ■

A Thank You to Our Supporters for 2009

Stephen Bechtel Fund, Gordon and Betty Moore Foundation, Chevron Corporation, Noyce Foundation, National Science Foundation, S.D. Bechtel, Jr. Foundation, American Honda Foundation, Amgen Foundation, Yahoo! Employee Foundation, NiSource, Cisco Foundation, Wells Fargo, Symantec Foundation, Google, PG&E, Fremont Bank, Autodesk, Stellar Solutions, Swinerton Foundation, Clorox Company Foundation, Becky Ancheta, Ted Buttner, Lyn Gomes, Joseph DeRisi, Jill Fuss, Laura Shimmin, Nicole Lark, Roger Lee, and Teresa Williams

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Graphic Design

Edmonds Design

Printer

**Thank you to Solstice Press
(www.solsticepress.com)
for its generous
contribution to help print
this newsletter.**

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