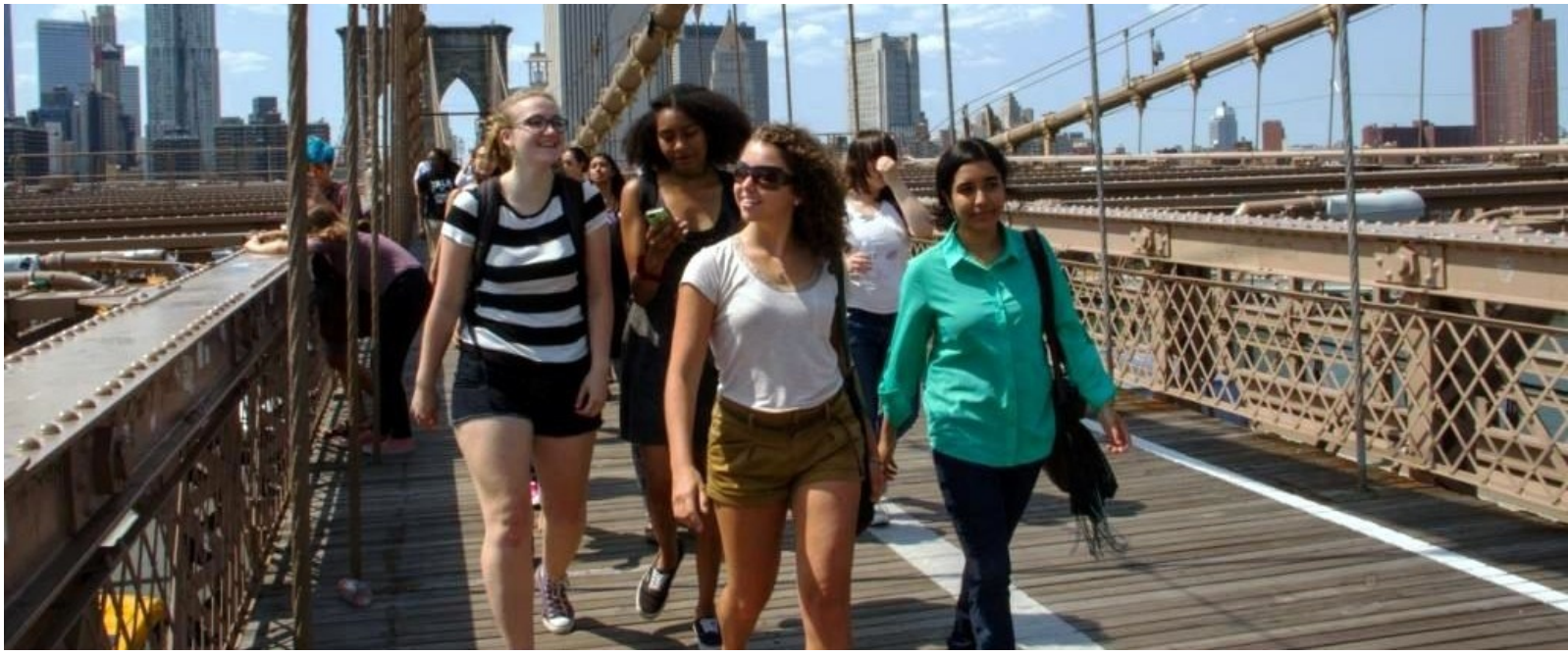
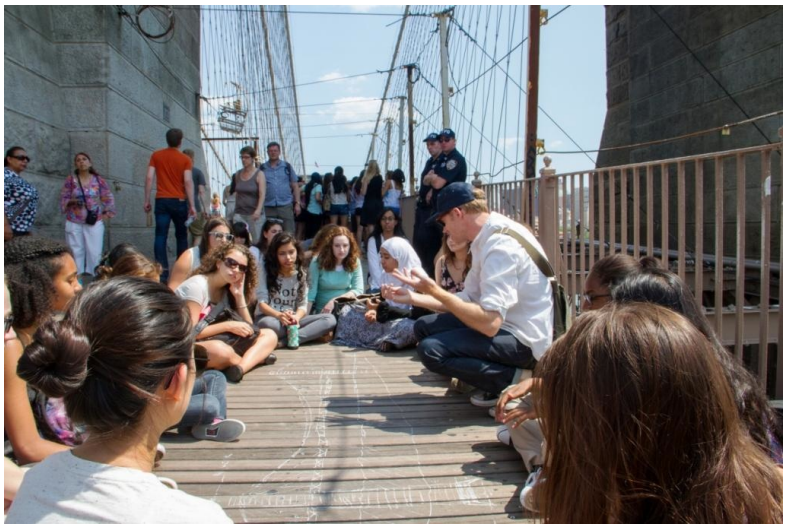


THESANDBOXBLOG

Future Women Engineers on the Brooklyn Bridge

Michelle Han — September 03, 2014

Among our many projects this summer, I had the privilege of developing an educational workshop combining several things close to my heart: hands-on learning, innovation, and... the Brooklyn Bridge!



Scott leading a discussion of the bridge's engineering principles, suspension cables, and "caisons." An 8-foot chalk drawing diagram helped explain.

For the second year in a row, I led a tour of the Brooklyn Bridge for the Girls Science, Technology, Engineering, and Math program at NYU. The program is a six-week summer intensive for high school girls in "STEM" fields of study. These areas have been the focus of significant effort in recent years, as research has shown America falling behind in sciences, math, and hands-on spatial learning.

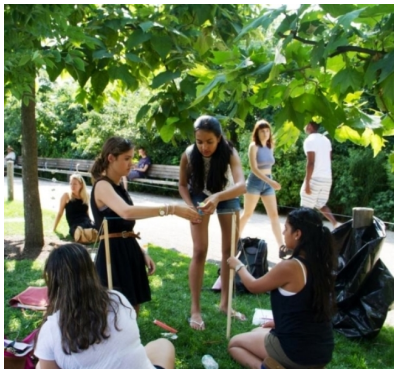
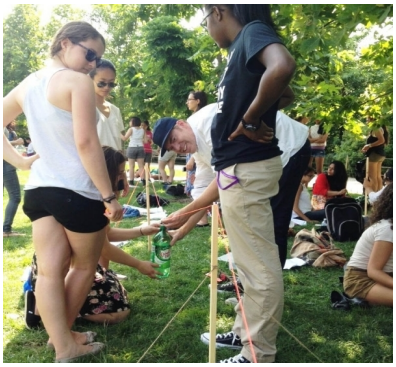
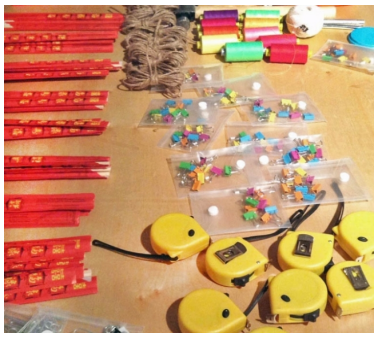
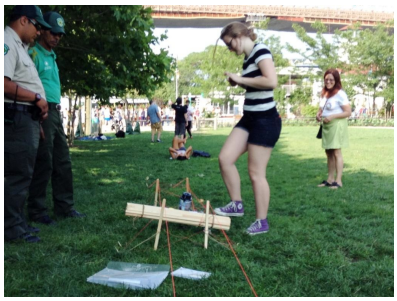
The GSTEM program at NYU is aimed first at encouraging girls who are already excelling in these fields to pursue them in their education and careers, and second, to build a community of women scholars in these areas. It was inspiring to work closely with this group of high-achieving young women—the next generation of leaders in innovation in the sciences and engineering.

This year, in addition to the bridge tour where we looked at its materials, details, and engineering innovations, Pilot Projects created a hands-on workshop for the students to test some of the basic structural

ideas that make the bridge so unique. Really, it was Suspension Bridge Building 101.

While walking the famous wooden Promenade boardwalk, we discussed the engineering principles of suspension cables, and the "caisons" (effectively wooden submarines used to dig the foundations for the huge stone towers). Upon our descent from the bridge the girls set out with a kit of parts to build their own suspension bridges on the Bridge View Lawn at Brooklyn Bridge Park.

In groups of three and four, the girls tested their materials, sketched structural diagrams using basic trigonometry, and came up with a design to suspend a two-liter water bottle using strands of very thin, colorful thread. They built their structures, tested them to failure, and learned from their mistakes, applying the theories from the walking tour in their own actual bridges.

Top left: A student group working out a design before "testing it to failure." Top right: Groups used basic trigonometry to design a bridge that would hold a 2-liter bottle of water. Bottom left: Kit of parts, including thread, hardware, tape measures, tension scale, and chopsticks. Bottom right: Even park rangers could not deter one student from testing her bridge to failure. She ultimately had to stand on it to get it to break!

As Rebecca Stern, program coordinator for NYU GSTEM, put it: "Experiential learning is so important and incredibly effective. It's not just about learning something they'll be doing in the future, it's about doing it now, and also learning things that will prepare them for the future."

Many thanks to PhD researcher Sara Wilson, tropical forest ecologist, for leading an inspirational segment on tropical trees, wood, and forest communities; mechanical engineer Noel Titus; and Laura Carlson of Pilot Projects, for their help making the day a great success.

For my part, I loved working on this project because it combines so many of the things we are passionate about here at Pilot Projects: the relationship between the built environment and learning; culture, ecology and systems; and most of all, participation. We look forward to more opportunities like it in the future.

If you'd like to discuss a project of any sort, please contact us!

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