



Engineers to the Rescue

A Girl's Extreme Survival Guide





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We would like to acknowledge our partners who reviewed the lessons, piloted the activities, and provided feedback. We thank Cary Sneider and Lisa Regalla for their thoughtful reads of our lessons and suggestions for making the science content accurate and accessible for Girl Scouts and the adults who work with them. Our advisory team including Faith Brown, Jean Fahy, Randy Freedman, Melissa Koch, Diane Matt, and Karen Peterson offered guidance to support our training for leaders.

The Techbridge staff demonstrated tireless creativity and flexibility while developing and testing these programs. Thanks to Maria Anaya, Megan Davis, Jennifer Diaz, Jennifer Joyce, Linda Kekelis, Molly Larkin, Lulu McCourt, Martha Pena, and Jennifer Wei, with the assistance of Eli Leonardo, Jennifer Tai and Vicki Tu.

Our friends at the Girl Scout councils of Northern California (especially troops 60021, 60656, and 60688), Central Texas, West Central Florida and Central Maryland, piloted early versions of the activities and offered suggestions that helped improve the program boxes.

Our partnership with Girl Scout councils embodies the best in collaboration. We have shared resources and learned so much from teaming up on this project. Together we worked to inspire girls to change the world through engineering and science.



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About Techbridge

“Boring, nerdy, and only for boys.” Some girls may think of engineering in those terms, but not the girls participating in Techbridge. They say, “I learned that this science thing is very fun and educational at the same time. I LOVE IT!” and “I learned that engineering is not just for men.”

Techbridge is a leader in providing girls with firsthand experience working as engineers—from designing toys and building turbines, to meeting professional engineers who help make the world a better place.

Techbridge brings together best practices and lessons learned for partners and offers curriculum that builds on girls’ interests and expands their career options. We have seen first-hand the impact that role model visits and field trips can have. We offer training and resources to youth-serving adults to create positive experiences for girls.

The Techbridge program reaches out to girls in under-served communities and offers after-school and summer programs with hands-on projects and career exploration. Techbridge has served over 3,000 girls in elementary, middle, and high schools in Oakland, California and surrounding communities since its start in 2000. The program has been shown to increase girls’ confidence, build skills, and promote interest in careers in engineering, science, and technology.

In order to bring a Techbridge experience to girls across the country, we are partnering with Girl Scout councils. The Techbridge team has developed programs-in-a-box that include all the activities and materials you will need to introduce girls to the wonders of engineering and science. The Girls Go Techbridge program-in-a-box includes the leader guide you have in your hands, and the box of materials in front of you, ready for a group of ten girls to dive in and enjoy.

We invite you to partner with us to bring engineering and science to girls in your community. Together we can inspire a girl to change the world.

For more information, visit www.techbridgegirls.org.

Engineers to the Rescue: Suggested Schedule

Time	Session 1	Session 2	Session 3	Session 4	
:00	Pre-Surveys (if applicable)	Activity: Clean This Water	Career Activity: Your Career Card	Icebreaker: Fractured Facts	
:10	Icebreaker: Rescue Introduction			Activity: Give Me Shelter	Activity: Car to the Rescue
:20	Icebreaker: Design Your Tool		Career Activity: Tune in Techbridge		
:30					
:40	Career Activity: Tune in Techbridge				
:50		Icebreaker: Girl of the Year			
1:00	Post-Surveys				
1:10					
1:20					
1:30					

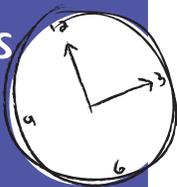
Engineers to the Rescue: Alternative Schedules

	6 Hours	4.5 Hours
:00	Icebreaker: Rescue Introduction	Icebreaker: Rescue Introduction
:10	Icebreaker: Design Your Tool	Activity: Wind-Powered Crank
:20	Activity: Wind-Powered Crank	
:30		
:40		
:50		
1:00		
1:10	Activity: Clean This Water	
1:20		
1:30		
1:40		
1:50		
2:00	Career Activity: Tune in Techbridge	
2:10		
2:20		
2:30		
2:40		
2:50	Activity: Give Me Shelter	
3:00		
3:10		
3:20		
3:30		
3:40		
3:50	Activity: Car to the Rescue	
4:00		
4:10		
4:20		
4:30		
4:40	Career Activity: Tune in Techbridge	
4:50		
5:00		
5:10		
5:20		
5:30		
5:40	Icebreaker: Girl of the Year	
5:50		
6:00	Activity: Car to the Rescue	Career Activity: Your Career Card
	Career Activity: Your Career Card	

Engineers to the Rescue: Introduction

4 Suggested Sessions

approximately 1 hour and 30 minutes each



Skills:

- Brainstorming
- Communication
- Teamwork
- Critical & Creative Thinking

The Scenario:

You're on a camping trip with your Girl Scout troop at Yellowstone National Park. Your first day at Yellowstone was incredible; you hiked all morning, saw Old Faithful in the afternoon, and sang campfire songs under the stars. You also visited the Visitor's Center, picked up a brochure, and met a park ranger. You learned that Yellowstone is situated on a bed of lava, and that minor earthquakes are frequent.

Although scientists didn't predict it, there was an earthquake which shook your tents for two minutes overnight. Unfortunately, this natural

disaster has broken the water pumps, and disrupted the generators in the park. To make matters worse, your cell phone battery is dead and you can't call for help. The worst part is your animal-proof food box fell down a ravine. You're hungry!

The good news is that your troop is safe, everyone is in good spirits, and women from the Society of Women Engineers (SWE) are on a leadership retreat—they are your neighbors at the campground! They have a lot of knowledge to offer as you rebuild your campground. Check out the backs of the career cards to hear from the SWE team.

As a troop, you must develop a wind-powered crank to lift your food box, create a water filter to clean water for drinking, build a shelter to withstand any aftershocks, and design a car prototype that will make it over the terrain to deliver your message to potential rescuers. You've got common sense, science smarts, and a group of skilled engineers to help you.

Good luck!

Meet the SWE* Team!

- Environmental Engineer, Cari Ishida
- Geologist, Jeanette Hummel
- Civil Engineer, Melanie Lapointe
- Mechanical Engineer, Judy Lee
- Structural Engineer, Kittrina McCourt

* Society of Women Engineers



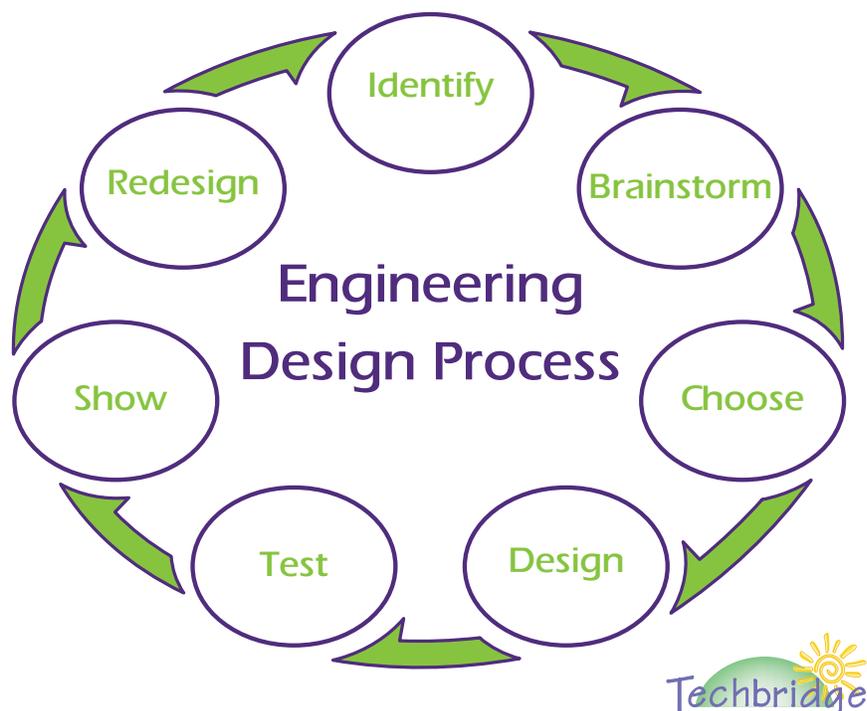
Engineers to the Rescue: Introduction

Engineering Design Process

The Techbridge **Engineering Design Process** is a never-ending cycle of creativity. With each of the hands-on activities in this guide, we encourage you to lead girls to identify and talk about where they are in the design cycle. Growing awareness of the design process helps girls strengthen their outcomes, whether it be a hand-made product or a presentation in front of a group.

The design process encourages girls to both “try, try again” and recognize that “two heads are better than one.” Engineers, and everyone from kids to professionals, use these steps to reach their desired result. We knew this was an effective tool when one Girl Scout remarked that she used the **Engineering Design Process** when writing and revising a paper for English class, and to persuade her parents to get a later curfew!

As the leader, you’ll have to know when it’s time to stop, but the more opportunities you allow girls to reflect, redesign, and repeat the design process steps, the better the experience for all. We recommend you display the supplied **Engineering Design Process** poster throughout these activities for easy reference.



Recommendations:

Throughout this project, emphasize the **Engineering Design Process** and the steps necessary to make an innovative, well-functioning design.



Girl Scout Leadership Experience

In 2008, Girl Scouts of the USA introduced fifteen Leadership Outcomes to help leaders create and recognize a successful Girl Scouting experience. You know your girls are enjoying a quality Girl Scout activity when an out-of-school experience is **girl-led, experiential, and cooperative**. You see that your girls are leaders when they:

Discover...

- Girls develop a strong sense of self
- Girls develop positive values
- Girls gain practical life skills
- Girls seek challenges in the world
- Girls develop critical thinking

Connect...

- Girls develop healthy relationships
- Girls promote cooperation and team building
- Girls can resolve conflicts
- Girls advance diversity in a multicultural world
- Girls feel connected to their communities, locally and globally

Take Action...

- Girls can identify community needs
- Girls are resourceful problem solvers
- Girls advocate for themselves and others, locally and globally
- Girls educate and inspire others to act
- Girls feel empowered to make a difference in the world

We are proud that Techbridge's hands-on activities meet many of the Girl Scout Leadership Experience (GSLE) outcomes. Girls **gain practical life skills and develop critical thinking** abilities as they work through design challenges in our programs-in-a-box. By testing and redesigning their products, working through the **Engineering Design Process**, girls thrive on **challenges**, conquer doubts, and gain confidence and new perspective.

Girls **develop healthy relationships, learn to cooperate, and resolve conflicts** as they share, brainstorm, and negotiate in teams and pairs during Girls Go Techbridge activities. To build connectedness with your community, we encourage you to invite role models in engineering to interact with your girls. Remind your guest engineers to share that they are members of the very same community as your girls, and that together we can all be problem-solvers for the issues facing our world.

We hope, through the reflection and active questioning built into the Girls Go Techbridge activities, you will lead your girls to **identify community needs, educate and inspire others, and feel empowered** to make a difference in the world. While our hands-on-activities are presented in the context of having fun in an informal learning environment, there are real-world applications. With the skills and concepts learned by working through this program-in-a-box, girls gain the tools to make the world a better place.

Our mission at Techbridge is to **inspire a girl to change the world**. Thank you for sparking the fire for change.

GIRLS GO TECHBRIDGE AT A GLANCE

Techbridge
at
Girl Scout Council of
Colonial Coast

Girls Go Techbridge Programs-in-a-Box

Girl Scout Councils and Techbridge have joined together to offer five fun, hands-on programs-in-a-box to inspire girls in science, technology, and engineering!



GIRLS can experience Techbridge in many ways with Colonial Coast

Series Pathway
Local schools and recreation centers
theresap@gscgcc.org

Council Wide Events
Science Alive
Norfolk State University Sep 28th

Check out GO! for more .
www.gscgcc.org

Troop Check Out
For troops with girls in grades 4-8. Adult workshops required.
To reserve a box, visit www.gscgcc.org/shop.
The fee is a \$50 refundable deposit per box plus \$14 per girl for Make It Green, Design Time, Thrillbuilders, and Engineers to the Rescue. \$16 per girl for Power It Up
donna@f@gscgcc.org



Make It Green

Construct a green studio from start to finish—from brainstorming an idea, to creating a floor plan, to building “green.”



Design Time

Work through the engineering design process and get your creative juices flowing with four playful design scenarios.



Power It Up

Master electricity and circuits through a series of hands-on investigations, with the option to use a soldering iron.



ThrillBuilders

Explore simple machines all around you in a crazy carnival of your own creation.



Engineers to the Rescue

Apply engineering know-how, problem-solving skills, and design savvy to navigate your way out of a camping trip gone wrong.

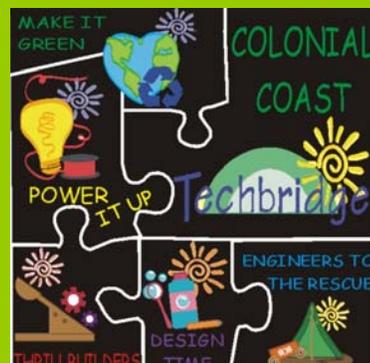
ADULTS and Techbridge
Free training and workshops provided.

Be a **Techbridge facilitator**. Train adults to deliver these programs to girls.

Deliver program to girls through our troop, series, and event pathways.

Be a **role model** for one of the troop, series, or event uses. Each techbridge experience has a role model/career component. Share your passion for science to inspire the next generation.

theresap@gscgcc.org



Frequently Asked Questions

Is Techbridge for Girl Scout Juniors and Cadettes only?

Yes. These program activities have been written specifically for 4-8 grade. There are safety aspects and science concepts that would be too difficult for younger girls and too simple for older girls.

Where can techbridge kits be used?

Techbridge is adaptable to almost any situation. Troop meetings, service unit events or encampments, a full day, lock-in, troop camping, day camp, weekly series at school, place of worship, or recreation center. There are three suggested schedules listed in each leader guide or you may choose to create your own.

Is adult training required?

Yes. To give adults a better understanding of exactly what to expect, any adult wishing to guide girls through these kits are required to attend training. Two hour workshops are provided at no charge to any adult wishing to check out techbridge kits. Check the adult learning page on our website for dates and locations or contact Cheryl McGrenra at cherylm@gsgccc.org or (757)410-0595.

What is the check out process?

1. Email donnaaf@gsgccc.org to request a kit. Provide the topic, number of girls to be served, and the date you wish to pick up the kit. Requests must be received eight weeks in advance.
2. Once all of the details are in order, you will be given a link to register and pay.
3. Pay online. \$50 refundable deposit and \$14 per person for Make It Green, Design Time, Thrillbuilders, and Engineers to the Rescue. \$16 per girl for Power It Up.
4. Kit will be available for pick up at APFG or PSC and must be returned on the date agreed upon.
5. \$50 is returned when all surveys and non-consumables, in good condition, are returned. This may take up to two weeks to process.

How long can we keep the kits?

We encourage you to check the kit out one week before you plan to begin with girls. This will give you time to review the materials and lesson plans, watch the videos, and have time to do a few of the activities.

If you are planning to use this for a one day or weekend event, we ask that you arrange to return it as soon as possible as others are waiting to reserve them.

Maximum Check Out Times by topic:

Power It Up—7 weeks

Make It Green—7 weeks

Design Time—6 weeks

Thrillbuilders— 6 weeks

Engineers To the Rescue—6 weeks

Is there a minimum and maximum number of girls we can serve?

Each kit topic may be checkout to serve a minimum of 5 girls and a maximum of 100 girls. Requests for more than 20 girls must be received 10 weeks in advance..

Are supplies included for leaders to do the activities?

We strongly suggest you purchase one more than you need so that an adult can do the activities for herself prior to leading the girls. It will also give you a sample for the girls to see if they get stuck along the way.

Do I have to complete all activities? No, if you wish to complete all of the activities, you may, but you must do at least one hands-on activity and one career activity and return all surveys in order to count this as a techbridge experience.

Is there a patch?

Yes. There are six patches available for purchase in the council shops. There is a picture on the front side of this flier. One patch is the techbridge base corner. Then there are five smaller puzzle piece patches (one for each topic). You may choose to buy one, some, or all six.

Was your question not answered here?

Contact Donna Farnham at donnaaf@gsgccc.org