



ThrillBuilders

Launch Your Own Crazy
Carnival of Moving Parts



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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.

ThrillBuilders: Suggested Schedule

Time	Session 1	Session 2	Session 3	Session 4
:00	Pre-Surveys (if applicable)	Career Activity: Illustrate Your Career	Icebreaker: Gearing Up!	Icebreaker: Fling It!
:10	Icebreaker: Simple Machines Scavenger Hunt	Activity: Coaster Car	Activity: Merry-Go-Round	Activity: Bean Bag Toss
:20				
:30				
:40	Activity: Mini Playground		Career Activity: Park Plan	
:50				
1:00				
1:10				
1:20			Career Activity: Your Career Card	
1:30				Career Activity: Career Catcher
1:40				Post-Surveys

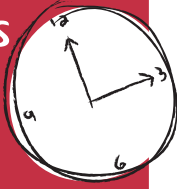
ThrillBuilders: Alternative Schedules

	6.5 Hours	4.5 Hours
:00		
:10	Icebreaker: Simple Machines Scavenger Hunt	Icebreaker: Simple Machines Scavenger Hunt
:20		
:30		
:40	Activity: Mini Playground	Activity: Mini Playground
:50		
1:00		
1:10		Icebreaker: Gearing Up!
1:20		
1:30		
1:40	Activity: Coaster Car	
1:50		Activity: Merry-Go-Round
2:00		
2:10		
2:20		
2:30	Icebreaker: Gearing Up!	
2:40		Career Activity: Illustrate Your Career
2:50	Lunch	
3:00		Icebreaker: Fling It!
3:10		
3:20	Activity: Merry-Go-Round	
3:30		
3:40		
3:50		Activity: Bean Bag Toss
4:00		
4:10		
4:20		Activity: Career Catcher
4:30	Career Activity: Illustrate Your Career	
4:40		
4:50	Icebreaker: Fling It!	
5:00		
5:10	Activity: Bean Bag Toss	
5:20		
5:30		
5:40		
5:50		
6:00		
6:10		
6:20	Career Activity: Your Career Card	
6:30	Activity: Career Catcher	

ThrillBuilders: Introduction

4 Suggested Sessions

approximately 1 hour and 30 minutes each



Skills:

- Designing projects with simple machines

Many of the products and places girls come into contact with every day have moving parts. Girls may not realize that so many of these machines were designed by **Mechanical Engineers**. This unit uses a fun, exciting place—an amusement park—as a basis for understanding simple machines and how they relate to things we use every day.

The ThrillBuilders program-in-a-box introduces girls to simple machines. Girls build simple machines in the form of amusement park

attractions. Girls will explore energy sources, mechanics, and design as they build their very own attractions for the amusement park. The career theme of this program is **Mechanical Engineering**, and a **Mechanical Engineer** can be introduced each session. An additional engineer is introduced in each activity as a complement to the wide range of projects **Mechanical Engineers** might work on. Some activities include:

☀ **Mini Playground:**

Girls will work as **Structural Engineers** and build playground equipment that contains at least three simple machines.

☀ **Coaster Car:**

Girls will take on the role of **Transportation Engineers** and design a car for a roller coaster that can travel under the power of gravity.

☀ **Merry-Go-Round:**

Girls will build a merry-go-round using bevel gears. As **Industrial Engineers**, they will determine the most efficient ways to run the ride.

☀ **Bean Bag Toss:**

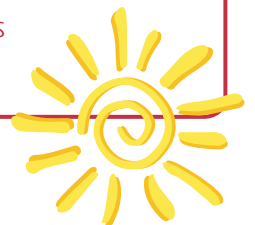
Girls will use levers, fulcrums, and potential energy to create a catapult-inspired bean bag toss. They will judge the safety of the equipment as **Safety Engineers**.

Each activity includes an icebreaker that introduces key concepts. Be sure to do the icebreakers—*Simple Machine Scavenger Hunt*, *Gearing Up!*, and *Fling It!*—before continuing to the longer activities.

We encourage you to invite role models into your program and to take the girls on field trips. Our career cards include profiles of women in those fields, but nothing compares to a field trip to see where these engineers work. See page eleven for tips on planning a role model visit or field trip.

Recommendations:

Emphasize to the girls that many of the products we use every day have moving parts, and were designed by the types of engineers girls will meet during this unit.



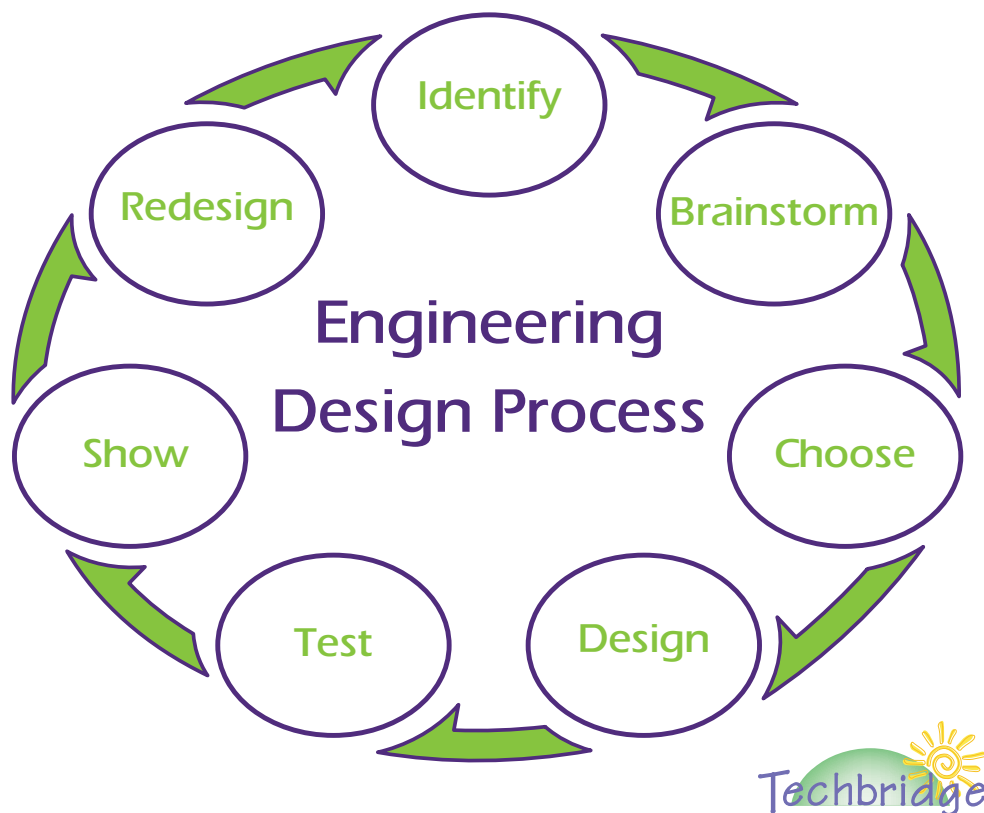
ThrillBuilders: Introduction

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.



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.