Summer STEM Guide
Science, Technology, Engineering, and Math Opportunities

About Techbridge Girls

Techbridge Girls pictures a world where all girls lead, contribute, and thrive in science, technology, engineering, and math (STEM). Based in the San Francisco Bay Area, Greater Seattle, and Washington, D.C., Techbridge Girls serves girls in grades 4 to 12 through high-quality STEM afterschool and summer programs that include hands-on projects and career exploration.

Dear Parents and Guardians,

Your daughters have spent this school year learning about science, technology, engineering, and math (STEM) careers and developing critical-thinking and collaboration skills needed to pursue jobs in these fields. This knowledge can help them grow into young scientists, engineers, and technology workers, but it can also be lost over this long summer break.

Summer learning loss happens to kids when they don’t have changes to practice the skills they have gained over the school year. This guide shares summer programs, books, and hands-on activities that can help you encourage your daughter’s STEM learning during their summer break. Here are other ideas for simple things you can do at home to help your daughter hold on to the knowledge and skills she’s learned:

- **Read together.** Reading out loud or together as a family can help prevent the loss of reading skills over the summer break. This guide provides a number of STEM-related books that can help retain your daughter’s reading level while also keeping her interested in STEM.

- **Practice math.** Math is another skill that often declines during the summer months. You can encourage your daughter to practice math during everyday activities, like cooking or shopping. Ask her to add, subtract, multiply, and divide to calculate the amounts of ingredients needed or to estimate the cost of a grocery bill.

- **Encourage her to follow a STEM-related passion.** Summer is a perfect time for developing a passion or hobby. Find out what your daughter is interested in: maybe it’s coding or architecture or medicine. Encourage her to find books, websites, and apps on the subject, and to try out her ideas — whether that’s designing a game or creating a model of a building.

www.techbridgegirls.org
Below are local camp programs to keep your daughters engaged in STEM this summer.
Be sure to apply early for scholarship opportunities!

Seattle Aquarium– Marine Summer Camps
Through field visits and interactive behind-the-scenes museum days, campers will observe and learn about the marine life that calls the PNW home. Excursions include boat trips in the Salish Sea, tide pool exploration at local beaches, and more. Scholarships available!
**Ages:** 4-14
**Location:** Seattle Aquarium
www.seattleaquarium.org/public-programs

Museum of Flight’s Amelia’s Aero Club
This program is designed to support and empower middle school girls to explore aeronautics, aviation, history of women in flight, and leadership skills. Many Scholarships are available!
**Grades:** 6-8
**Location:** Museum of Flight
www.museumofflight.org/Education/Explore-programs/Amelias-Aero-Club

Reel Grrls
Call The Shots Summer Day-Camp will teach filmmaking and video production where participants build skills and focus through creative storytelling. In addition to this, participants receive one-on-one mentoring sessions with professional filmmakers and teaching artists. *This camp is for female, transgender and gender non-conforming youth. Scholarships available!*
**Grades:** 5-8, 8-12
**Location:** Northwest Film Forum
http://reelgrrls.org/program-basics/summer-programs/

Camp Invention
Camp Invention inspires children to invent with fun, hands-on challenges that encourage creative problem solving, teamwork, entrepreneurship, and innovation. For youth in grades 7-9, there is an opportunity to apply for a Counselor in Training position to gain leadership skills. Payment plans available.
**Grades:** 7-9 for Counselor in Training program.
**Location:** Elementary Schools around Greater Seattle
http://campinvention.org/

DigiGirlz High Tech Camp
This free camp hosted by Microsoft works to dispel stereotypes of the high-tech industry. Girls will engage in hands on activities and workshops, listen to motivational speakers and receive mentoring from female Microsoft Employees.
**Grades:** 6-12
**Location:** Microsoft Headquarters—Redmond, WA

SIFF Filmmaking Camps
Explore a range of filmmaking topics including claymation, storytelling, or use of green screens with master filmmaking educators. Scholarships available for students who qualify for free and reduced lunch.
**Grades:** 9-12
**Location:** SIFF
https://www.siff.net/education/youth/filmmaking-camps

Temporary Computer Science & Engineering Summer Camps
Hosted by the University of Washington, these camps offer a wide range of topics to explore, from web design to bioengineering to human centered design.
**Grades:** 6-12
**Location:** University of Washington
https://www.engr.washington.edu/admission/k12

Summer of Learning
Attend free engaging summer programs at libraries in King County on STEM, arts and reading!
**Ages:** All
**Location:** King County Libraries
http://www.spl.org/audiences/children/
Below are STEM books to keep your daughters reading and learning all summer long.
Check out your local library for free access to books!

**Hidden Figures Young Readers’ Edition**
By Margot Lee Shetterly
Ages: 8+
The story of four female African American mathematicians at NASA in the 1960s who overcame racial and gender barriers to succeed in their careers. Made into an Academy-Award nominated movie.

**The Fourteenth Goldfish**
by Jennifer L. Holm
Ages: 8+
In this fictional book, Ellie Cruz is an 11-year old girl whose life is changed when her scientist grandfather transforms himself into a 13-year old boy. As she helps him she learns about science and the work of scientists in history.

**Women in Science: 50 Fearless Pioneers Who Changed the World**
by Rachel Ignotofsky
Ages: 9+
This book has profiles of 50 women who have made a difference in STEM, such as Katherine Johnson and Marie Curie, along with illustrations on topics such as lab equipment.

**Radioactive! How Irène Curie and Lise Meitner Revolutionized Science and Changed the World**
by Winifred Conkling
Ages: 10+
The story of two female scientists who made breakthrough discoveries about radioactivity and nuclear energy.

**Girl Code: Gaming, Going Viral, and Getting It Done**
by Andrea Gonzales and Sophie Houser
Ages: 10+
The real-life story of two teenagers who met at a summer camp for coding and made a viral video game. Includes information on how to get started coding.

**Finding Wonders: Three Girls Who Changed Science**
by Jeannine Atkins
Ages: 9+
This novel, written in the form of poems, tells the story of three girls who grew up to be groundbreaking scientists.

**Wonder Women: 25 Innovators, Inventors, and Trailblazers Who Changed History**
by Sam Maggs
Ages: 12+
This book tells the stories of 25 women scientists, engineers, mathematicians, inventors, and adventurers. It also includes list of organizations that can help girls and women interested in STEM.

**Primates: The Fearless Science of Jane Goodall, Dian Fossey, and Birute Galdikas**
by Jim Ottaviani and Maris Wicks
Ages: 12+
This graphic novel looks at the careers of three primatologists—scientists who study primates such as gorillas and chimpanzees.

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STEM Activities

Doing STEM activities together is a fun way for the whole family to learn! Below are simple challenges that you can try with materials around the house. While doing these activities, ask girls questions about their design and building process to push their thinking.

Cookie Packaging Design Challenge

**Goal:** Design and build a new and innovative package for cookies that protects them from breaking.

**Materials:** Use materials you can find around the house, such as:

- Newspaper or recycled paper
- Cardboard
- Tape
- Plastic bags
- Foil
- One cookie or graham cracker

**Directions:** Design your cookie package using the Engineering Design Process. While designing, look at packaging for other products like food, cleaning supplies, and electronics for inspiration. After building your package, test it by placing a cookie or cracker inside and dropping it from different heights. How high can you drop it without the cookie breaking? If it breaks, how can you redesign your package to better protect it?

**Ask:** Where do you see packages in your everyday life? What would happen if we did not have packages for the products we use? What materials and design elements worked best for your cookie packaging? What step of the Engineering Design Process is most challenging for you?

**Career:** Package Engineers research, design, and manufacture packaging for common products like cosmetics, electronics, food, and toys. They make sure packages are designed to both protect and sell products. Average starting salaries of package engineers are about $55,000, and average salaries after 5 years are about $85,000.

Boat Design Challenge

**Goal:** Design a boat that can float AND carry as much weight as possible.

**Materials:** Use materials you can find around the house, such as:

- Aluminum foil
- Wax paper
- Rope or string
- Tape
- Straws
- Paper cups

**Directions:** A boat will float if the force of gravity (pulling it down) is less than the buoyancy force (pushing it up). Make a boat using materials you have found around your home. Then, add weights (such as coins, buttons, or washers) and see how many it can hold. Can you redesign your boat so that it holds more weight?

**Ask:** How does the shape of the boat affect the amount of weight it can hold? What kinds of materials make the best boat? What step of the Engineering Design Process is your favorite?

**Career:** Marine engineers design and build ships, like aircraft carriers, submarines, and sailboats. Marine engineers earn about $60,000 after getting a 4-year college degree, and can earn about $95,000 after working in the field.