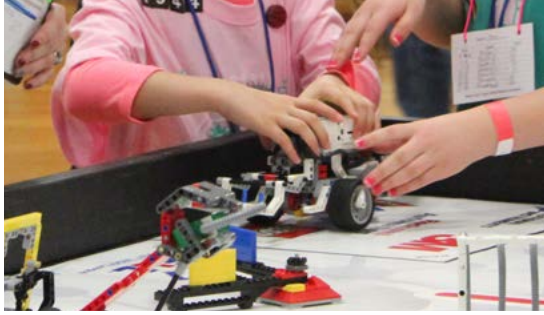
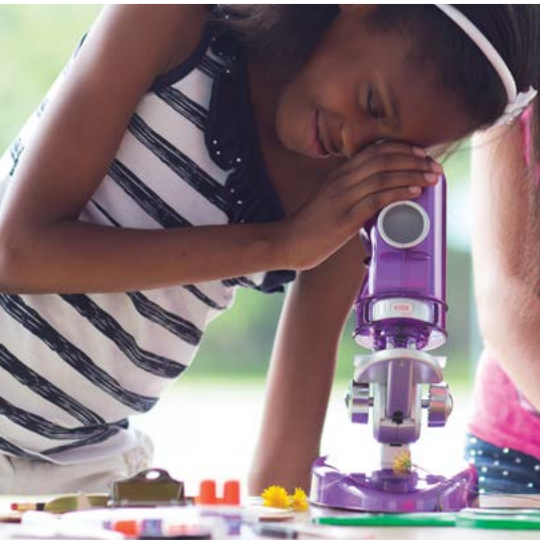
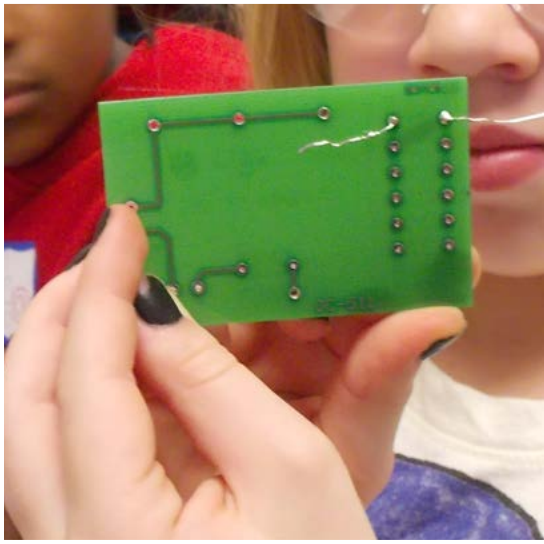
girl scouts







How Girl Scout STEM Programs Benefit Girls

A Compilation of Findings from the Girl Scout Research Institute

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How Girl Scout STEM Programs Benefit Girls

Over 160,000 Girl Scouts participate in STEM programs annually, and a majority of councils offer their members more than ten STEM programs each year.[1] These programs serve to engage young women in STEM topics and scientific reasoning, and allow them to apply concepts learned in school in new ways. When situated within the context of the Girl Scout Leadership Experience (GSLE), these programs also afford girls the opportunity to combine STEM learning with leadership development, growth mindset development,[2] and other socially desirable skills[3] in a flexible, informal environment that supports student-driven exploration and experimentation. While the content and intensity of STEM programs vary, they are often developed with the same impact goals in mind—increasing girls' interest in STEM, increasing girls' confidence in their STEM-related abilities, educating girls about STEM careers, and exposing girls to STEM professionals, to name a few. Though these outcomes are often considered "soft" and less valuable than academic performance goals, research has found that factors such as STEM interest and perceptions of relevance of STEM to one's life provide the necessary foundation for successful STEM learning and careers.[3,4,5]

How Girl Scout STEM Programs Benefit Girls is a collection of findings from evaluations of nationally funded Girl Scout STEM programs conducted by the Girl Scout Research Institute (GSRI) from 2010 to 2015. These findings illustrate just some of the benefits to girls when they participate in STEM programming through Girl Scouts, particularly in relation to the social and emotional impact goals described above.

STEM and the Girl Scout Leadership Experience (GSLE): A Natural Fit

The Girl Scout Leadership Experience (GSLE) is built on three core implementation strategies, or processes, that support girls' leadership development: girl led, cooperative learning, and learning by doing. Research by the GSRI has shown that program engagement through the processes is strongly associated with achievement of key leadership skills[6,7,8] and academic outcomes.[9] The hands-on and inquiry-based nature of STEM disciplines make them a natural fit with the GSLE, and our evaluation research shows that Girl Scout STEM programs rely significantly on these practices and consider them important program components.

- **Girls engage in cooperative learning as they work together to solve problems.** Girls work with one another, as well as their adult leaders, to conduct experiments and plan and implement projects in Girl Scout STEM programs. Girls in the Imagine Your STEM Future program indicated that they **learn by working with other girls** (70%)[10] and **work with others to learn things I would not be able to do on my own** (66%[10] & 81%[11]), while 84 percent of girls who participated in the evaluation of GSUSA's 2012-2013 Robotics program achieved the Cooperation and Team Building GSLE outcome.[12]
- **Girls lead their own explorations in Girl Scout STEM programs.** A majority of girls in STEM programs agree that they **have many opportunities to decide what we do and how we do it** (66%[10] & 81%[11]) and that they have more of a say than they do in other programs (74%[13] & 72%[14]). Girls in Imagine Your STEM Future have the opportunity to drive their own learning—74 percent of them agreed that **in this program, we learn more by doing things ourselves than by being told things by an adult**.[11]
- **Girls take on leadership roles more often and in different contexts.** Eighty-one percent of robotics evaluation participants agreed that **because of Girl Scouts, I've been a leader in more activities with friends, class or community,**[12] and 86 percent of evaluation participants from GSUSA's Journey and Connect Through Technology program agreed that **Girl Scouts prepared me to be a leader**.[15]
- **Girls are most satisfied with program components that manifest the Girl Scout processes.** Robotics participants consider **working with others on a team** (77%) and **building things with their hands** (73%) the most important components of their STEM programs.[16]

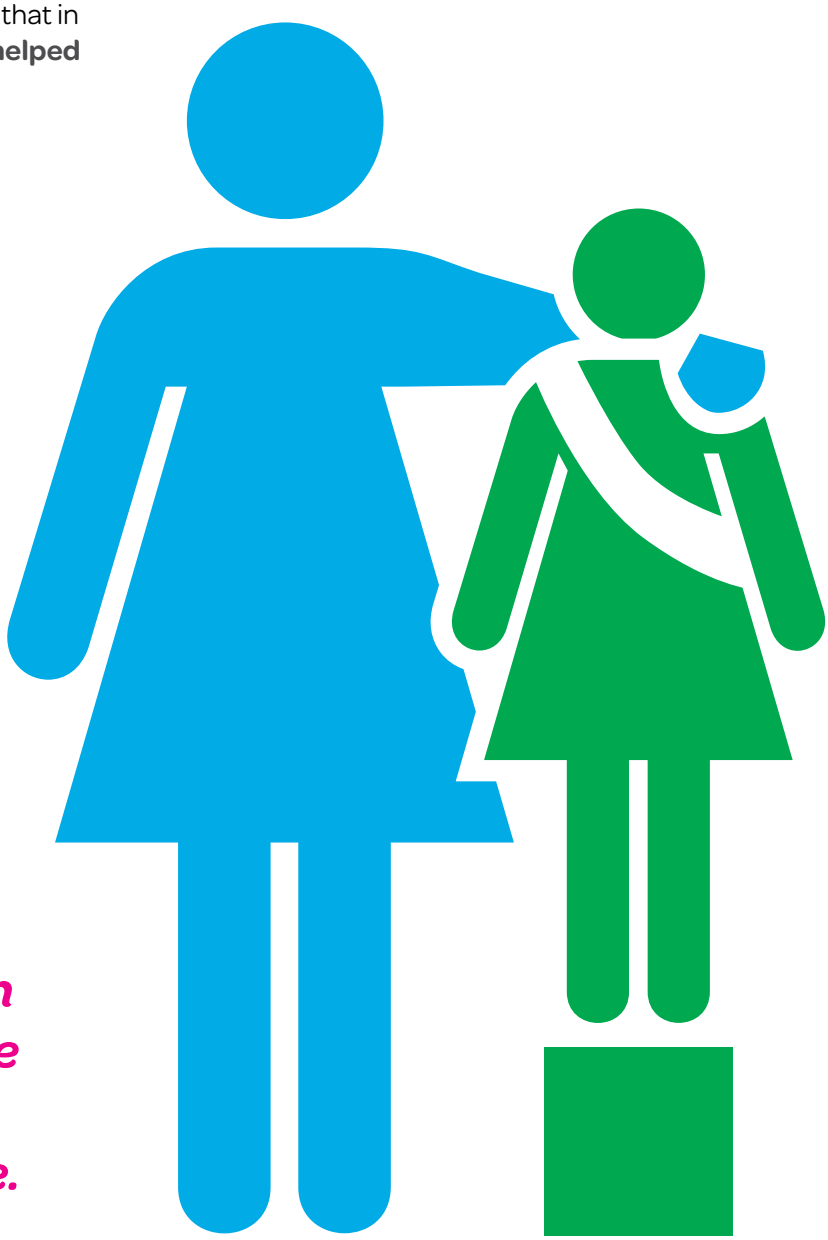
74%

74% of girls in Imagine Your STEM Future agree that in the program, they learned more by doing things than by being told things.

The Building Blocks: Supportive Adults Make STEM Programs a Success

- **Girls receive support and inspiration from STEM professionals.** Adults help girls learn about the program content and serve as role models, providing real-life insights into how girls can prepare for successful careers in STEM. The Imagine Your STEM Future program, for instance, integrates career presentations by working STEM professionals into the series and many councils partner with local colleges and universities to provide girls with opportunities to visit campuses and meet with scientists and their students. More than three-quarters (83%[10] & 91%[11]) of Imagine participants agreed to some extent that in Imagine, **there is at least one adult who has helped me think about my future**.

- **Adult leaders provide emotional support by making girls feel valued.** A majority of girls across programs consistently agree that in their STEM program **there is at least one adult who makes me feel like I am valuable** (82–93%), and that those adults **listen to girls more than they do in other places** (67–87%).[10,11,13,14]



Girls across programs consistently agree that in their STEM program there is at least one adult who makes them feel valuable.

Building the Foundations: Increasing Interest in STEM

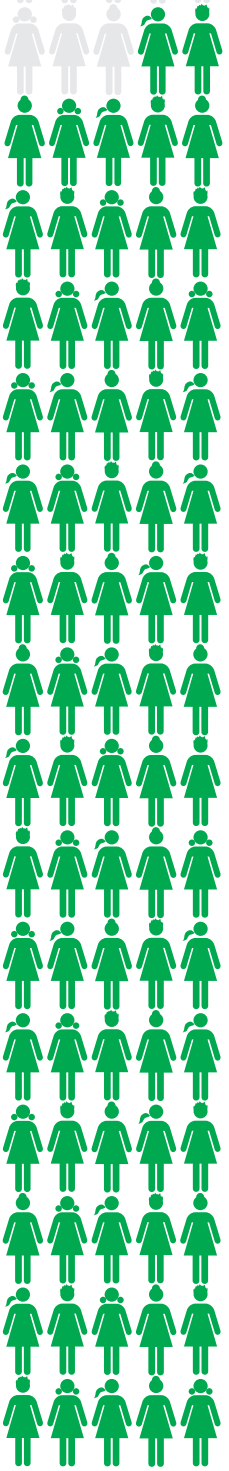
- **Girls become more positive about STEM.** Participants in Girls STEAM Ahead programs across the country say Girl Scouts has shown them that math, science, and the arts can be fun (86%[17] & 93%[18]). Additionally, girls who did not like math or science **a lot** at the start of their STEM programs became more positive about these subjects after participating: between 42 and 56 percent liked science more[10,13,14,19] and between 39 and 42 percent liked math more[10,13,14] after the program than they had at its start. Asked if the program increased their interest in science or engineering **not as much as**, **the same as**, or **more than other programs**, 48 percent of Robotics participants indicated that the program **increased their interest more than other programs**, while fewer than 12 percent selected **not as much as other programs**.[16] Importantly, these changes are visible to the adults who work with these girls. Coaches from two separate years of robotics indicated that **most or all** of the girls on their teams **demonstrated more excitement around learning science** (69%[13] & 70%[14]) and **around learning about engineering** (69%[13] & 72%[14]). Coaches from a third robotics program indicated that **because of my team members' involvement in Girl Scouts' FIRST program, their interest in learning how to program computers** (74%), **in designing things** (74%), and **in learning more science** (70%) had **increased**.[16]

- **Girls become more interested in engaging in additional STEM activities and taking more STEM-related classes in school.** A comparison of pre- and post-surveys found that 35 percent of girls in the Imagine Your STEM Future program were more **interested in participating in non-school programs that focus on STEM** at the end of the program than they were at the beginning, and this number jumps to 45 percent when girls who selected the top response on the pre-survey are not included.[10] Additionally, 52 to 61 percent of girls in two other programs who did not strongly agree at the start of the program that they were looking forward to learning more science or taking more science classes were looking forward more to these endeavors by the end of their programs.[12,13,14,19]

- **Girls want to learn more about STEM careers, and older girls become interested in college-level STEM majors and pursuing STEM careers.** Girls STEAM Ahead participants report that **because of Girl Scouts, I want to learn more about careers in math, science and the arts** (77%[17] & 90%[18]). Additionally, over three-quarters of high-school-aged robotics participants (79–83%) who did not **agree a lot** at the start of the program that **I am interested in majoring in a science or engineering-related subject in college**, and between 46 and 61 percent of those who did not **agree a lot that I am in interested in studying computer science in college**, agreed more with these statements at the end of the program.[13,14] This impact goes even further than college pursuits—girls in our STEM programs are **significantly more interested** after the programs in having a STEM career than they were when they entered the programs.[10,12,13,16,20]

- **Girls themselves say Girl Scouts makes the difference.** Girls attribute their increased interest in STEM activities, classes, and careers to the STEM programs they engage in through Girl Scouts, and say that these programs have made more of an impact than other programs in which they have been involved. In one program, 91 percent of evaluation participants agreed that **because of Girl Scouts, I enjoy learning about and using technology**, and 77 percent agreed that **because of Girl Scouts, I am thinking about pursuing a career in technology**.[15] Similarly, participants said that Girl Scouts' FIRST Robotics program **has increased my interest in science or engineering** (48%) and **increased my interest in designing things** (52%) **more than other programs**.[16]

77% *of girls say that, because of Girl Scouts, they are considering a career in technology.*



Building Muscles: Developing STEM Skills and Knowledge

- **Girls develop important STEM-related skills.** Girls indicate that their ability to **build and design things** (64%), **solve problems** (50%) or **think of different ways to solve a problem** (51%), and **research a problem** (48%) all **got a lot better** through their participation in STEM programs.[16] Adults also observe these changes in the girls with whom they work. Amongst the other improvements, the biggest changes, according to adult volunteers, were that girls' **ability to design things** (68%),[16] **to use trial and error to solve problems** (60%),[16] and **to think of different ways to solve a problem before deciding on a solution** (57%)[12] all **improved a lot** through the course of their programs.

- **Girls learn to persevere in the face of challenging problems.** Thirty-seven to forty-nine percent of girls who did not **agree a lot** at the start of the program that **I would rather solve a problem by figuring it out than be told the answer**, agreed more with this statement at the end of the program.[12,13,14] Similarly, the adults who work with these girls report observing that girls' tendency **to try their hardest most of the time** (73%)[12] and **to persevere through a difficult challenge** (82%)[13] has **increased**, and that most or all of the girls **more frequently want to solve a problem themselves rather than be told the answer** (71%[13] & 76%[14]).

- **Girls learn about STEM careers and professions.** Girl Scout STEM programs place a strong emphasis on introducing girls to STEM careers, demonstrating what STEM professionals, such as engineers and scientists, do in their work and how they do it. These programs also offer the opportunity to meet successful female STEM professionals which, in turn, helps girls understand what opportunities are open to them with hard work and a strong STEM education, and to visualize themselves in similar careers.

Adults report that participants' tendency to try their hardest and to persevere through a difficult challenge increased as a result of the program.

In the Imagine Your STEM Future program, for instance, 59 percent of participants in one year knew more about career options in STEM at the end of the program compared with the start,[10] and 83 percent in another year **agreed** that **because of this program I know more than I did before about the types of things that people who study science, technology, engineering, or math can do for their jobs**.[11] Similarly, girls in Engineer Your Journey agreed significantly more at the end of the program than they had at the start that **I know what scientists and engineers do** and **I know about the process engineers use to create products and solve problems**,[20] while robotics participants agreed significantly less after the program that **I don't know what engineers do**.[13] Importantly, these career introductions help break down the STEM stereotypes that often turn girls off of science, such as decreasing how much they see **engineering as a better job for a man than a woman** (58% who did not disagree a lot at the start)[12] or as boring (71–90% who did not disagree a lot at the start),[12,13,14] and increasing how much they believe **scientists and engineers work on things that help people** (69–74% of girls who did not agree a lot at the start).[12,13,14]

Building Confidence: Changing Girls' Sense of Self Around STEM

- **Girls develop a stronger STEM identity.** Because of their hands-on and supportive nature, Girl Scout STEM programs have positively impacted girls' self-confidence related to STEM, as well as their confidence overall. STEM participants credit Girl Scout STEM programs with increasing their confidence in their science (82%[10] & 68%[11]) and math (61%[10] &–76%[11]) abilities, or both (83%[17] & 92%[18]). Not only do girls indicate that these programs have increased their overall self-confidence (84%),[15] but they also say they had **more of an impact on them than other after-school programs** (46%).[16] The increased self-confidence of girls in STEM programs is apparent to the adults who work with them as well. These adults report that girls in their programs display an increased confidence in their science (64–83%), math (50–59%), and computer skills (69–82%)[12,13,14,16]—confidence that is reflected in an increased **willingness to take on new challenges or try new things** (87%[12] & 81%[13]), as well as their confidence overall (80–88%).[12,13,14]

A majority of girls are more confident in their science and math abilities after participating in Girl Scout STEM programs.

Building Motivation: Learning the Value of STEM Knowledge

- **Girls display an increased understanding and appreciation of the importance of STEM and STEM literacy in their lives.** Girls who do not start their STEM programs with a high appreciation of the importance of science come to more strongly agree after their program that scientists (56%[10] & 65%[19]) and engineers (69–74%)[12,13,14] **work on things that help people**, and that STEM professionals **make a difference in the world** (53%).[10] This change in perception directly impacts what girls value for themselves, as well, as they come to feel more strongly that it is important for them to **learn as much science in school as possible** (48%).[10]

Building Future Leaders: Working Together to Solve Problems and Tackle New Challenges

- **Girls who participate in Girl Scout STEM programs achieve Girl Scout Leadership Experience (GSLE) outcomes.** Through our STEM programs, girls become **resourceful problem solvers** (48–75%,)[12,13,14] **challenge seekers** (56%[13] & 49%[14]), **promotors of cooperation and team building** (84%[12] & 74%[19]), and **feel empowered to make a difference in the world** (89%).[19]
- **Girls attribute improvements in their leadership skills to their participation in Girl Scouting and STEM programs.** Girls credit their Girl Scout STEM programs with helping them step in to leadership roles more often (81%[12] & 86%[15]), and with becoming better at working with others (83–92%).[12-15]

Breaking down Stereotypes

- **Girls develop a more equitable perception of the relative abilities of men and women in STEM.** After participating in Girl Scout STEM programs, girls who had doubts at the start of the program not only agree more strongly that that **women can be good scientists and engineers** (71%),[16] but also disagree more that **engineering is a better career for a man than a woman** (58%).[12] More relevant to their immediate lives, 77 percent of girls who did not completely agree at the start of their program agree more by the end that **girls can be good at computers and science**.[16]

Satisfied Customers

- **Girls have fun and are satisfied customers!** As a testament to their satisfaction with their STEM experiences, 78 to 97 percent of girls say they **would participate in the same or a similar program with Girl Scouts if one were available**,[10,11,17,18] and 79 to 97 percent of girls say they **would recommend their Girl Scout program to their friends**.[10,11,13-15,17,18]

More than 3 in 4 girls say they would participate in the same or a similar program with Girl Scouts if one were available and would recommend their Girl Scout program to their friends.

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