



FIRST® Frequently Asked Questions

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FIRST® FAQ

What is FIRST®?

FIRST® (For Inspiration and Recognition of Science and Technology) is the world's leading child-serving nonprofit advancing science, technology, engineering, and math (STEM). Founded by inventor Dean Kamen in 1989, *FIRST* has evolved into a global movement by engaging millions of people with a proven game-changer for preparing kids to solve the world's greatest problems. *FIRST* programs inspire innovation and leadership through engaging, hands-on robotics challenges developed to ignite curiosity and passion in students in grades K-12. *FIRST* builds powerful mentorship relationships between young people and STEM professionals, helping kids gain confidence to explore the innovation process while they learn valuable science, engineering, technology, teamwork, and problem-solving skills. *FIRST* creates the people who will change the world – today and tomorrow.

FIRST provides a progression of four international, after-school programs for K-12: the *FIRST*® Robotics Competition for Grades 9-12 (ages 14 to 18); the *FIRST*® Tech Challenge for Grades 7-12 (ages 12 to 18); the *FIRST*® LEGO® League for Grades 4-8 (ages 9 to 16; ages vary by country); and the *FIRST*® LEGO® League Jr. for Grades K-4 (ages 6 to 10). *FIRST* also operates a research, development, and training facility called *FIRST*® Place™ at its headquarters in New Hampshire.



Who are some of the organizations that sponsor FIRST?

FIRST is supported by a strong network of corporations, educational and professional institutions, and individuals. Some of the world's most respected companies – including more than 200 of the Fortune 500 companies – provide funding, mentorship time and talent, volunteerism, equipment, and more to make *FIRST* a reality.

FIRST Strategic Partners – sponsors that support FIRST at the highest level – are:

The 3M Company, Argosy Foundation, Bechtel Corporation, The Boeing Company, Booz Allen Hamilton, Caterpillar Inc., DEKA Research & Development Corporation, The Dow Chemical Company, FedEx Corporation, General Motors Company, Google, Inc., John Deere, LEGO® Education, Lockheed Martin, Motorola Solutions Foundation, National Aeronautics and Space Administration (NASA), NI, NRG Energy, PTC, Inc., Qualcomm® Incorporated, Rockwell Automation, Rockwell Collins, and United Technologies Corporation.

Rockwell Collins is the Official Program Sponsor, PTC is the Official IoT, CAD and Collaboration Sponsor, and Qualcomm Incorporated is the Official Control System Sponsor for ***FIRST Tech Challenge***.

The LEGO Group is a Founding Partner of *FIRST* LEGO League. 3M Company and LEGO Systems A/S are Official Suppliers, and NI and Rockwell Automation are Global Sponsors of *FIRST* LEGO League.

***FIRST* Founding Sponsors are:**

Baxter International Inc., Boston Scientific Corporation, DEKA Research & Development Corporation, Delphi Automotive PLC, FCA Foundation, General Motors Company, Johnson & Johnson, Kleiner Perkins Caufield & Byers (KPCB), Motorola Solutions Foundation, and Xerox Corporation.

***FIRST* has Strategic Alliances in place with:**

Alpha Omega Epsilon; American Society for Engineering Education (ASEE); Automation Federation/International Society for Automation (AF/ISA); Boys & Girls Clubs of America (BGCA); Electronic Components Industry Association Foundation; Girl Scouts of the USA; MIT Alumni Association; National 4-H Council; National Center for Women & Information Technology (NCWIT); National Fluid Power Association; National Parent Teacher Association (National PTA); National Robotics Week; Sigma Phi Delta Fraternity; Society of Professional Hispanic Engineers; Society of Women Engineers (SWE); Triangle Fraternity; and Yale Science & Engineering Association (YSEA)

What does research show about participation in *FIRST*?

More than a decade of data and research shows that exposing kids to fun, exciting *FIRST* programs builds 21st century work skills and greatly increases their motivation to seek education and careers in STEM fields. Learn more at www.firstinspires.org/about/impact.

How does the education community support *FIRST*?

FIRST provides an education, skill, and career path for young people who might not otherwise have discovered an interest in and pursued education and careers in science and technology. *FIRST* works closely with schools at every level to transform both the perception and reality of education in science and technology. Some of the finest colleges and universities support *FIRST* by providing scholarship opportunities, sponsoring teams, and providing mentorship, equipment, and facilities. As a result of the support of these colleges and universities, 2017/18 season *FIRST* high school students are eligible to apply for more than \$50 million in scholarship funds to continue education in science, technology, engineering, and math (STEM).

FIRST Alumni make up:

- 4% of the 2017 incoming freshman class at Florida Institute of Technology
- 5+% of the 2017 incoming freshman class at Yale University
- 7% of the 2017 incoming freshman class at Webb Institute
- ~10% of the 2017 incoming freshman class at Massachusetts Institute of Technology
- 19.7% of the 2017 incoming freshman class at Milwaukee School of Engineering
- 15% of the 2017 incoming freshman class at Worcester Polytechnic Institute
- 29% of the incoming 2017 freshman class at Kettering University
- 33% of the 2017 incoming freshman class at Capitol Technology Institute
- 34% of the 2017 incoming freshman class at Olin College of Engineering

Who participates in *FIRST* programs?

- Approximately 3,650 teams of high-school students will compete in the 2018 *FIRST*[®] **Robotics Competition** season. Over 155 Regional and District events will be held in the U.S., Australia, Canada, China, Israel, Mexico, and Turkey.

- Approximately 5,900 teams of students in Grades 7-12 will compete in the 2017/18 **FIRST® Tech Challenge**. More than 800 Meets and League events, Qualifying and Championship Tournaments, and Super Regionals will be held.
- Approximately 35,200 teams of middle-school students, ages 9-16 (age varies by country), will participate in **FIRST® LEGO® League** in over 90 countries in 2017/18. Over 1,400 Championship and Qualifying Tournaments will be held worldwide.
- **FIRST** also offers **FIRST® LEGO® League Jr.** for 6 to 9 year olds. More than 14,000 teams in 43 countries are expected to participate in 2017/18.
- More than 1,400 teams will attend the 2018 **FIRST** Championship to be held April 18-21 at the George R. Brown Convention Center in Houston, Texas, and April 25-28 at the Cobo Center in Detroit, Michigan.
- All competitions are intense, exciting, fun, and free for all ages.

Who manages the teams and events?

FIRST is truly a volunteer-driven organization. For the 2016/17 **FIRST** season, more than 230,000 volunteer roles were filled, with contributions in areas including mentorship, event management, recruitment, and team management. The growth and success of **FIRST** is a direct result of the efforts of the mentors, parents, teachers, community leaders, and citizens who volunteer their time and talent.

How can volunteers get involved?

The best ways to start discovering the rewards of **FIRST** are:

- Attend a **FIRST** event visit [the FIRST event search](#) to find an event close to you – attendance is free!;
- Contact a mentor from a [local team](#) to assist;
- Visit [the FIRST volunteer website](#) for volunteer/event opportunities; or
- Contact **FIRST** at 1-800-871-8326 or email volunteer@firstinspires.org.

Interested volunteers can visit our website at www.firstinspires.org/ways-to-help/volunteer for more information about how to become a mentor, coach, or event volunteer.

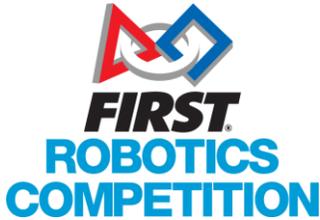
What is Gracious Professionalism®?

Gracious Professionalism® is part of the ethos of **FIRST**. The idea and phrase are found throughout **FIRST**, but no one has been a stronger champion than **FIRST** Distinguished Advisor, Dr. Woodie Flowers.

“Gracious Professionalism is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community. With Gracious Professionalism, fierce competition and mutual gain are not separate notions. Gracious professionals learn and compete like crazy, but treat one another with respect and kindness in the process.”

What is Coopertition®?

Coopertition® produces innovation. At **FIRST**, *Coopertition* is displaying unqualified kindness and respect in the face of fierce competition. *Coopertition* is founded on the concept and a philosophy that teams can and should help and cooperate with each other even as they compete. *Coopertition* involves learning from teammates. It is teaching teammates. It is learning from Mentors. And it is managing and being managed. *Coopertition* means competing always, but assisting and enabling others when you can.



FIRST® Robotics Competition FAQ

What is the FIRST® Robotics Competition?

The FIRST® Robotics Competition for Grades 9-12 (ages 14 to 18) is an annual competition that helps young people discover the rewards and excitement of education and careers in science, engineering, and technology. The program challenges high-school-aged students – working with professional Mentors – to design and build a robot, and compete in high-intensity events that reward the effectiveness of each robot, the power of team strategy and collaboration, and the determination of students. In 1992, the initial FIRST Robotics Competition took place with 28 teams in a high school gym in New Hampshire. In 2018, the largest-ever season will include 3,650 teams from 27 countries competing in 85 District Events, 10 District Championships, and 63 Regional Events, as well as FIRST Championship Houston at the George R. Brown Convention Center, April 18-21, 2018, and FIRST Championship St. Louis at the Cobo Center, April 25-28, 2018.

Why involve a professional mentor? Why don't students build the robot themselves?

FIRST creates powerful mentoring relationships between the students and professional mentors. FIRST Robotics Competition teams include engineers and other professionals from some of the world's most respected companies. Students work closely with and learn from these "stars" of the engineering world. Meaningful involvement of adults in children's lives is proven as an essential component for developing young people's potential.

How is the game played?

Each year's Kickoff event unveils a new, exciting, and challenging game. From the Kickoff, teams have just six weeks to build and program a robot to compete in the game using a kit of parts provided by FIRST and a standard set of rules. FIRST POWER UPSM, the 2018 FIRST Robotics Competition game, finds teams trapped in an 8-bit video game. Each three-team alliance has three ways to help defeat the boss: Tipping the scale or alliance's switch in their favor to earn points, exchanging power cubes for power ups (force, boost, and levitate) to gain a timed temporary advantage during the match, and climbing the scale tower to face the boss. The alliance with the highest score at the end of the match, which includes autonomous and teleoperated periods, defeats the boss and wins the game.

Who participates in the competition?

During the 2018 season, more than 91,000 high-school students on 3,650 FIRST Robotics Competition teams will compete in 85 District Events, 10 District Championships, and 63 Regional Events (in the U.S., Australia, Canada, China, Israel, Mexico, and Turkey), and the FIRST Championship. Teams are comprised of professional mentors and 10 or more student members in grades 9-12. In addition, each FIRST team has one or more sponsors. Those sponsors include companies, universities, or professional organizations that donate their time, talent, funds, equipment, and much more to the team effort.

Is scientific, technology, or mathematic expertise required for students to participate in the FIRST Robotics Competition?

FIRST invites students who may not be predisposed to science, math, or technology to participate. In fact, FIRST Robotics Competition is designed to inspire, motivate, and encourage students to learn

basic principles while challenging more experienced students. Since there are critical roles for students in everything from design and building, to fundraising and research, to marketing, every student can actively participate and benefit.

What do the students gain from participating?

Throughout their FIRST experience, students gain maturity, build self-confidence, learn teamwork, and gain an understanding of professionalism. Students have fun while building a network of friends and professional mentors who enrich their lives.

Any *FIRST* Robotics Competition participant is eligible to apply for more than \$50 million in scholarships from leading colleges and universities.

A series of awards honor accomplishments in areas including engineering, design excellence, competitive play, sportsmanship, and high-impact partnerships between schools, businesses, and communities. A judging committee of distinguished professionals makes award decisions. The most prestigious award is the Chairman's Award, which recognizes the team that best represents a model for other teams to emulate and best embodies the purpose and goals of *FIRST*.

Are there other benefits to participating?

Young people gain the skills and knowledge to fill one of the more than two million STEM-related positions available in the U.S. today. Sponsors benefit by finding future employees and interns. Mentors benefit from renewed inspiration and a reminder as to why they chose science, technology, engineering, and math (STEM) as a career. Volunteers are recognized as an integral and vital part of the way in which young people connect to the real world, in their own communities and in the world at large.

The majority of *FIRST* Robotics Competition participants participate in key STEM activities on the team and experience gains in a number of outcomes, for example*:

- 91% expressed an increased interest in going to college
- 88% expressed an increased interest in doing well in school
- 97% expressed an increased desire to learn more about STEM
- 92% gained self-confidence
- 99% increased teamwork skills
- 95% increased leadership skills
- 99% felt better able to solve unexpected problems

*Source: Cross-Program Evaluation of the *FIRST* Tech Challenge and the *FIRST* Robotics Competition (2011)



FIRST® Tech Challenge FAQ

What is FIRST® Tech Challenge?

- **It's way more than building robots.** FIRST Tech Challenge teams (10+ members, grades 7-12) are challenged to design, build, program, and operate robots to play a floor game in an alliance format.
- Participants call it “the hardest fun you’ll ever have!” Guided by adult coaches and mentors, students develop STEM skills and practice engineering principles (like keeping an engineering notebook), while realizing the value of hard work, innovation, and sharing ideas.
- The robot kit is reusable from year-to-year and can be programmed using a variety of languages. Teams also must raise funds, design and market their team brand, and do community outreach for which they can win awards.
- Participants have access to tens of millions of dollars in college scholarships.
- Each season concludes with regional Championship Tournaments and an exciting, international [FIRST Championship](#).

What does every FIRST Tech Challenge team need?

- Two or more screened adult mentors/coaches who are willing and motivated to coach the team through the build and competition season, and beyond!
- Other adults can volunteer to help with administration, fundraising, community outreach, technical advising, and other tasks.
- A suitable meeting place and space to design and build a robot about the size of a microwave oven.
- A standard kit of robot parts and a common set of game and robot rules issued by FIRST Tech Challenge.
- A budget and a fundraising plan.
- The desire to learn, explore, strategize, build camaraderie, share ideas and talents, make new friends, be accepted, and HAVE FUN!

When does FIRST Tech Challenge happen?

- The FIRST Tech Challenge season starts in **May**, when teams generally form and registration opens. Season kick-off is on **September 9, 2017** when the season's game is announced.
- The design and build season runs from **September to January**.
- Tournament season varies by region and can begin as early as **October and continues through April**. State and Regional Tournaments advance teams to Super-Regional Championship Tournaments, and winners earn spots at FIRST Championships at the end of **April in Houston, Texas, and Detroit, Michigan**. There are also many off-season events where teams participate, strategize, hone their skills, learn new technology, meet other teams, and *have fun!*

What is the time commitment?

- **Mentors or adult volunteers meet with their team at least once per week during the build and competition season (September - April). Many mature teams also meet throughout the school year, and some compete in off-season events during the summer. You, your family, and your available free time can decide together how much time you can devote to the program.**
- As a **team member**, the same applies. Students meet at least once per week from Mid-September through April. Like any sport or other after-school activity, the more time you invest, the better you will become at your task(s).

Any special skills required?

- **All skill levels are welcomed and needed, technical and non-technical. Teams need all kinds of skills to succeed, so what are you good at? Chances are we have a job for you. And we'll probably teach you a few new ones while you're with us.**
- Student and adult **team members** are encouraged to bring any skills they already have, like programming, electronics, metalworking, graphic design, web creation, public speaking, videography, and many more. *FIRST* Tech Challenge welcomes every student, with or without specialized skills.

What is the impact on the students?

The majority of *FIRST* Tech Challenge participants participate in key STEM activities on the team and experience gains in a number of outcomes, such as*:

- 93% expressed a deeper understanding of the engineering design process
- 87% expressed an increased interest in going to college
- 86% expressed an increased interest in doing well in school
- 95% expressed an increased desire to learn more about STEM
- 85% reported increased self-confidence
- 99% increased teamwork skills
- 92% increased leadership skills
- 98% felt better able to solve unexpected problems

*Source: Cross-Program Evaluation of the *FIRST* Tech Challenge and the *FIRST* Robotics Competition (2011)

What does it cost to participate?

There are [costs](#) involved with fielding a *FIRST* Tech Challenge team and they can vary from team to team and region to region depending on what level of participation the team chooses.

Here are some basic cost parameters:

- The *FIRST* Tech Challenge registration for North American teams is \$275 each season. International team registration varies by location.
- The average season costs per, including: team registration, a robot kit of parts, event registration, travel, and additional costs for rookie teams is approximately \$2,250.
- The robot kit of parts is reusable each season, so veteran teams can expect to pay less.
- *FIRST* offers many fundraising tools and teams are encouraged to create their own opportunities. Grants may also be available, as well as sponsorships provided locally, regionally and nationally by many corporations.
- All costs for individual team members are assumed by the team as a group.



FIRST® LEGO® League FAQ

What is FIRST® LEGO® League?

FIRST® LEGO® League for Grades 4-8 (ages 9 to 16; ages vary by country) introduces children to the fun and experience of solving real-world problems by applying engineering, math, science, and technology. FIRST LEGO League is an international program for children created in a partnership between FIRST and the LEGO® Group in 1998. Each year, the program announces an annual Challenge to teams, which engages them in authentic scientific research and hands-on robotics design using LEGO MINDSTORMS® technologies. After a minimum of eight weeks, the FIRST LEGO League season culminates at high-energy, sports-like tournaments. In the 2017/2018 season, more than 280,000 students are participating in nearly 90 countries.

What is the LEGO Group's role?

The LEGO Group is the Founding Partner of FIRST LEGO League. Since its inception, the LEGO Group has supported the growth and success of the program by contributing each year to the development, management, and funding of customized Challenge Sets, Robot Sets, marketing communications resources, volunteers, and more. During the 2015/2016 season, LEGO Education became a FIRST Strategic Partner.

What is the role of FIRST?

FIRST is responsible to provide:

- The overall vision and mission to inspire young people's interest and participation in science and technology. This vision guides all FIRST decisions and led to the development of the FIRST LEGO League program.
- The FIRST LEGO League program includes developing the annual Challenge, the standards for the program and Championship Tournaments, and supporting program documents.

Do you have any information on how FIRST LEGO League actually impacts the future science and engineering workforce?

More than 280,000 students will participate in FIRST LEGO League in 2017/2018. A study of participants in the U.S. and Canada conducted by Brandeis University showed that:

- Ninety-four percent of coaches reported an increase in students' understanding of how science and technology can be used to solve problems

Among past participants*:

- **98% expressed a greater awareness of STEM**
- **88% expressed an increased interest in going to college**
- **87% expressed an increased interest in doing well in school**
- **84% expressed interest in a job that uses science and technology**
- **99% increased teamwork skills**
- **95% increased time management skills**

*Source: Evaluation of the FIRST LEGO League SENIOR SOLUTIONSSM season (2012-2013)

Is the *FIRST* LEGO League experience rooted in real-world issues?

Absolutely. Every year, as *FIRST* LEGO League designs the Challenge, we look to the real-world practitioners and experts in the chosen subject area for guidance, input, and opinion, so that children are engaged in practical and realistic activities.

For the 2017/2018 **HYDRO DYNAMICSSM** Challenge, *FIRST* collaborated with experts in the fields of water purification, wastewater collection, environmental compliance, hydrology, agriculture, medicine, and more. These experts made up the Challenge Advisory Team, which included representatives from DEKA Research & Development, Washington State University, and the Institute for Water, Environment & Health at United Nations University, among others. These specialists collaborated with *FIRST* to create a theme and challenge missions that reflect how we find, transport, use, and dispose of water.

Why did you select **HYDRO DYNAMICS as the 2017/2018 Challenge theme and why is it important?**

Every *FIRST* LEGO League Challenge reflects an important real-world issue as a way to not only bring visibility to it among young children, but also as a way to show students how science and technology can contribute to solving problems. The themes are selected to engage students in STEM learning via a topic relevant to their real-life. In the *FIRST* LEGO League Season Challenge, **HYDRO DYNAMICS**, teams will explore the human water cycle and discover how we find, transport, use, or dispose of water. They will also develop their own innovative solutions to improve the human water cycle. Throughout their experience, teams will operate under the *FIRST* LEGO League signature set of Core Values.

What do the students win?

The competition is judged in four areas: Project; Robot Performance; design and programming of the robot; and Core Values. A judging committee of distinguished professionals makes award decisions. The highest honor, the Champion's Award, goes to the team that is strongest across all four performance categories. Every participant who attends a Championship Tournament receives a medallion to commemorate his/her experience and dedication to the eight-week process.

What is the role of the *FIRST* LEGO League Partners?

FIRST LEGO League relies on volunteers to run the program at many levels, from managing a region to coaching an individual team. *FIRST* and LEGO partner with and manage organizations with similar missions to deliver the program in specified regions. *FIRST* LEGO League partners roll out the program in their respective regions. These partners fundraise, run championship tournaments, hold workshops and demonstrations, market the program locally, handle public relations, and recruit volunteers and teams.

What other sponsors are involved?

In addition to the LEGO Group's role as Founding Partner, *FIRST* LEGO League is supported by Global Sponsors 3M Company, LEGO System A/S, NI, and Rockwell Automation. Also, *FIRST* LEGO League Championship Tournaments are made possible by hundreds of local sponsors, as well as universities/colleges participating in the program.



FIRST® LEGO® League Jr. FAQ

What is FIRST® LEGO® League Jr.?

FIRST® LEGO® League Jr. for Grades K-4 (ages 6 to 10) is designed to introduce younger children to the fun and excitement of solving problems with science and technology. FIRST LEGO League Jr. teams are given a Challenge based on a real-world theme, requiring them to build models and create a *Show Me Poster* depicting their research journey. Teams are encouraged to gather together to share their projects and experiences with family and friends or at a locally organized Expo. In 2017/2018, more than 86,000 children are expected to participate in 43 countries.

FIRST LEGO League Jr. teams receive the Inspire Set – a special LEGO Education kit that will be used by teams to inspire creativity within the Challenge theme – and the Engineering Notebook, which provides a structured experience for teams.

What is the LEGO Group's role?

The LEGO Group is the Founding Partner of FIRST LEGO League Jr. Since its inception, the LEGO Group has supported the growth and success of the program by contributing each year to the development, management, and funding of customized Inspire Sets, marketing communications resources, volunteers, and more. During the 2015/2016 season, LEGO Education became a FIRST Strategic Partner.

What is the role of FIRST?

FIRST is responsible to provide:

- The overall vision and mission to inspire young people's interest and participation in science and technology. This vision guides all FIRST decisions and led to the development of the FIRST LEGO League Jr. program.
- The FIRST LEGO League program includes developing the annual Challenge, the standards for the program and Expos, and supporting program documents.

Why did you select AQUA ADVENTURESM as the 2017/2018 Challenge theme and why is it important?

FIRST LEGO League Jr. is the starting point to exploring the world of science and technology. Every FIRST LEGO League Jr. Challenge reflects an important real-world theme to not only bring visibility to it among young children, but also to show students how science and technology can impact the world around them by engaging them in a real-world theme to which they can relate. In **AQUA ADVENTURE**, participants will learn all about the water they use in their daily lives. Teams will learn the fundamentals of design and programming, and how science, technology, engineering, and math impact our everyday lives, while they get excited about future innovations.

What do the students win?

FIRST LEGO League Jr. offers a non-competitive introduction into the world of science, technology, and innovation. Teams are not judged but are encouraged to present their research findings to family and friends or at a *FIRST* LEGO League Jr. Expo. Volunteers often organize expos where each child may receive a participation medal or other optional team recognition awards.

How is the *FIRST* LEGO League Jr. experience administered?

FIRST LEGO League Jr. relies on volunteers to run the program at many levels. *FIRST* and LEGO partner with and manage organizations with similar missions to deliver the program in specified regions. Parents, educators, community program administrators, can start and coach or mentor a team in their area. The program also has partners who facilitate the *FIRST* LEGO League Jr. program in their region. These partners help fundraise, run expos, market the program locally, handle public relations, and recruit volunteers and teams.