



FIRST® FAQ

What is FIRST®?

FIRST® (For Inspiration and Recognition of Science and Technology) was founded in 1989 by inventor Dean Kamen to inspire young people's interest and participation in science and technology. Based in Manchester, N.H., the 501(c)(3) not-for-profit public charity inspires young people to be science and technology leaders, by engaging them in exciting Mentor-based programs that build science, technology, math, and engineering (STEM) skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.

FIRST provides a progression of four global, 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.

2016 FIRST Strategic Partners are:

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

Qualcomm Incorporated is the Season Presenting Sponsor, Rockwell Collins is the Official Program Sponsor, and PTC is the Official IoT, CAD and Collaboration Software Sponsor of **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

What does research show about participation in FIRST?

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/aboutus/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, 2016/2017 season *FIRST* high-school students are eligible to apply for more than \$26 million in scholarship funds to continue education in science, technology, engineering, and math (STEM).

Who manages the teams and events?

FIRST is truly a Volunteer-driven organization. For the 2015/2016 *FIRST* season, more than 200,000 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 <http://www.firstinspires.org/team-event-search> to find an event close to you – attendance is free!;
- Contact a Mentor from a local team to assist;
- Visit the *FIRST* website at <http://www.firstinspires.org/ways-to-help/volunteer/new-volunteers> for Volunteer/event opportunities; or
- Contact *FIRST* at 1-800-871-8326 or email volunteer@firstinspires.org.

Interested Volunteers can visit our website at <http://www.firstinspires.org/ways-to-help/volunteerfor> more information about how to become a Mentor, Coach, or event Volunteer.

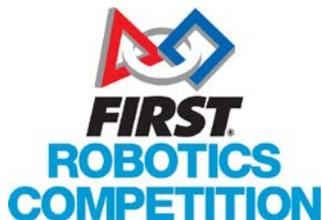
What is Gracious Professionalism®?

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 **(as of 1/04/17)**

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 2017, the largest-ever season includes 3,336 teams from 25 countries competing in 80 District Events, 10 District Championships, 55 Regional Events, and the *FIRST*® Championship in Houston, TX., April 19-22, 2017, and St. Louis, MO., April 26-29, 2017.

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 a robot to compete in the game using a kit of parts provided by *FIRST* and a standard set of rules.

FIRST® STEAMWORKSSM, the 2017 *FIRST* Robotics Competition game, invites two adventure clubs from an era in which technology relied on steam power to prepare their airships for the ultimate long distance race. Each three-team alliance scores points and prepares to take flight by building steam pressure, gathering materials to start the rotors, and boarding robots onto their airships. The adventure club with the highest score at the end of the match is the best prepared for the race and wins.

Who participates in the competition?

During the 2017 season, more than 83,000 high-school students on 3,336 *FIRST* Robotics Competition teams will compete in 80 District Events, 10 State/District Championships, and 55 Regional Events (in the U.S., Australia, Canada, China, Israel, and Mexico), 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.

With more than \$30 million in scholarships available to *FIRST* high-school participants from leading colleges and universities, *FIRST* Robotics Competition is an opportunity for students to enhance their education and personal development through a challenging and meaningful extra-curricular activity. *FIRST* Tech Challenge programs are recognized by top universities and corporations as essential preparation for higher-education and workforce development.

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
- 91% gained self-confidence
- 98% increased teamwork skills
- 95% 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)



FIRST® Tech Challenge FAQ

What is the FIRST® Tech Challenge?

The FIRST® Tech Challenge for Grades 7-12 is a challenging robotics competition designed for young people who want a hands-on learning experience to develop and hone their skills and abilities in science, technology, engineering, and math (STEM). The program was designed for teams who want hands-on experience building with a reusable kit and competing head to head against other teams in a sports-like atmosphere. FIRST Tech Challenge is also an ideal next step for students moving from FIRST® LEGO® League or prior to participating in the FIRST® Robotics Competition.

What is the Game?

The annual game is revealed to teams each September. Teams must determine their strategy, develop their plan, and program, build, and test their robot. Working through the engineering process brings the reality of science and technology to students on an intimate, hands-on level. Teams compete in an Alliance format in a head-to-head competition that challenges them to adjust their tactics based upon changing Alliance partners and changing opponents during a competition.

How is the game played?

Using a combination of motors, controllers, wireless communications, metal gears, and sensors, including infrared tracking (IR) and magnet seeking, students program their robots to operate in both autonomous and driver-controlled modes on a field with a center rack. In the 2016/2017 game, VELOCITY VORTEXSM presented by Qualcomm® Incorporated, teams work in an Alliance to score points against their opponents by placing small balls, called particles, into two different types of vortices, including a Center Vortex on a rotatable stand in the center of the field. Robots can also light beacons with their Alliance's color, and in the final 30 seconds of the match, raise a large ball off of the playing field and place the ball in their Center Vortex.

What do teams use to build their robots?

Teams participating the FIRST Tech Challenge build their robots using components from a kit of parts. Included with the kit is an Android smartphone, powered by the Qualcomm® Snapdragon™ 410 processor, which teams use as the main controller for their robot. The kit of parts also contains mechanical construction elements (beams, fasteners, gears, wheels, etc.), motors, servos and sensors that are used to construct the robots. The kit also includes the electronic modules which let the Android smartphone communicate with the motors, servos and sensors on the teams' robots. Teams also have the option of using commercially available off-the-shelf raw materials (aluminum, wood, plastic, etc.) and parts (gears, fasteners, wheels, etc.) to construct their robots.

Who participates in the competition?

In the 2016/2017 season, approximately 55,000 students on 5,540 teams are expected to compete in FIRST Tech Challenge. Teams will advance through local and regional tournaments, with the chance to compete in the FIRST® Championship in April, 2017. Each team is comprised of a professional Mentor or Coach and between 3 and 10 students on average. The program is flexible in structure, allowing teams to form within the school or home-school environment, as an after-school program, with a neighborhood group, or as part of any youth-based organization.

Where do events take place?

For the 2016/2017 season, close to 650 *FIRST* Tech Challenge events will be held around the world.

What do the students gain from participating?

Teams receive awards at *FIRST* Tech Challenge Qualifying and Championship Tournaments in recognition of their achievements in robot design, creativity, innovation, team performance, outreach, and enthusiasm. A judging committee of distinguished professionals makes award decisions.

Giving awards for outstanding achievement builds self-esteem in students and is a great way to encourage them to continue pursuing science, technology, engineering and mathematics. The highest level of achievement at a *FIRST* Tech Challenge competition is the Inspire Award. It incorporates elements of all other award categories.

With more than \$30 million in scholarships available to *FIRST* high-school participants, *FIRST* Tech Challenge is an opportunity for students to enhance their education and personal development through a challenging and meaningful extra-curricular activity. *FIRST* Tech Challenge programs are recognized by top universities and corporations as essential preparation for higher-education and workforce development.

Are there other benefits to participating?

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)

Is scientific, technology, or mathematic expertise required for students to participate in the *FIRST* Tech Challenge?

FIRST Tech Challenge motivates students just becoming familiar with basic concepts in science, math, and technology. The program effectively engages students from various backgrounds, instilling new ideas and concepts in more experienced students, while helping to inspire, motivate, and encourage learning basic principles and skills among students with less experience. Through their *FIRST* involvement, students also learn about important, life-long team skills such as planning, research, collaboration, mentorship, and teamwork.

What Sponsors are involved?

Qualcomm is the Season Presenting Sponsor, Rockwell Collins is the Official Program Sponsor, and PTC is the Official IoT, CAD and Collaboration Software Sponsor of *FIRST* Tech Challenge.



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 2016/2017 season, more than 255,000 students are participating in over 80 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 255,000 students will participate in FIRST LEGO League in 2016/2017. 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 2016/2017 **ANIMAL ALLIESSM** Challenge, *FIRST* collaborated with experts at Omaha's Henry Doorly Zoo and Aquarium, University of New Hampshire, New England Aquarium, and LEGO Education to create the theme and Challenge missions.

Why did you select ANIMAL ALLIES as the 2016/2017 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, **ANIMAL ALLIES**, teams will explore the animal kingdom and how humans interact with animals -- from study to transport, to care and conservation -- and will develop their own innovative solutions to improve the interactions to make them better for everyone. 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 or on the FIRST LEGO League Jr. Online Showcase. In 2016/2017, more than 68,000 children are expected to participate in 29 countries.

New for the 2016/2017 season is the addition of 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 will create a more 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 Inspired 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 Jr. program includes developing the annual Challenge, the standards for the program and Expos, and supporting program documents.

Why did you select CREATURE CRAZESM as the 2016/2017 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 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 impact the world around them by engaging them in a real-world theme to which they can relate. In **CREATURE CRAZESM**, participants will dive into the wonders of the animal kingdom. 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 or the *FIRST* LEGO League Jr. Online Showcase. Volunteers often organize expos where each child may receive a participation medal or other optional team recognition awards.

What is the *FIRST* LEGO League Jr. Online Showcase?

The *FIRST* LEGO League Jr. Online Showcase is a way for teams to share what they have learned during the season. They do so by posting a team profile to fljrshowcase.firstinspires.org. They then have the opportunity to connect with other teams from around the world by checking out their profile pages, giving stickers, and sending them messages.

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.