



## 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-3 (ages 6 to 9). 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 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)

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

### **What does research show about participation in FIRST?**

A decade of data and research shows that exposing kids to fun, exciting *FIRST* programs builds 21<sup>st</sup> century work skills and greatly increases their motivation to seek education and careers in STEM fields. Learn more at [www.firstinspires.org/aboutus/impact](http://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, 2015/2016 season *FIRST* high-school students are eligible to apply for more than \$25 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 will be 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](mailto: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.

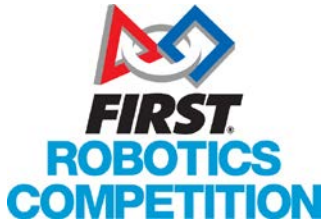
### **What is Gracious Professionalism®?**

*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*<sup>®</sup>?**

*Coopertition*<sup>®</sup> 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<sup>®</sup> Robotics Competition FAQ

### **What is the FIRST<sup>®</sup> Robotics Competition?**

The FIRST<sup>®</sup> 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 2016, the largest-ever season will include over 3,100 teams from nearly 25 countries competing in 65 District Events, 8 State/District Championships, and 53 Regional Events, and the FIRST Championship at the Edward Jones Dome in St. Louis, April 27-30, 2016.

### **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. Details of the 2016 game *FIRST STRONGHOLD*<sup>SM</sup> will be announced on January 9, 2016.

### **Who participates in the competition?**

During the 2016 season, more than 75,000 high-school students on over 3,100 FIRST Robotics Competition teams will compete in 65 District Events, 8 State/District Championships, and 53 Regional Events (in the U.S., Australia, Canada, 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.

Any *FIRST* Robotics Competition participant is eligible to apply for more than \$25 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
- 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. The object of the 2015/2016 game – FIRST® RES-Q<sup>SM</sup> – is to score more points than an opponent by: “resetting” Rescue beacons; delivering Rescue Climbers to a shelter; parking on the mountain; and parking in the Rescue beacon repair zone or floor goal. Robots may also score points by retrieving debris from the playing field and placing them in mountain or floor goals, and also by hanging from a pull-up bar during the last 30-seconds of a match.

### 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 2015/2016 season, approximately 50,000 students on more than 5,100 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, April 27-30, 2016. 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 2015/2016 season, close to 500 *FIRST* Tech Challenge events will be held around the world.

### **What do the students win?**

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.

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.

A judging committee of distinguished professionals makes award decisions. With more than \$16 million in scholarships available to 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?**

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



## 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 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 eight intense weeks, the FIRST LEGO League season culminates at high-energy, sports-like tournaments. In the 2015/2016 season, over 233,000 children are participating in approximately 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 Kits, Robot Sets, marketing communications resources, Volunteers, and more.

### 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?

Over 233,000 children will participate in FIRST LEGO League in 2015/2016. 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 SOLUTIONS<sup>SM</sup> 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 2015/2016 **TRASH TREK<sup>SM</sup>** Challenge, *FIRST* collaborated with experts in the fields of waste management and sustainability including representatives of the EPA, Waste Management, LEGO, Clean Harbors, among other specialists to create a theme and challenge missions that reflect today's waste problems and solutions.

**Why did you select TRASH TREK as the 2015/2016 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. In the *FIRST* LEGO League season Challenge, **TRASH TREK**, teams will explore the fascinating world of trash, from collection, to sorting, to smart production and reuse, and will develop their own innovative solutions to make less trash or improve the way people handle the trash we make. 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 presentation; robot performance; technical design and programming of the robot; and teamwork. 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* LEGO League Operational Partners, or *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 Official Suppliers 3M Company and LEGO System A/S, and by Global Sponsors NI and Rockwell Automation. Also, *FIRST* LEGO League Championship Tournaments are made possible by close to 200 local Sponsors with 37 universities/colleges participating in the program.



## FIRST<sup>®</sup> LEGO<sup>®</sup> League Jr. FAQ

### What is FIRST<sup>®</sup> LEGO<sup>®</sup> League Jr.?

FIRST<sup>®</sup> LEGO<sup>®</sup> League Jr. for Grades K-3 (ages 6 to 9) 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 the same theme as the FIRST<sup>®</sup> LEGO<sup>®</sup> League research Project, 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 2015/2016, approximately 40,000 children are expected to participate.

### Why did you select WASTE WISE<sup>SM</sup> as the 2015/2016 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 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 impact the world around them. In WASTE WISE<sup>SM</sup>, participants will take a closer look at what making trash really means, from reducing, to reusing, to recycling, and beyond. Teams will learn 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 [jrllshowcase.firstinspires.org](http://jrllshowcase.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. 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.