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 designs accessible, innovative programs to build self-confidence, knowledge, and life skills while motivating young people to pursue opportunities in science, technology, engineering, and math.

FIRST provides two well-known programs, the *FIRST* Robotics Competition (FRC) for high-school students and *FIRST* LEGO® League (FLL) for 9 to 14 year-olds. *FIRST* also offers the Junior *FIRST* LEGO League (JFLL) for 6 to 9 year-olds and the *FIRST* Tech Challenge (FTC), an intermediate robotics competition that offers high-school-aged students the traditional challenge of FRC, but with a more accessible and affordable robotics kit. *FIRST* also operates a research and development facility called *FIRST* Place at its headquarters.

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 provide funding, mentorship time and talent, volunteerism, equipment, and more to make *FIRST* a reality. Founding Sponsors are John Abele/Boston Scientific Corporation, Baxter International Inc., Daimler Chrysler Corporation Fund, DEKA R&D, Delphi, General Motors, Johnson & Johnson, Kleiner Perkins Caufield & Byers, Motorola, Inc., and Xerox Corporation. NASA is a sponsor and Autodesk, FedEx, Intelitek, Microchip, National Instruments, Rockwell Automation, SMC Corporation, and Underwriters Laboratories are Official Suppliers of the *FIRST* Robotics Competition. Autodesk is a *FIRST* Tech Challenge sponsor. The LEGO Group is a Founding Partner of *FIRST* LEGO League. 3M and LEGO Systems A/S are Official Suppliers and National Instruments and Vestas are sponsors of *FIRST* LEGO League.

How does the education community support *FIRST*?
FIRST provides an education 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, 2007 *FIRST* students were eligible for close to $8 million in scholarship funds to continue education in science, technology, engineering, and math.

Who manages the teams and events?
FIRST is truly a volunteer-driven organization. For the 2006/07 *FIRST* season, over 60,000 volunteers contributed 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 way to start discovering the rewards of *FIRST* is to attend a *FIRST* event (attendance is free), contact a mentor from a local team, visit the *FIRST* website, or contact *FIRST* at 1-800-871-8326. Interested volunteers can visit our website at www.usfirst.org for more information about how to become a mentor.

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* National Advisor, 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.

FIRST Robotics Competition FAQ

What is the *FIRST* Robotics Competition (FRC)?
The *FIRST* Robotics Competition (FRC) is an annual competition that helps young people discover the rewards and excitement of education and careers in science, engineering, and technology. FRC challenges high-school-aged young people – working with professional mentors – to design and build a robot, and compete in high-intensity events that measure the effectiveness of each robot, the power of team strategy and collaboration, and the determination of students. Fifteen years ago, the initial *FIRST* Robotics Competition took place with 28 teams in a high school gym in New Hampshire. In 2007, the largest-ever FRC included 1,307 teams from 7 countries competing in 37 Regionals and the *FIRST* Championship at the Georgia Dome in Atlanta.

Why involve a professional mentor? Why don't students build the robot themselves?
FIRST creates powerful mentoring relationships between the students and professional mentors. FRC 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 solve the season's common problem using the same kit of parts and a standard set of rules. In the 2007 game, "Rack 'N' Roll," students' robots are designed to hang inflated colored tubes on pegs configured in rows and columns on a 10-foot high center "rack" structure. Extra points are scored by robots being in their home zone and lifted more than 4" off the floor by another robot before the end of the 2 minute and 15 second match.

Who participates in the competition?
During the 2007 season, over 32,500 high-school students on 1,307 FRC teams competed in 37 Regionals (in the U.S., Brazil, Canada, and Israel) and the Championship. Each team is comprised of professional mentors and an average of 25 students 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, the FRC 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 computer animation, to fundraising and research, every student can actively participate and benefit.

What do the students win?
Teams compete for a series of awards honoring 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*. All participating students receive a medallion in honor of their achievements.

Any FRC participant is also eligible to apply for $8 million in scholarships from the leading engineering colleges and universities.

Are there other benefits to 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.

A 2005 Brandeis University evaluation of *FIRST* participants primarily from urban and low-income schools found that, compared to a group of students with similar backgrounds in high school math and science, FRC participants were:
- nearly twice as likely to major in science or engineering (55% vs. 28%)
- more than three times as likely to major specifically in engineering (41% vs. 13%), and they majored in engineering at roughly seven times the average among US college students overall
- more than twice as likely to expect to have a science or technology-related career after college (45% vs. 20%)

Goodman Research Group, Boston, Mass., found positive results from their 2000 *FIRST* Robotics Competition evaluation. Their findings showed:
- Improvement in student attitudes about science, math, teamwork and the working world
- Improvement in students' self-image, particularly among under-represented groups
- *FIRST* students' attitudes about teamwork are significantly more positive after *FIRST* than they were before participating in the competition season
- Two-thirds of student participants indicated interest in working for one of their team sponsors after completing their education, and one fifth planned to work for one of their team sponsors in a summer internship or part-time job

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 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.

FIRST Tech Challenge FAQ

What is the *FIRST* Tech Challenge?
The *FIRST* Tech Challenge is a mid-level robotics competition principally for high-school-aged students. It offers the traditional challenge of a *FIRST* competition but with a more accessible and affordable robotics kit. The ultimate goal of FTC is to reach more young people with a lower-cost, more accessible opportunity to discover the excitement and rewards of science, technology, and engineering.

How was it developed?
The *FIRST* Tech Challenge grew out of the existing *FIRST* Robotics Competition and the *FIRST* Robovation platform. *FIRST*, RadioShack, and Innovation First collaborated to develop an improved version of the *FIRST* Robovation kit. The new kit is significantly upgraded and is called the Vex® Robotics Design System. The competition was piloted for two years under the name '*FIRST* Vex Challenge' before becoming a full program for our 2007 season. *FIRST* creates the game/challenge and teams build robots that compete in the game.

Does this replace existing *FIRST* robotics competitions?
No, this does not replace any current programs. The *FIRST* Robotics Competition, *FIRST* LEGO League, and Junior *FIRST* LEGO League continue as important parts of *FIRST*. The *FIRST* Tech Challenge is intended to complement these programs and allow more young people to participate in *FIRST*.

What is the yearly Challenge?
The Challenge is the annual game revealed to teams each September during the on-line Kickoff. Teams must determine their strategy and program, build, and test their robot. Working through the engineering process brings the reality of science and technology to students on a more intimate, hands-on level while instilling teamwork mores.

How is the game played?
In the 2007 game, "Quad Quandary," in which students' robots place 3-inch PVC rings on movable single or paired goals, side goals, or posts. Extra points are scored by moving single or paired goals into an alliance's playing field quadrant. The fast-paced matches include a twenty-second autonomous period followed by two minutes of driver-controlled play.

Who participates in the competition?
In 2007, approximately 8,000 young people on 800 teams are expected to compete in more than 25 events and the *FIRST* Championship. Each team is comprised of professional mentors and a maximum of 10 students. 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?
In 2007, 30 Championship Tournaments will be held in the U.S., Canada, and Mexico.

What do the students win?
Teams compete for a series of awards honoring 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 *FIRST* Tech Challenge Inspire Award, a peer- and formal-judged award that honors the team that performs well in all categories, is viewed by other teams as the most desirable alliance partner, and is viewed by judges as best exemplifying all components of the *FIRST* Tech Challenge philosophy.

FTC participants are also eligible to apply for approximately $5 million in scholarships from the leading engineering colleges and universities.

Are there other benefits to participating?
A team of researchers at the Center for Youth Development at Brandeis University conducted an evaluation of the 2006 pilot season that included observation of the six events and interviews with teams and their coaches/mentors. Both team leaders and team members assessed FVC positively:

- 90% or more reported that the program had increased participants understanding of basic science principles, how technology could be used to solve real-world problems, and team members' understanding of the engineering design process
- 93% of participants reported wanting to learn more about science and technology
- 80% or more of participants reported increased interest in science and technology careers and doing well in school
- 74% of team leaders participated as a way to get young people involved in science and technology.

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

FIRST LEGO® League FAQ

What is *FIRST* LEGO League?
FIRST LEGO® League (FLL) introduces 9 to 14 year-olds (9 to 16 outside the U.S. and Canada) 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 September FLL announces the annual Challenge to teams, which engages them in authentic scientific research and hands-on robotics design using LEGO MINDSTORMS® technologies and LEGO play materials. After 8 intense weeks, the FLL season culminates at high-energy, sports-like tournaments. In 2008, more than 100,000 children are expected to participate in 38 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 FLL by contributing each year to the development, management, and funding of customized Challenge Kits, Robot Sets, marketing communications resources, volunteers, and more.

What is *FIRST*'s role?
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 itself, including developing the annual FLL Challenge, the standards for the FLL program and Championship Tournaments, and the supporting program documents.

Do you have any information on how *FIRST* LEGO League actually impacts the future science and engineering workforce?
More than 100,000 children are expected to participate in FLL in 2007. A recent study of FLL participants in the US and Canada conducted by Brandeis University showed that:
- 94% of coaches reported an increase in students' understanding of how science and technology can be used to solve problems

Among participants:
- 93% wanted to learn more about computers and robotics
- 88% wanted to learn more about science and technology
- 77% reported increased interest in having a job that uses science or technology when they are older

Is the *FIRST* LEGO League experience rooted in real-world issues?
Absolutely. Every year, as we design the Challenge, we look to the real-world practitioners and experts in the chosen subject for guidance, input, and opinion, so that children are engaged in practical and realistic activities. The 2007 Power Puzzle Challenge is very much linked to and rooted in the work undertaken by such organizations as the Department of Chemical Engineering at the University of South Carolina, the Second Hill Group, and the Gulf Coast Combined Heat and Power Application Center. These organizations work to research new energy sources and improve efficiency in current energies and their consumption.

Why did you select Power Puzzle as the 2007 Challenge theme and why is it important?
Every FLL 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. Power Puzzle combines the challenge of creating sustainable energy options for the world's energy needs in a way that is good for the environment with energy production and consumption choices. Power Puzzle highlights the many options and endless solutions to one of the world's most significant challenges.

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 Junior *FIRST* LEGO League?
Junior *FIRST* LEGO League (JFLL) is an extension of *FIRST* LEGO League for children ages 6-9, and is designed to introduce younger children to the fun and excitement of solving problems with science and technology. JFLL teams are given a modified version of each year's FLL 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. In 2006, over 3,500 children participated.

What is the role of the *FIRST* LEGO League Partners?
FLL relies on volunteers to run the program at many levels, from managing a region to coaching an individual team. FLL Operational Partners, or FLL Partners, roll out the FLL program in their respective regions. These FLL Partners fundraise, run Championship Tournaments, hold workshops and demonstrations, market FLL 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, FLL is supported by Official Suppliers 3M and LEGO System A/S, and by sponsors National Instruments and Vestas. Also, FLL Championship Tournaments are made possible by close to 200 local sponsors and over 45 universities/colleges participate in FLL.