

Section 1: What Is FIRST?

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INTRODUCTION

Welcome to one of the most dynamic and exciting high school programs in existence. FIRST Robotics teaches a mixture of technology and business skills that cannot be matched by any other high school program.

The competition occurs yearly and is organized by the US FIRST organization (www.usfirst.org). Robots built by high-school students teamed with industry professionals compete against each other to complete objectives that are laid out by the FIRST Game Design Committee (GDC) at the start of each competition year. Teams also compete against each other in categories like community service, outreach, and business planning.



A new game challenge is released every January. After the game is released, teams have approximately 6 weeks to design, build, program and debug a robot capable of playing that year's game. After the build season, the robots are either shipped to a central facility or locked inside a large plastic 'bag' to prevent teams from accessing them.

After the build season is complete, regional and district competitions are held around the country. These competitions usually pit 40 to 64 robots against each other. Successful robots can earn awards, some of which will allow the teams to move on to either a State Championship or the World Championship. In 2011, teams participated in 48 regional and district competitions throughout March in an effort to qualify for the FIRST Championship in St. Louis in April.



Dave Lavery, Dean Kamen, and Woody Flowers (left to right) answering questions during a FIRST Kickoff.



The robots typically weigh 120 lbs and compete on a playing field that is 27 feet by 54 feet. The sizes and shapes of the robots vary dramatically each year. Their sizes vary depending on game specific rules. There are few limitations placed on materials and components that can be used on the robots, however power sources (batteries and motors) and electrical systems are tightly regulated for safety purposes.

The games are divided into 3 time periods. The first is an AUTONOMOUS period of 15 seconds where the robot scores points by performing pre-programmed actions.

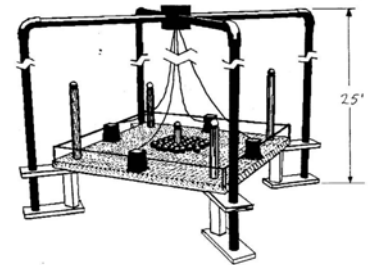
The second is a TELEOPERATED period of varying length. During this period drivers take control of the robots and guide them through the tasks. The third period is called the 'END GAME', where the robots can perform another task for extra points. Some years vary in the length of the different game segments, and some have not had an END GAME.

MISSION

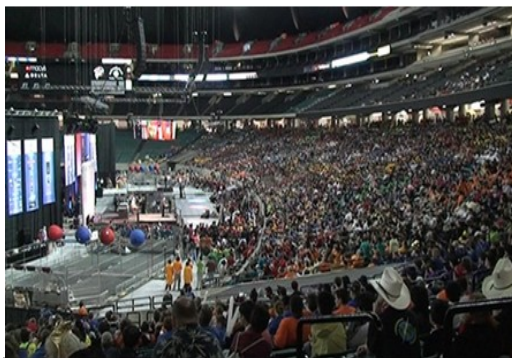
FIRST aims to inspire students in the science, technology, engineering and math (STEM) fields. Dean Kamen, FIRST's founder, has long held that the culture in the United States needs to be changed. Young students should admire and emulate famous engineers and scientists. Challenges and triumphs of the mind should be celebrated in the same way that celebrities and sports stars are cherished. Dean maintains that until the culture changes, the world will continue to struggle with unsolved technological challenges like pollution and poverty.

HISTORY

In 1989 Dean planted the seeds for FIRST in New Hampshire. In 1992, FIRST introduced their first game to 28 teams. In nearly every kickoff event since 1992, Dean has expounded on FIRST's goal to make science and technology 'cool'. He also highlights the importance of changing the culture, specifically in the United States, where sports figures and celebrities are idolized but those that have made advancements in technological fields are not.



1992's Playing Field for
"Maize Craze"



2008 FIRST Robotics
Championship

First has grown each year and now encompasses nearly a million participants. Thousands of teams take part each year from numerous countries. The championship event hosts over 352 teams. It is currently located in St. Louis.

In addition to the high school FIRST Robotics Competition (FRC) championship, the FIRST Tech Challenge (FTC) and FIRST Lego League (FLL) championships are also held at the same time.

FIRST® ROBOTICS COMPETITION (FRC®) GAME DESCRIPTIONS

1992	Maize Craze	4 opponents playing on a field covered in approximately 1.5 inches of corn attempt to collect the most tennis balls.
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1993	Rug Rage	Opposing teams collect kick balls and smaller water-filled balls to score points.
1994	Tower Power	Teams fight to place soccer balls in several goals set at different heights. Higher goals are worth more.
1995	Ramp N' Roll	Robots attempt to score by lifting balls over a 9 foot wall.
1996	Hexagon Havoc	Robots attempt to score in a central goal.
1997	Toroid Terror	Teams score inner-tubes onto pegs or around the top of a goal. Tubes are color-coded to denote which team they belong to.
1998	Ladder Logic	Robots and human players score by putting balls into central or side goals. Balls are colored to match each alliance.
1999	Double Trouble	Light weight thin cushions with Velcro around them are positioned at varying heights to score points. Robots who are able to climb onto a central field object can add a multiplier to their score.
2000	Co-opertition FIRST	Robots score black and yellow balls into goals and hang from a central bar in the end game.
2001	Diabolical Dynamics	All teams on the field work together to cross a central bridge, score balls into several goals, then place those goals back on the bridge as quickly as possible.
2002	Zone Zeal	Balls placed around the field are put into mobile goals. The goals are moved to the other end of the field to score points.
2003	Stack Attack	Large plastic bins are collected and stacked to score points.
2004	First Frenzy	Robots are required to pass balls to humans, who then shoot them into goals scoring points.
2005	Triple Play	Points are scored by placing tetras onto 9 goals placed on the field in a tic-tac-toe pattern.
2006	Aim High	Teams score points when their robots shoot balls into goals placed on opposite ends of the field.
2007	Rack 'N' Roll	Robots hang colored-inner tubes on a central structure then attempt to elevate themselves off the floor of the playing surface at the end of the match.
2008	FIRST Overdrive	Large (approximately 40 inches in diameter) track balls must be elevated over twin overpasses while robots race around a track scoring points.
2009	LUNACY™	The surface of the moon is mimicked by a hard plastic floor that offers little traction while the robots tow trailers behind themselves and fire balls into the opposing alliance's trailers.
2010	BREAKAWAY™	Robots score soccer balls at either end of the field. Scored balls return to the center to be rescored.
2011	LOGO MOTION™	Inner tubes are hung from pegs attached to driver station walls so points can be scored. Small 'MINIBOTS' are deployed in the end game to climb poles in a race to score additional points.

GRACIOUS PROFESSIONALISM

While FIRST can be considered a robot competition, the founders saw a need to temper some of the negative aspects of the competitive spirit. That led to the creation of the core principle of FIRST. “Gracious Professionalism” was developed by MIT Professor Woodie Flowers. Woodie wanted teams to compete as hard as possible against each other while maintaining a professional demeanor. FIRST’s competition structure stresses the ideal by randomly matching teams to play together. Teams should never think of another team as their opponent because they may be playing as partners in the next match. In addition, the culture of FIRST is such that if another team’s robot breaks, all the teams competing help to repair that robot. Winning against a broken robot is not a success. Winning against a robot working at 100% is an achievement.