

FIRST LEGO League Smart Move Challenge University of Detroit Mercy

Summary Fall 2009



Program Director: Daniel Maggio

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Michigan Ohio University Transportation Center**

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FIRST in Michigan**

History



FIRST (For inspiration and Recognition of Science and Technology) was founded in 1989 by Dean Kamen to inspire young people's interest and participation in science and technology. Based in Manchester, NH, the 501 (c) (3) not-for-profit public charity designs accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and math, while building self-confidence, knowledge, and life skills. Dean Kamen is an inventor, entrepreneur, and tireless advocate for science and technology. His passion and determination to help young people discover the excitement and rewards of science and technology are the cornerstones of *FIRST*.

FIRST's mission is to inspire young people to be science and technology leaders, by engaging them in exciting mentor-based programs that build science, engineering and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication, and leadership.



The FIRST LEGO League (FLL) represents a partnership between the LEGO Group and FIRST. Since its inception, FIRST has been establishing partnerships between private industry and high schools for the FIRST Robotics Competition, a national engineering challenge for high school students. FIRST LEGO League extends this concept of celebrating science and technology to 9 to 14 year old children using a real-world context and hands-on experimentation.

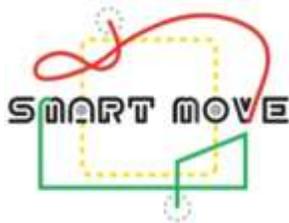


Teams worked on a 4x8 foot mat which defined the playing field. Two playing fields are shown above.

FIRST LEGO League provides an inspirational learning experience that celebrates science and technology. FLL believes that the natural curiosity and creativity inherent in children are qualities critical to understanding complex problems, envisioning possibilities and developing innovative solutions. Bringing theory and practice together in a revolutionary program, FLL empowers participants to use what they learn in the classroom combined with the latest technology to solve the Challenge – a current scientific or technological need facing the world. Each September, the eight week FLL season commences with the announcement of the annual Challenge.

Each Challenge engages teams in the same problem solving process that is practiced in industry: research, strategies, design, build and test. Additionally, Challenges may also be used to fulfill national science and technology education standards. Teams use LEGO bricks, sensors, motors and gears to construct and program a fully autonomous robot capable of completing different missions while maneuvering around the 4 foot-by-8 foot FLL Playing Field.

2009 FIRST LEGO League Challenge



The 2009 FIRST LEGO League (FLL) challenge, *Smart Move*, was released on September 3, 2009. FLL teams were tasked with learning about transportation - accessing people, places, goods and service in the safest, most efficient way possible.

There were two parts to the *Smart Move* challenge - the Robot Game and the Project. This year's robot game took place on a field that represents a vehicle test track. Each team designed, built and programmed a sensor-equipped vehicle (their robot). This vehicle needed to gain access to places and things, while avoiding or surviving impacts. The playing field, which is 4' x 8', had numerous LEGO challenge elements and obstacles that the team's robot needed to traverse and interact with. Some challenge elements needed to be manipulated on the field some needed to be delivered to specific locations, while other objects needed to be retrieved from their locations on the field and brought back to base.



The Project for *Smart Move* asked teams to look at how transportation affects their everyday lives. Nearly everything we use is impacted by transportation. Teams first needed to describe their community, and then to create a list of how everything moves in, around, to and through their community. From this list, teams needed to learn more about these forms of transportation and identify problems with them. After selecting one particular problem, they needed to create an innovative solution to this problem - then share what they learned with others.

A few examples of Project ideas presented at some of the Michigan tournaments included:

- The championship winning team created a driver's license encoded driver information. If the driver was a young driver, it placed restrictions on the speed and would slow the car down if the driver leaned forward in the seat (like picking something off the floor), etc.
- A team from the Novi, MI qualifying tournament proposed placing GPS devices on school buses and linking their position to a website so parents could see when to send their child to the bus stop.
- A team charted produce miles (miles that produce travels from the field to the store). In their research, they spoke to an expert in the field from London, England.

The official season ran from September to December, 2009. The details of the Smart Move Challenge were released at the beginning of September. However, many teams formed as early as May of 2009 and spent time working with the LEGO NXT system.

The State of Michigan had 312 FLL teams participate in the *Smart Move* Challenge. Each team had 3-10 students, ages 9-14, and at least one adult coach. An average team consisted of eight students and two coaches.

Michigan conducts a qualifying tournament system in which all teams have the opportunity to compete in one official qualifying tournament. Based on overall performance, the top third of the teams at each qualifier advance to one of two state championship tournaments.

The following six qualifying tournaments advanced teams to the [December 5, 2009 Championship Tournament in White Lake, MI: Allen Park, Detroit Science Center, Monroe, Novi, Sterling Heights, Troy.](#)

The following seven qualifying tournaments advanced teams to the [December 12, 2009 Championship Tournament in Flint, MI: East Lansing, Flint, Grandville, Marquette, Saginaw, Sault Ste. Marie, Zeeland.](#)



The grant from the Michigan Ohio University Transportation Center provided the 91 *Smart Move* field setups necessary to run all fifteen Michigan FLL tournaments impacting over 3,100 students and adults. Additional funding was used to purchase medals and trophies for the two Championship Tournaments.



Trophies given to the two Champion Tournament Team members.

A field setup consists of a 4 foot by 8 foot mat which defines the playing field surface and the LEGO models which are placed on the mat. These models define the missions. The field setups represent about 20% of the annual budget for FLL in Michigan.

The White Lake Championship Award winner was The Robo Rockets from Boulan Park Middle School in Troy. The Flint Championship Award winner was The Robo Hippies from Troy Schools in Troy.

FIRST LEGO League is a volunteer driven organization. In Michigan, each of the 15 tournament organizers oversees over 100 volunteers including judges and referees to the planning staff to setup, teardown and general volunteers. The state committee donates hundreds of hours each year in order to make FLL successful.

