

# How and why you should start an FLL team...

By Team #4135 The Iron Patriots



**FIRST LEGO<sup>®</sup> League**

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# Overview

At its basic level, FIRST LEGO League (FLL) is a program of exploration for children age 9 to 14 (ages vary by country), which is designed to get children excited about science and technology – and teach them valuable employment and life skills. FLL is has two main parts:

- FIRST LEGO League Core Values
- The FIRST LEGO League Challenge
  - The Challenge has 2 parts: the Robot Game and the Project.



# The Statistics

## SCHOOL ENGAGEMENT INCREASES FOR FIRST PARTICIPANTS



More interested in doing well in school

87%

FIRST® LEGO® League

86%

FIRST® Tech Challenge

88%

FIRST® Robotics Competition

Plan to take a more challenging math or science course

84%

FIRST® Tech Challenge

90%

FIRST® Robotics Competition

More interested in going to college



88%

FIRST® LEGO® League

87%

FIRST® Tech Challenge

91%

FIRST® Robotics Competition

## 21<sup>ST</sup> CENTURY WORK-LIFE SKILLS GAINED BY FIRST PARTICIPANTS



Improved problem solving skills

98%



Increased time management skills

95%



Increased conflict resolution skills

93%



Strengthened communication skills

OVER 76%



# Preparation

## Pre-Season Preparation for the Coach

- Register your team with FIRST LEGO League
- Pay your registration fee and order the materials you need.
- FIRST LEGO League will usually contact you by email with important updates. Make sure you provide a valid email address when you register, and check that inbox often throughout the season.
- Read this Coaches' Handbook.
- Review the Core Values.
- Decide how team members will be identified or selected.
- Identify at least 1 computer your team may use (must have Internet access).
- Find out about your region's tournament structure and event registration process.



# Preparation (Continued)

## Begin Meeting with Your Team

- Create a meeting schedule.
- Review the Core Values with parents and team members (and keep discussing them at each meeting!).
- Set up a practice competition area and storage for equipment between meetings.
- Have team members begin researching this year's Challenge theme to get a head start on the Project.
- Build a Robot Game table or just the borders.
- Use the Mission Model building instructions on [www.firstlegoleague.org](http://www.firstlegoleague.org) to build the Mission Models.  Install robot programming software on the computer(s) your team will use.



# Preparation (Continued)

## Complete the Challenge

- Download the new Challenge from [www.firstlegoleague.org](http://www.firstlegoleague.org) and review it as a team. It will be released on the last Tuesday in August.
- Have team members begin designing, building, and programming your team's robot.
- Have team members begin researching for the Project and brainstorming ideas for innovative solutions.
- Register for a tournament.
- Review the rubrics that will be used to judge your team at tournaments. Discuss them with your team.
- Check your email regularly for communication from FIRST LEGO League.
- Assign a team member to check the Challenge Updates and Judging FAQ frequently for any new information. ([www.firstlegoleague.org](http://www.firstlegoleague.org))
- Prepare any documents required by your tournament organizers.



# Teams

A team must consist of 2-10 students, grades 4-8, and 2 adult coaches. **Team members must make all decisions and do all the work on the Robot.** Does this mean you should stand idly by while your team struggles? Absolutely not! Instead of telling the team how to solve a problem, try asking questions like:

- ▲ “What could you change to get the result you want?”
- ▲ “How will that affect...?”
- ▲ “What information do you need to answer that question?”

Children become problem solvers by finding solutions themselves! We understand that adults can become just as passionate about FIRST LEGO League as the children, but adults must always remember that the children come first.



# Mentors

A Mentor is any person who works with the team in his or her area of expertise for at least one team meeting. Mentors help expose your team members to potential careers in addition to helping them learn the skills necessary to complete the FIRST LEGO League season. The most important quality for a Mentor is someone who enjoys working with young people and wants to help them learn. You may want to consider recruiting someone like:

- ▲ Engineer – Teaches skills the team can use to design their robot or complete the Project.
- ▲ FIRST® Robotics Competition or FIRST® Tech Challenge team member – Helps the team work through a practice programming challenge, shares strategizing methods, serves as a possible youth role model.
- ▲ Science Professional – An expert in this year’s Challenge theme presents real examples of science in practice, advises the team on the Project, describes existing solutions, and recommends new sources of information for the team to explore.





# Team Roles

Rotate roles so everyone has an opportunity to try different things. Children often discover that they enjoy a task they wouldn't have volunteered for on their own and it can prevent boys and girls from falling into stereotypical gender roles. Here are examples of the roles or sub-teams you may want to establish within your team:

- ▲ Researching
- ▲ Community Sharing
- ▲ Presenting
- ▲ Strategy Analysis
- ▲ Building
- ▲ Programming
- ▲ Project Management
- ▲ Marketing



# Tips for a Rookie Team

1. Remember, you don't have to be an engineer to be a great Coach.
2. Work with team members to come up with rules for your team at the first meeting.
3. Let the students and parents know that the students do the work.
4. Practice asking questions to guide the students to their own answers instead of telling them your ideas.
5. Don't try to do everything alone.
6. Figure out your funding.
7. Get the team committed to a meeting schedule before the season starts.
8. Make sure all parents have roles – even rotating ones so that they become invested in the progress of your team.
9. Use good time management.
10. Keep it FUN!!! The students will learn to handle frustrations and deadlines better if the element of fun is in the mix.



# Groundwork

## Choosing a Meeting Place

When choosing a place for your team to meet, try to choose a meeting place that will provide the following:

- ▲ Computer, either a Macintosh or PC.
- ▲ Internet access.
- ▲ Enough room for your team to set up. Part of the Robot Game is a 4- x 8-foot mission mat which you will need to lay out on a level floor or table.
- ▲ A secure place to store team supplies and work in progress between meetings.



# Groundwork (Continued)

## Purchasing Your Materials

Your team will need certain required materials to participate in FIRST LEGO League. Grants are available. New Teams can expect to pay \$900 for the following:

- ▲ Team Registration - \$225
- ▲ LEGO® MINDSTORMS® set: Each team must have a LEGO MINDSTORMS set to participate in the Robot Game (EV3, NXT, or RCX) - \$469
- ▲ Challenge Set: All teams must have access to an official FIRST LEGO League Challenge Set. This is the practice field for your team's robot. You will need a new Challenge Set each Challenge year - \$75
- ▲ Robot Programming Software - Your robot may only be programmed using LEGO MINDSTORMS EV3, NXT, or RoboLab software (any release). No other software is allowed. - Usually free

# The Competition

Released on the last Tuesday in August, the challenge changes each year, focusing on real world problems with no clear or single solutions. These themes will not only affect the project, but will be reflected in the challenge mat, too. While this is a robotics competition, it is important to know that it isn't all about robots. We will also host our annual Iron Patriot Fest, an FLL regional competition, in early November. Teams will be judged in the following categories:

- Robot Game
- Robot Design
- Project
- Core Values



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## Robot Game

In the Game, Teams will have 2 ½ minutes to score as many points possible by completing tasks on the challenge mat. The robot must be able to function autonomously, and Team members are only allowed to touch the robot while it is in Base. The Team with the highest number of points will win, and be awarded the core award of “Robot Game.” The following slide is a picture of last year’s mat.





LEGO education

Rockwell Automation

FIRST LEGO LEAGUE

NATIONAL INSTRUMENTS

3M

FIRST

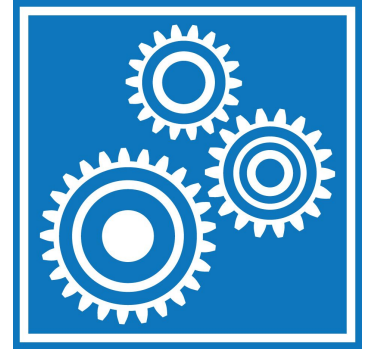
LEGO

HYDRO DYNAMICS

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# Robot Game Tips

1. Read the Challenge document carefully and repeatedly!
2. Use the MINDSTORMS training features.
3. Set manageable goals.
4. Make your robot's navigation depend on features of the field whenever possible.
5. Don't try to program more than 1 step at a time.
6. Build things strong enough that the robot can be knocked over in any direction and not break.
7. While building, keep access to essential features in mind.
8. Build a shroud around your optical (color and light) sensors.
9. For consistency in turning, build sliders/casters as close to the drive wheels as you can without giving away stability.
10. Don't try to work for much more than 90 minutes at a time, and be sure to call it a day if you've spent more than 30 minutes frustrated and stuck.

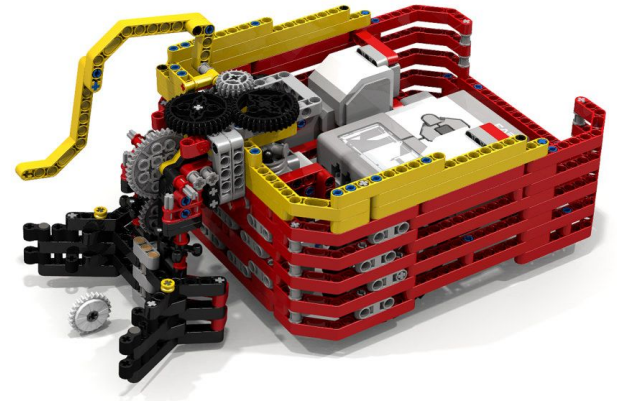




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# Robot Design

While your robot may not earn the most point on the field, you may still earn a core award, “Robot Design,” for how it is built and programmed. This is given to the team that shows remarkable problem solving and efficiency in their robot’s design and programming. When considering this award, think “outside of the box.”



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# Project



Teams explore the Challenge theme each year through the Project. FIRST® LEGO® League is not just about building and competing with robots. Any successful engineering project requires a wide variety of skills.

The Project is your team's opportunity to see what it's like to be scientists, inventors, and engineers. The Project description will give your team some information about the topic to get them thinking and describe the essential steps each team must take. Your team will choose a problem and research it, design their own innovative solution to the problem, and share their experience with others. At a tournament, your team will have 5 minutes to summarize all of their work in a presentation for the Judges and 5 minutes for questions from the Judges.

Many teams choose a problem that is very personal. It might be a problem that affects someone on the team or someone they know. It is important to let your team members guide the choice, because choosing something they really care about will help the children see how big scientific concepts connect to their own lives.

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# Core Values

- ▲ We are a team.
- ▲ We do the work to find solutions with guidance from our Coaches and Mentors.
- ▲ We know our Coaches and Mentors don't have all the answers; we learn together.
- ▲ We honor the spirit of friendly competition.
- ▲ What we discover is more important than what we win.
- ▲ We share our experiences with others.
- ▲ We display Gracious Professionalism® and Coopertition® in everything we do.
- ▲ We have fun

Gracious Professionalism - Gracious Professionalism means teams compete like crazy against challenges but appreciate and treat each other with respect.

Coopertition - Coopertition combines the concepts of cooperation and competition. Coopertition is founded on the philosophy that teams can (and should!) cooperate with each other even as they compete.





# Resources

- FLL website - <https://www.firstinspires.org/robotics/fll>
- Coach's Handbook - [https://www.firstinspires.org/sites/default/files/uploads/resource\\_library/fll/hydro-dynamics/hydro-dynamics-coaches-handbook.pdf](https://www.firstinspires.org/sites/default/files/uploads/resource_library/fll/hydro-dynamics/hydro-dynamics-coaches-handbook.pdf)
- Educator Information - <https://www.firstinspires.org/community/educators>