

## How to Start a FIRST LEGO League (FLL) Team - 2015



### **Introduction from the Maine director:**

Inspiring curiosity in science and technology among 9 - 14 years olds is the goal of the revolutionary program known as the FIRST® LEGO® League (FLL). Launched in 1999 by FIRST (For Inspiration and Recognition of Science and Technology) through a partnership with the LEGO Company, FLL presents an interactive program that captivates children's interest in science and technology as they master the dynamics of teamwork and problem solving.

Each fall, FLL announces its Challenge highlighting a current scientific or technological problem facing the world. During the Challenge process, teams of **two to ten children** and **two** adult mentors have approximately 8 weeks to build, program and test their own fully autonomous robot capable of completing various "missions", while also completing a research project and giving a presentation of their findings. In Maine the preliminary qualifiers are in November, and the Championship is the first or second Saturday in December, but other states may have theirs as late as February.

**2015: The qualifiers will be November 21<sup>st</sup> and in several places around the state.**

**2015: The Championship will be December 12<sup>th</sup> at the Augusta Civic Center**

The FLL has three main components to strive for: The robot; the research; and the core values. FIRST has done an excellent job at holding all teams to their core values of teamwork and gracious professionalism; without them you can't win anything.

Teams can gather for local events, Preliminaries, Qualifiers, and State Championships where they are recognized for factors such as excellence in teamwork, problem-solving, creativity, design, strategy and leadership. Each championship participant receives an FLL medallion to commemorate their significant achievement of completing the team process. FLL promotes numerous solutions in a competitive, yet friendly environment as kids discover the rewards of science and technology.

Following is an overview of how to organize an FLL team. Additional information is available on the FLL web site at <http://www.usfirst.org/roboticsprograms/fll>. You can also see the [FLL Coaches Handbook](#), which provides further instructions on organizing a team, on the website. They also have a "Start a team" section at <http://www.firstlegoleague.org/challenge/startateam> and a "Team Resources" page at <http://www.firstlegoleague.org/challenge/teamresources>

## Organization

- **Registration** - To participate in the program, all teams must register nationally between the beginning of May and approximately the end of September (changes each year). Registration is conducted on the FLL web site at <https://my.usfirst.org/fll/tims/site.lasso>
- **Team Profile** - FLL teams can be part of a school classroom, after school program, extracurricular group, home school, neighborhood group, family, club or civic organization. FIRST is partnered with the Girls Scouts, Big Brothers/Big Sisters, and the 4H program.
- **Coaches** - Teachers, parents, and technology professionals are all excellent choices for the role of coach. The coaches must be 18 years or older and should possess the following abilities: the desire to explore side-by-side with children, good communication skills, prioritizing skills, and multi-tasking skills. The coach's role is to facilitate instruction and optimize the learning experience of the team members by allowing independent thought. Direct adult involvement or intervention during the problem solving process is strongly discouraged.

Coaches **do not need technical expertise** but must be willing to acquire some basic knowledge of the programming environment and LEGO robot building. As a registered team, the coaches will have access to software and building instructional manuals from FLL. Starting in 2014, FIRST is requiring at least two adults be listed as coaches, even if one is passive and one is active. This is for several reasons, but one is to prevent "orphaned teams" where the coach becomes unreachable (bad email usually).

- **Team Size** - It is required that an FLL team consist of from two to ten participants, and at least two adult coaches. There are several team member roles and responsibilities that provide a basis for creating and managing the team's time and talent. These roles include building, documentation, rules, marketing, programming, quality control, research, strategic analysis and project management. New teams with only one active coach may want to limit size to 6 or fewer team members for the first year until the adults have a chance to become familiar with the process.
- **Practice Space** - A team must have the space to build and test the robot on the FLL Playing Field (contained in the FLL Field Setup Kit). The playing field is a roll out 93" X 45" mat upon which LEGO pieces and various elements are arranged to create the Challenge missions. Additional materials such as 2 X 4's must be purchased separately in order to build a border around the playing field. Set up can be as simple as clearing an area on the floor, or your team may opt to build an official FLL Table (for detailed instructions please go to the FLL website. Note, cost to build the table can be as little as \$25 for a piece of Luan plywood or other 1/4" or 5/16" plywood and three 2x4s. Thicker plywood will be more stable, but more expensive and heavier. We use heavier for competitions but have a couple of light weight ones for easy handling.
- **Computer** - A team must have access to either a Mac or PC with an Internet connection\*. The computer is used to develop programs for the team's robot. Programs are easily downloaded to the RCX (LEGO Programmable Brick) via an infrared transmitter; or by wireless/USB connections to the NXT or EV3.

\*Internet access is required for maintaining contact with FLL for updates and notices throughout the Challenge season. If your team attends a local event, Preliminary, or State Championship, you will need an on-site computer for the day of the competition. Robot programs are often modified to accommodate the specific conditions of the tournament setting and to improve robot performance. The team does not need internet access during practice.

NOTE: The older "RCX" kits (still around) run with several programs including Robotic Invention

System (RIS) and only works on PCs, but I don't believe that will run on Vista or later. Also will work with RoboLab (PC only and XP or earlier OS) or MindStorms (XP, Vista, Windows 7, or Mac). Some versions and operating systems require patches that are available from the LEGO MindStorms website. <http://mindstorms.lego.com/en-us/support/default.aspx>

- **Time** - In general, 2 - 3 meetings per week with a minimum time block of 2 hours is adequate. An occasional Saturday or Sunday is often added for those teams preparing to attend a local event, Preliminary, or State Championship. It is difficult to maintain the program with 1 or 2 – 45 minute class blocks due to the setup/takedown time required. Schools have been able to successfully incorporate the program into the daily curriculum in a mod program (for example a 6 week rotation). As with any activity, the more time you can commit, the better the outcome. We highly recommend aiming for 30+ hours with the team prior to attending the Championship.
- **Costs** - Costs for the 2015 Challenge will be made available on the FLL web site in May of 2015 but are likely to be as follows:
  - LEGO MindStorms Challenge Kit (EV3 Robot)..... \$499<sup>1</sup>
  - Annual Mat and Field Pieces ..... \$75<sup>2</sup>
  - National Registration ..... \$225
    - FIRST LEGO League Team Multi-team discounts:
      - FIRST now offers a small discount to returning Veteran Groups
      - A 20% discount is available for new teams ONLY (so you need to field more teams than the previous year to get the discount)
      - The 20% only applies to the number of teams GREATER than you had last year.
  - Maine Qualifier Registration (required to compete)..... \$90
  - Maine State Championship Registration (if you qualify) ..... \$150<sup>3</sup>
  - Team T-shirts (optional)..... ??
  - Travel budget..... ??
  - TOTAL (without t-shirts, travel, or coach stipends)..... \$1,050
- So a total of \$1,050 for the first year (if you don't have a robot) and \$400-500 (plus shipping) each year after is a good rule of thumb, not counting any travel, snack, or t-shirt expenses and assumes a volunteer coach.
- **FLL General Timeline**
  - May – September: National/international Team registration available on FLL web site
  - August: MindStorms Challenge kits and field sets begin shipping
  - August 25<sup>th</sup>: Challenge is announced
  - September-October: State Championship registrations occur (check our website in September)
  - November: Maine Qualifiers
  - December: Maine State Championship

---

<sup>1</sup> This includes a base EV3 MindStorms kit, software, and rechargeable battery pack. The kit listed includes the rechargeable battery pack and the software and a number of other pieces not normally in the MindStorms kit. The LEGO MindStorms EV3 kit version currently available from LEGO.com costs \$349.99 and comes with Software (1 seat) but not the rechargeable battery pack. The same version from LEGOEducation.us costs \$349.95 and comes with the rechargeable battery pack but not the software (sold as either a single license for \$99 or a site license for \$399). Sorry it's an Apples to Kiwi's comparison.

<sup>2</sup> The field setup kit includes a 45" x 93" roll out plastic mat and all the LEGO® pieces to populate the missions on top of the field. This is the cheapest \$75 you will ever spend for the number of LEGO pieces you get (usually 1600-2100 pieces).

<sup>3</sup> In Maine, the State Tournament registration is used to purchase the trophies, individual participation medallions, event programs, and tournament field setup kits, rent the facility, cover insurance, etc.

## **The Role of The Adult**

“The role of the adult is not necessarily to teach, but to inspire.” Dean Kamen, Founder of FIRST

Coaching a FIRST LEGO League team is a rewarding experience! As an FLL coach you have the opportunity to empower the children with a sense of accomplishment that comes from knowing they have complete ownership of the solution they create. Team members are responsible for all research, documentation, programming and building. The coach acts as a facilitator to guide the children and help with team building, negotiation and conflict resolution.

The richest experience occurs when the coach seeks additional support from mentors, parents and volunteers who combine their specific skills. The coach should evaluate the team’s needs and determine the best fit for each volunteer or mentor, noting specifically when their skills are required and delegate as necessary. Remember if you don’t ask for help from outside mentors, you won’t get it.

- **Mentors** - Technology professionals, professors, college students, or high school participants of the FIRST Robotics Competition are recommended mentors. High school students often make wonderful mentors and the partnership establishes a rewarding learning experience for both age levels. A team can also solicit an expert in the field relative to the current Challenge. In 2012 there were 10 Maine FRC teams from Bangor to Kennebunk. Check out the website to find those teams - <http://www.usfirst.org/whatsgoingon> and select “FRC” or “FTC” and “Maine”
- **Parents** - Parental cooperation and support is invaluable to the team members. Parents can act as a resource as well as volunteer to assist with transportation, snacks and refreshments, fundraising, etc. Parents and family members are invited to attend tournament and preliminary events to applaud their team’s accomplishments.
- **Volunteers** - Hosting guest volunteers/professionals to work with the team in their area of expertise provides valuable one-on-one interaction. For example, an engineer can speak to the team as a whole, and then provide guidance to the builders and programmers on the robot’s design. A graphic artist or illustrator can offer advice to the team for creating their logo and/or team t-shirts. A person with public speaker experience can help the team with their presentation.

## **Setting Expectations**

One of the first things you will need to do with your team members is help them understand the various roles and responsibilities as defined in the FLL Team Manual. It is the coach’s responsibility to help the team understand how these roles relate to the various Challenge missions and the surrounding scientific and technological aspects associated with the theme of the Challenge.

Next, eliminate any confusion by having your team brainstorm to create a timeline with assigned action items for each member of the team. Meeting on a regular basis to review the status of these action items will relay the importance of teamwork, as well as reinforce time management and prioritizing. It is not uncommon for a team’s timeline, roles & responsibilities, action list, and expectations to change through the season.

Try to keep in mind that the FLL experience extends beyond the deadlines, the competition and robot performance. The FLL program is designed as a team-building and problem-solving learning experience for children. Once these goals are achieved, your team has already won!

## Grants

Maine Robotics usually has access to several **hardship grants** for teams that come from financially troubled school districts (even if the applicant isn't from the school district). These are from FIRST and come through Maine Robotics with awards occurring from late June to late August. The grants can cover **two** of the following:

- National Registration
- Robot Kit
- Field Setup Kit

Maine Robotics also has been able to recruit teams to get the LEGO Education Foundation support for **Rookie Teams**. These can only go to new teams, which can include additional teams at existing schools (meaning you had one team, but now want two teams). These grants are typically multi-year grants, starting with an EV3 kit and a Field Setup Kit for year 1; a FSK for year 2; and then the option for another EV3 kit on year 3.

About 10% of Maine teams will be getting one or the other of these grants for 2015.

## Sponsorship and Fundraising Ideas

Team fundraising can build ownership in the team, create team unity, and develop the much-needed enthusiasm for success. Seeking out financial assistance for your team can begin on many different levels. If your team obtains donations or a team sponsor, always remember to have the team write a letter of thanks. This recognizes the sponsor as part of the team and their accomplishments, and creates a feeling of connection to the community. Also, if your team is looking to obtain a sponsor, consider having the team members prepare a presentation for an executive within the company to discuss their personal involvement in the FLL process. The team's input is an excellent opportunity to demonstrate their commitment to the team and strengthen their presentation skills.

### **Some sponsorship suggestions include:**

- Look to local companies or solicit parents to see if any are owners or employees of a local business. Many businesses are excited to invest in FLL programs through sponsorship and/or mentors as part of their community relations. Businesses can also sponsor a FLL team in exchange for some form of recognition such as the company name on a t-shirt the team will wear during events or a special mention during public appearances.
- The local school district, Parent Teachers Organization, after-school programs, and chambers of commerce are good places to check as well.
- If the team is part of a classroom environment, explore grant opportunities, or programs for special education, gifted and talented-based programs, or minority-focused programs. Contact your parent teacher organization to discuss collaborative efforts.<sup>4</sup>
- If the team is derived as part of a civic organization, i.e. Boy Scouts, Girl Scouts, Boys & Girls Clubs, YMCA, 4H, etc, research the available funds from the headquarters of the organization; the team might be eligible for funds allocated to special programs.
- One of the simplest means to acquire funds is to distribute the cost of materials evenly between the number of participants and coaches. Sending a note to the parents to collect money is also a good way to enlist their support.

---

<sup>4</sup> The Perloff Family Foundation has been very supportive of robotics in Maine classrooms. Check out the website at <http://fastgrants.org/content/index.htm> and see if you qualify.

The following are examples of creative events organized by FLL teams to raise funds while also raising community awareness.

- · “Hanging the Principal”- Dallastown school principal, George Jones, was taped to the cafeteria wall at the school in York, PA by the student council. Individual pieces of duct tape were sold to raise money. Students were allowed to donate their purchased piece of tape for the ‘hanging’ of their principal. The taping began at 7:20 AM with Jones standing on steps. At 8:00 PM they removed the steps and he was suspended against the wall, 3 feet above the floor level. The kids thought it was great and it was a terrific way to get the entire school community involved with the project.
- · “Trash-a-Thon”- The Lego Lakers from South Lake Tahoe collected donations from the community and then spent a Saturday afternoon picking up garbage near the school. For additional support, they contacted the local refuse company for a donation of garbage bags. It was easy, profitable, and the children were recognized in the local paper as “environmental heroes.”

General fundraising can be done in a number of ways. Ideas for raising money include bake sales, community suppers, car washes, LEGO drives, recycling programs, and 50/50 raffles. These efforts can take place well in advance of the active FLL season. Be creative!

**From Douglas Adams famous *Hitchhikers Guide to the Galaxy***

## **Don't Panic**

I've been watching local groups do this for the last 15 years. I know how you are feeling, overwhelmed, excited, lost, found, and everything in-between. But the kids will do okay, you will set good expectations that focus on the journey rather than the end result, and it will be OKAY! Actually it will be better than okay, it will be AMAZING!

One of my key pieces of advice... **“Everyone has to have a first year; it may as well be this year!”**

Tom Bickford, Director of Maine Robotics

USFIRST

[www.usfirst.org](http://www.usfirst.org)

Maine Robotics

[www.mainerobotics.org](http://www.mainerobotics.org)

207-866-4340

30 Main Street, #1

Orono, ME 04473