Littleton Robotics:

FLL Challenge Teams

Program Overview 2025: Fall Season

Last Updated on Jun 17, 2025

This packet goes over the Littleton Robotics FLL Challenge Program for the 2025 season. Some information has changed from last season, please read the entire document.

What is FLL?

FLL stands for "*FIRST* Lego League." *FIRST*, or "For Inspiration and Recognition of Science and Technology", is a non-profit organization with competitive robotics programs for students K-12 worldwide. FLL Challenge is the program for students in grades 4-8. In FLL Challenge, students are tasked with creating a fully autonomous LEGO robot to play a themed game, completing an in-depth research project related to the game theme, as well as learning and applying teamwork skills along the way through the *FIRST* Core Values.

The 2025 FLL Challenge game is "Unearthed" with an archeology theme.

What are the *FIRST* Core Values?

The *FIRST* Core Values are listed below. All *FIRST* participants are expected to learn and apply these Core Values in and outside of robotics meetings.

- **Discovery:** *We explore new skills and ideas.*
- **Innovation:** *We use creativity and persistence to solve problems.*
- **Impact:** *We apply what we learn to improve our world.*
- **Inclusion:** *We respect each other and embrace our differences.*
- **Teamwork:** *We are stronger when we work together.*
- **Fun:** *We enjoy and celebrate what we do!*

Overview

Littleton FLL is a community organization, hosted by Littleton Robotics, a registered 501(c)(3) organization. We partner with *FIRST* Robotics Competition (FRC) Team 6328 Mechanical Advantage and their other FLL Challenge teams based in Bolton, MA for scrimmages and outreach events throughout the year. Littleton Robotics started running FLL programs in the summer of 2017.

We encourage our FLL 8th graders to pursue FRC in high school, through 6328 or one of the other local FRC teams depending on what works best for your family and available space. One of our major goals is to excite students about STEM and robotics at a young age and keep them engaged as they move through the *FIRST* programs so they carry that enthusiasm to high school and beyond. Our mission is to develop the STEM leaders of the next generation, and we are doing that now!

Every year we have at least one parent who wants their student to be in robotics more than the student wants to be there, and usually that is the child who is uninterested, doesn't focus, and distracts their teammates and coaches. If that is your student, please don't sign them up for robotics. Their lack of enthusiasm will shine though in one way or another and we may ask them to leave the team to give someone else the opportunity. We always have more interested students than we have space for, so please be considerate of another student who may relish the opportunity.

The Littleton FLL program is administered by the Program Directors Katie Bonner and Michelle Tuck along with several Head Coaches who are in charge at meetings on a rotating basis. Our Head Student Coach is Sean Neary - a senior at Littleton High School, a member of FRC 6328, and an FLL alum.

*THE PRIMARY GOAL OF ALL TEAMS IS **HAVING FUN WHILE LEARNING!*** Awards and ranking are NEVER the focus of our program.

FLL Challenge Teams for Fall Competitions

Each team will have 4-6 student members with a minimum of 2 parent coaches, and high school student mentors as available. All adult coaches and student mentors will be registered with *FIRST* and complete the *FIRST* Youth Protection Program training (a short self-paced online program).

The team assignments will be decided on by the Head Coaches, with input from coaches and student mentors. Once the fall teams are posted each season, the decision is final. If the Head Coaches determine that a change to the team rosters needs to be made, up to and including removing a member from the team if necessary, they may do so.

Littleton FLL can run up to five teams, though we may run fewer in a season depending on volunteer coach availability. Our 5 teams are identified in the *FIRST* system as follows:

1. 30554 - Powerful Pulleys
2. 32514 - Littleton Levers
3. 32648 - Mechanism Madness
4. 45129 - Wild Wedges
5. 45554 - Groovy Gears

The number of teams we can run will depend on how many volunteers we have to be Parent Coaches (see more details further in this document). Without volunteer coaches (at least 2 per team and preferably 3-4), we cannot run FLL teams. If you volunteer as a coach, your student is guaranteed a place on the team. How many spots are available for other students will depend on the number of coaches/teams we have. We generally have more interest than available spots for students.

Fall Program Overview

The specifics of the fall FLL competition game is scheduled to be released on August 5, 2025. The competition consists of four parts: robot game (points scored), robot design (engineering process), research project, and core values. Each of the four parts is **equally important** - valued at 25% of overall scores - at competition and team participants are expected to give equal time to each.

At events, students participate in official robot matches plus a 30-minute presentation/Q&A with a panel of judges that covers robot design, the research project, and demonstration of core values. During team meetings in the fall, teams will have ample opportunity to prepare for and practice their presentations. We know that students this age are frequently new to giving presentations, but what a great skill to learn!

Robot Game

- Students are tasked with building fully autonomous LEGO-based robots to complete various missions
    - At Littleton FLL, we use Spike Prime robots
- Each game has 15-18 missions available to choose from laid out on a 4'x8' table, most teams complete 6-10 missions in a match
- Students pick which missions to complete in a 2.5-minute match (can combine multiple missions in one "run")
- Students can only touch the robot (to switch mechanisms, start a new run, etc.) in the "home base" area; if students touch robot outside of base a penalty is assessed
- Robots utilize motors, sensors and mechanisms the students design to navigate the field and complete missions (can change mechanisms in the home base so there is a strategic advantage to easily attached and detached mechanisms)

Robot Design

- Students are tasked with documenting their process over the fall to show how and why they made the decisions they did for game strategy, mechanism design, robot testing, etc.
- Students must demonstrate knowledge of their programming, show why and how their programming solutions work for their robot, and discuss what the code does.
- Robot Design is focused on learning the engineering and design process and is completely separate from how the robot does in the Robot Game.
    - Sometimes, FLL teams are able to score high points in the robot game without understanding how or why their robot works.
    - Other FLL teams demonstrate a deep understanding of a rigorous engineering design process even though their robot isn't reliably scoring points.

Project

- Students are tasked with completing a community service or research project that is related to the game theme. The project parameters are very broadly defined.
- The three steps of the project are identifying a problem, completing background research on the problem and existing solutions, and proposing a solution/improvement to the problem. Students are encouraged to design prototypes/models of their solutions, as well as creating documentation that explains their process and sharing their work widely with their community.
- At competitions, students will display their project work on a poster board in their pit area.

Core Values

- Students are expected to learn and practice using *FIRST* Core Values (described on page 1) during meetings and outside of FLL. These principles are at the core of *FIRST* and help everyone become productive and respectful members of their communities.
- We will have periodic core values (team building) challenges throughout the season so the students can develop their teamwork skills.
- Students, mentors, coaches, parents and anyone else affiliated with the team will be monitored all day during meetings and events to ensure everyone is following the *FIRST* Core Values.

Judging sessions

- Coaches and parents are not generally permitted to attend judging sessions, though some events allow for one adult to silently observe. Teams will have plenty of opportunities to practice their presentations and Q&A before attending a competition.

Parent Volunteer Options

Our program is 100% volunteer, run by adult and student volunteers who believe in the benefits of the *FIRST* programs. We require all families to actively volunteer for a minimum of 1 role during the FLL season. **Every family volunteers**, whether it's coaching, admin tasks, getting sponsors, scheduling interviews with experts, etc.

The most critical roles are the Robot and Project Coaches. Without parent/family volunteer coaches (at least 2 per team, and preferably 3-4), we cannot run FLL teams. **If you volunteer as a robot or project coach, your student will move to the top of the list for placement.** How many spots are available for other students will depend on the number of coaches/teams we have. We generally have more interest than available spots for students and low turnover year-to-year (returning students are eligible for early registration). No experience is required for volunteer coaches as long as you're willing to learn along with the students, be a role model of *FIRST* Core Values, and actively support the students' journey. Littleton Robotics will provide support and resources for Parent Coaches.

- All parent coaches on a team are expected to attend all meetings and actively work together through the entire meeting to help the students stay on task and manage collaborative work including when focused on work in the other domains (robot instead of project, or vice versa)
- Parent Coaches are expected to communicate with each other outside of FLL meetings to plan meeting objectives, milestones, schedules, etc.

We also have high school student mentors who enjoy supporting our FLL Challenge teams and working with the younger students. How many are available each season depends on their academic and extracurricular schedules. They are a great resource and a wealth of knowledge about FLL problem solving (most are actually FLL alumni), but the adult coaches ultimately have the responsibility of ensuring their team is accomplishing their tasks and working towards their goals.

Parent Volunteer roles and their descriptions:

1. **Robot Coach (1-2 per team):**
    a. Robot coach: Attend all Regular Meetings and events/competitions and optional meetings as needed to help teach a small group of students basic block-style programming, robot and attachment building, game strategy and problem solving. Provide general guidelines and help keep students focused and on task.
        i. A robot coach should ideally have some general programming knowledge (any programming language). If you do not already have programming knowledge, you can pick it up but you'll need to work a bit harder to stay a few steps ahead of the kids.
        ii. The robot coach encourages the students to do the work and may not do any of the building/programming themselves. They should ask guiding questions and help with ideas when students get stuck.
        iii. A robot coach must attend all required events.
        iv. Help students remember the goal of having fun while learning and showing their Core Values.
        v. Actively support the Project Coaches to help students engage and complete work during project time.
2. **Project Coach (1-2 per team):**
    a. Attend all Regular Meetings and events/competitions and optional meetings as needed to work on the research project, including brainstorming, choosing a project, researching, meeting with experts, preparing a presentation/prototype (if appropriate)/tri-fold board, and sharing with the community. Provide general guidelines and help keep students focused and on task.
        i. A project coach must have patience and a general willingness to encourage the kids to learn, research and present.
        ii. A project coach encourages the kids to do the work, they do not do the research for them. They should ask guiding questions and help with ideas when students get stuck.
        iii. A project coach must attend all required events.
        iv. Help students remember the goal of having fun while learning and showing their Core Values
        v. Actively support the Robot Coaches to help students engage and complete work during project time.
3. **T-Shirt Coordinator (1 total for all teams):**
    a. Coordinate the t-shirt order (design will be provided) along with getting the sponsor logos, shirt sizes, and any extra shirt/sweatshirt orders and payment
4. **Snack/Supplies:**
    a. **Snack/Supplies Coordinator (need 2 total for all teams):** Coordinate a team of parents who provide snacks every week. Check on general facility supplies (paper towels, hand

sanitizer, tissues, toilet paper, etc.) and solicit donations when replenishments are needed.

b. **Snack Parent (need 1-2 per team):** Purchase and bring snacks regularly for the kids on a rotating schedule. Make sure snacks are available for a mid-meeting break to help students focus the rest of the time. Funding is available for reimbursement.
    i. Responsibilities include setting up and distributing the snack, packing up and removing leftovers, and staying to the end of the meeting to manage cleaning up.
    ii. Snacks will be provided for Wednesday meetings.

5. **Sponsorship Coordinator (1-2 total for all teams):**
    a. Coordinate sponsorships for the back of the t-shirt (must be completed by late September to allow time for shirts to be printed).
    b. The more sponsorships we have, the more funds there are to purchase additional robots, sensors, laptops, etc. for team use.
    c. Parent/family employers are often great places to go to for sponsorship requests. Most sponsorships come from participating families' employers or family donations.

Fall Meeting Schedule

Regular fall meetings will begin the week of Labor Day at the Littleton Robotics workspace (20 Harvard Road Building D, a stand-alone building on the campus of Patriot Beverages in Littleton). There will likely be 1-2 coaches meetings beforehand. We may also hold 1-2 optional meetings in August to get an early start on building mission models. Participation in Regular Meetings, Scrimmages, and Competitions are required unless otherwise noted.

1. Regular Meetings will be held on Wednesdays at Littleton Robotics' workspace 6-9pm.
    a. **Students are required to be at all Wednesday Meetings (unless they are sick, have a doctor's appointment, travel, etc.), they are not permitted to chronically arrive late or leave early. Doing so is a disservice to their teammates and violates team expectations.**
2. Additional optional meetings will be scheduled on Fridays 6-8pm at the workspace starting (approximately) in October.
    a. Each team that chooses to make use of the optional meeting time must ensure there will be at least 2 coaches in attendance as well.
3. Supplies provided by Littleton Robotics (laptops, robots, LEGOs, mission models, etc.) **must stay at the shop** and are not to be taken home by students/families.
4. Students will be asked to complete work at home as needed (find research resources, work on presentations, document process, etc.). When assigned by coaches, this work is required.
5. There may be extra meetings available before scrimmages and competitions, as needed. Schedules for extra meetings will be determined at a later date.
6. Attendance at practice events/scrimmages and competitions is required unless otherwise noted.

Fall Program Overview – Main Events

Below is a summary of all main events for the fall season. Events include demos, fundraisers, scrimmages/practice events and official competitions.

1. **Outreach Events: Students and coaches are encouraged to participate in outreach events:** Backyard Bolton is an outreach demo event at the Bolton Town Common, usually in September. We may work with the Bolton Robotics FLL teams to set up a game table and the students will demo a previous robot. We will post other outreach opportunities when they occur. This is an optional fun event.
2. **Scrimmages/practice events**
    a. **Bolton Robotics Scrimmage – Saturday in Mid October:** Littleton Robotics is usually invited to a scrimmage with the FLL teams of Bolton Robotics at the Florence Sawyer School cafeteria in Bolton. **Participation in this event is required.**
    b. **Northborough Test Drive Scrimmage – Late October/Early November:** This scrimmage takes place on a Saturday at Algonquin High School in Northborough 9:00 am – 2:00 pm. This event is an opportunity for students to have a practice competition with their robots. There are no practice judging sessions.
        i. The decision whether or not to attend this event will be made by each FLL team as a group. Teams are not required to attend this scrimmage.
    c. **FRC Team 6328 Advantage Scrimmage:** This scrimmage event is usually in mid-November on a Sunday. It mimics a full official competition with robot matches and practice judging sessions. This event starts first thing in the morning and ends in the mid-afternoon. **Participation in this event is required.**
3. **Qualifier Event – early December:** Each team will attend 1 official qualifier competition which consists of robot matches and a judging session covering robot design and research project presentations. These events are local, usually within a 30-minute drive. Littleton Robotics FLL teams may or may not be attending the same Qualifier Event, that will depend on which one each team chooses. Registration for these events usually opens in mid-October. All teammates are required to participate in their Qualifier event. Most Qualifiers will be the weekend of December 6th, but *it is important to emphasize that we will not be able to confirm this date until mid-October.* This is a day-long event on a weekend and **participation is required.**
    a. Qualifier Events are usually the weekend before Thanksgiving and the first weekend in December. Teams submit an ordered list of which event(s) they could attend and are assigned to the best fit. It is most likely our Qualifier Event will be December 6 or 7, 2025.
    b. There are 2 main parts of the qualifier event – robot matches and a 30-minute judging session that covers robot design, project presentation, and core values evaluation. A variety of awards are presented at each event and about 30% of the teams at each qualifier event will advance to the state championship ("Robonautica") at WPI held on December 13, 2025. Brief description is below.
    c. There will also be incognito Core Values judges walking around at the Qualifiers to see how the teams are interacting. These judges will be looking at the students, coaches, mentors, and parents. If any of these people are not abiding by the FLL Core Values, the team can be disqualified from advancing to States or winning awards. It is important that everyone associated with the team demonstrates their FLL Core Values!
    d. The teams who will be advancing to Robonautica are announced at the end of the qualifier event. Meetings will continue after qualifiers for teams who advance to Robonautica. Teams who do not advance do not continue meeting.
4. **Robonautica - State Championship:** The State Championship will occur on Saturday December 13, 2025 and takes place at WPI's Harrington Auditorium. Approximately 64 teams will be at this event. The structure is the same as the qualifier – robot matches and a 30 minute presentation

with judges. **All teammates are required to participate for the entire day**, but only teams who advance beyond their Qualifier will attend, although others are welcome to come and cheer.

5. **Cleaning and Celebration Day - mid-December:** Once all teams have finished their events (either after Qualifiers or Robonautica), all teams will gather at the workspace to celebrate the season and clean/organize the space, most likely on December 17 but the date will be confirmed later. **This is a required meeting.**

Event participation: This is a competition-based program. If your child cannot participate in the required events and competitions, then your child should not sign up to be in robotics.

Special Needs

Please be in contact with the Head Coaches prior to the start of the season if your student has special needs or if there's anything that would be helpful for Coaches to know to best support your student. If you have a neuro-diverse student, then we would like to work collaboratively with you to discuss the right approach for your student. We are parent volunteers and not trained teachers, but we want to craft the best experience we can for every student, and the more we know the better we can help do that.

Activity Fees

There is a $250 activity fee per student for the fall Littleton FLL Challenge program. Checks should be made out to "Littleton Robotics" and sent to Littleton Robotics, PO Box 291, Littleton MA 01460 or brought to one of the first FLL meetings in the fall. Venmo is also available to @LittletonRobotics (4-digit code is 3598 if needed) - please include your student's name and "Littleton FLL" in the notes line.

Please do not pay the activity fee until you know your student has a confirmed spot on a team. It will likely take us much of the summer to figure out coaches and how many students we have space for.

Once paid, *the activity fee is non-refundable.* If the activity fee poses a financial difficulty for your family, please reach out to one of the Head Coaches or fll@littletonrobotics.org. Scholarships and financial support are available, we never want the activity fee to keep a student from participating in the program.

The activity fee covers:

- team registration with *FIRST*
- FLL Challenge season materials (mat, mission models, game instructions, etc.)
- Spike Prime LEGO robots, at least two per team
- LEGOs, sensors, motors, and other robot building supplies
- laptops, at least two per team
- one team t-shirt for each student and coach
- use of the Littleton Robotics building for meetings
- event registration fees - practice events and official competitions
- budget for research project/prototype supplies
- pizza lunch at scrimmages and qualifiers

Team Communication

We will be utilizing Google Group emails and Slack for all team communications. **All coaches and at least 1 parent per student are required to join the Littleton FLL Slack channel.** This is a great resource to share ideas, have conversations, and work together to coordinate activities, etc. Once your student is officially registered for the fall FLL team, please watch for an email invite to the Slack workspace. We will also utilize a Google Group email list for general all-team announcements. Parents are expected to check Slack and email daily for team updates throughout the season. If a student email is provided, they will be included in the Google Group and Slack channels.

If you have any questions on this information packet, please do not hesitate to reach out to fll@littletonrobotics.org.