

# FLL - A Gateway to FIRST Robotics

June 24, 2015



# Welcome to FIRST robotics

This meeting was organized by coaches, mentors and students from the LigerBots, Newton's high school FIRST robotics team, along with current and former FLL coaches and team members.

The LigerBots does not currently directly run any elementary or middle school programs, but we want to support FIRST robotics in the community!



# What is FLL

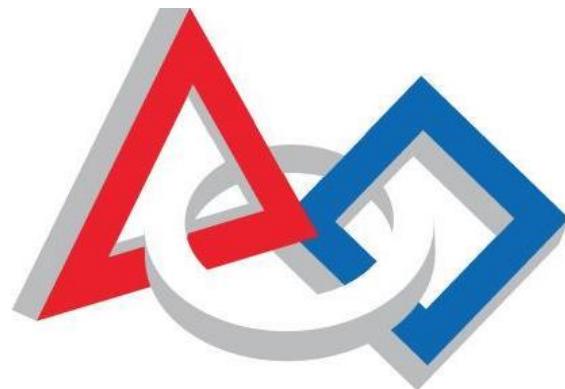


<https://youtu.be/ydLJKFi0vHA>



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# Introduction to FLL and Team Membership



***FLL***  
*FIRST® LEGO® League*

Presented by Team #763 — Free Candy

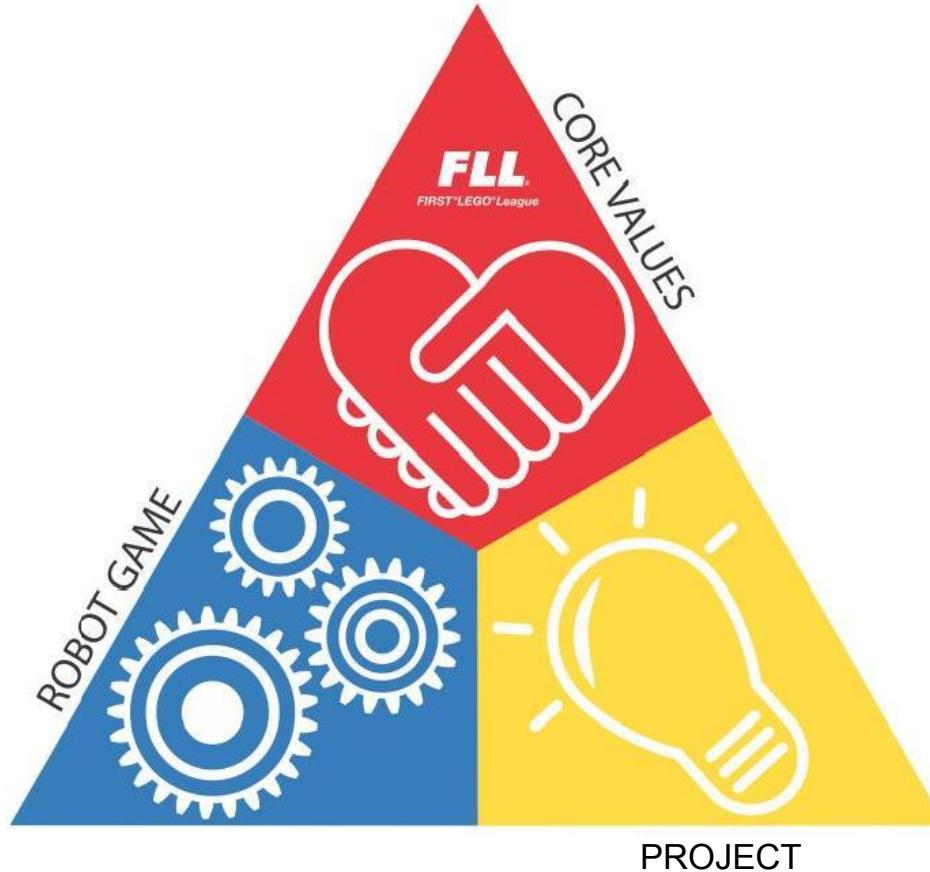
# The Robots We are Talking About



# The Robots We Are Not Talking About



# The Three Components of FLL



**The Project and Robot Game are what the children do. Core Values are how they do it.**

# Hidden Agenda

Working with robots and developing a real world solution are nice, but the real benefits of being on the team:

- learning how to work together
- positively work through conflicts
- confidence even under scrutiny

Other benefits

- applied engineering concepts
- applied software development concepts
- applied prioritization & time management
- applied fun and achievement

# The Team

- FLL teams have
  - 2 adult coaches
  - 4-10 students in grades 4 to 8
- Teams can be based in schools, organizations, or homes
- Students can only be on one team
- Teams compete in official and unofficial events



# Team Activities

## Team Building

- Icebreakers: Name Bingo, Pasta tower, low bar, name game, human robot...etc.
- Team name, logo, t-shirt design, banners,mascots...etc.
- “Yes, and...” exercises: practice agreeing, supporting, building
- Create decision making process to resolve conflicts

## Robot Game

- Build 96" x 48" FLL table (detailed instructions are available online)
- Setup challenge field (August)
- Lego build challenges – vague problem, many solutions, compare approaches
- Programming tutorials - navigate obstacles, push item, pick up, target ... etc.

## Project

- Practice project – Nature's Fury
- Research, brainstorm, present, document, and repeat
- Watch other team presentations

# Team Members Responsibilities

- Be positive to learn new subjects
- Be supportive of everyone
- Contribute to the team
- Respect coaches and others
- Do your share of the work and more
- Know your schedule & manage your time
- Make mistakes & share bad ideas (might not be bad)
- HAVE FUN!

# Parent Responsibilities

- Communicate scheduling conflicts
- Be supportive, drive and pick up on time
- Be involved and motivate your child
- Lots of opportunities to help out (treasurer, graphics,
- Administration (T-shirt, fundraising, field trip, snacks, photos, videos, pit management, food, carpool, etc)
- Help with fundraising or to obtain sponsorship

# Coach Responsibilities

- Encourage and structure the process, let the team develop the content
- Ask questions to encourage the team's thinking and problem solving
- Keep kids aware of the schedule
- Help learn skill in basic building and programming
- Help kids find resources for the project
- Read and understand the rules
- Balancing fun versus competition
- Keep parents informed

# Not Coaches Responsibilities

- Build and program the robot
- Do research and design project solutions
- Make important decisions
  - – The kids need to make the decisions
- Not a football coach
  - – Don't call the plays
  - – Winning isn't everything

# The Challenge

- Each year has a robot game and a project that share a common theme
  - Robot assembled from Lego parts
  - 4'x8' field layout is new every year
  - Research project: proposes solutions to real life problems
- Challenge is announced in late August
  - This year is August 25
  - Detailed manual + highlight video



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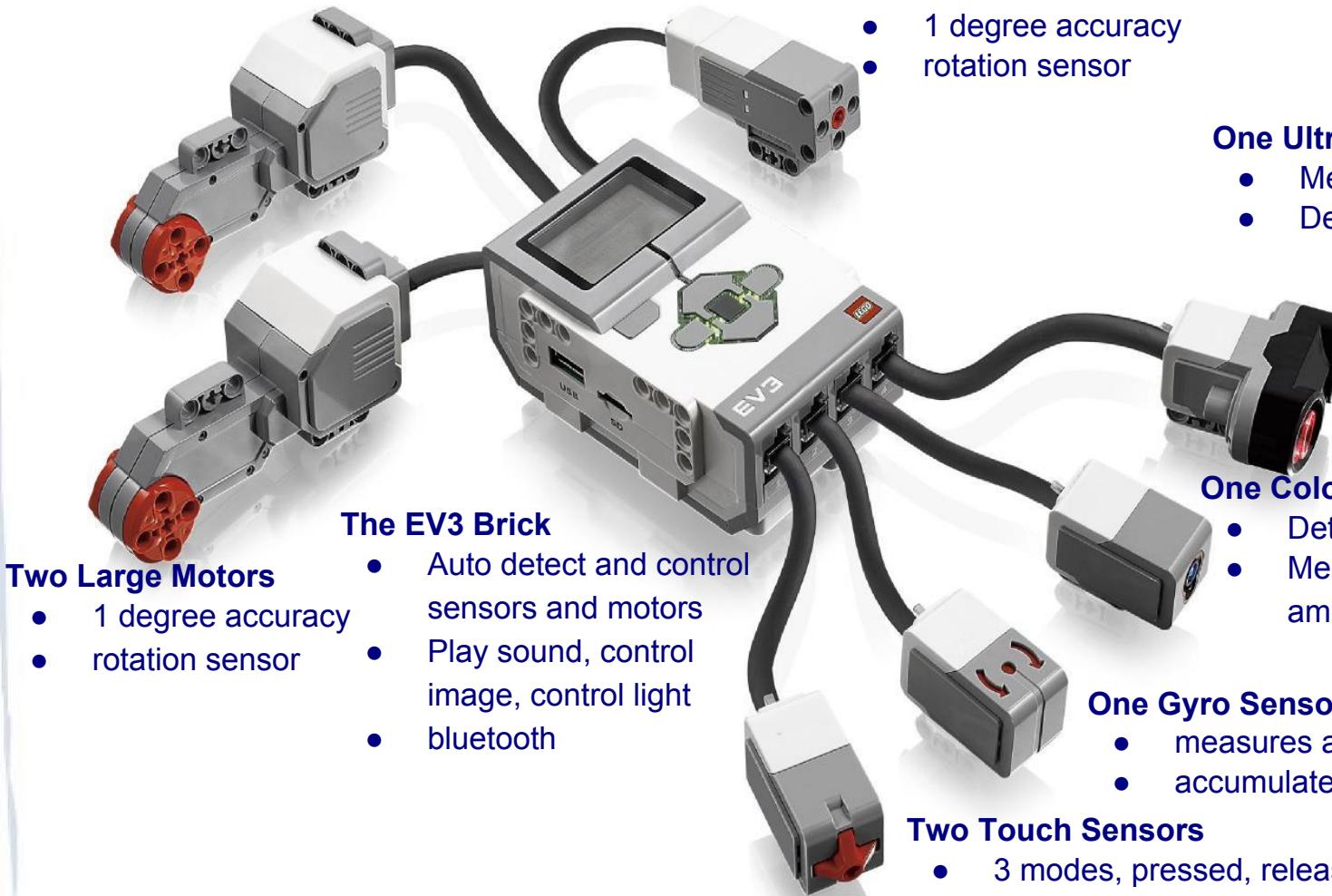
# The Robot

- Start with Lego Kit
- Add parts to perform tasks
- Write software
- Robot is completely autonomous

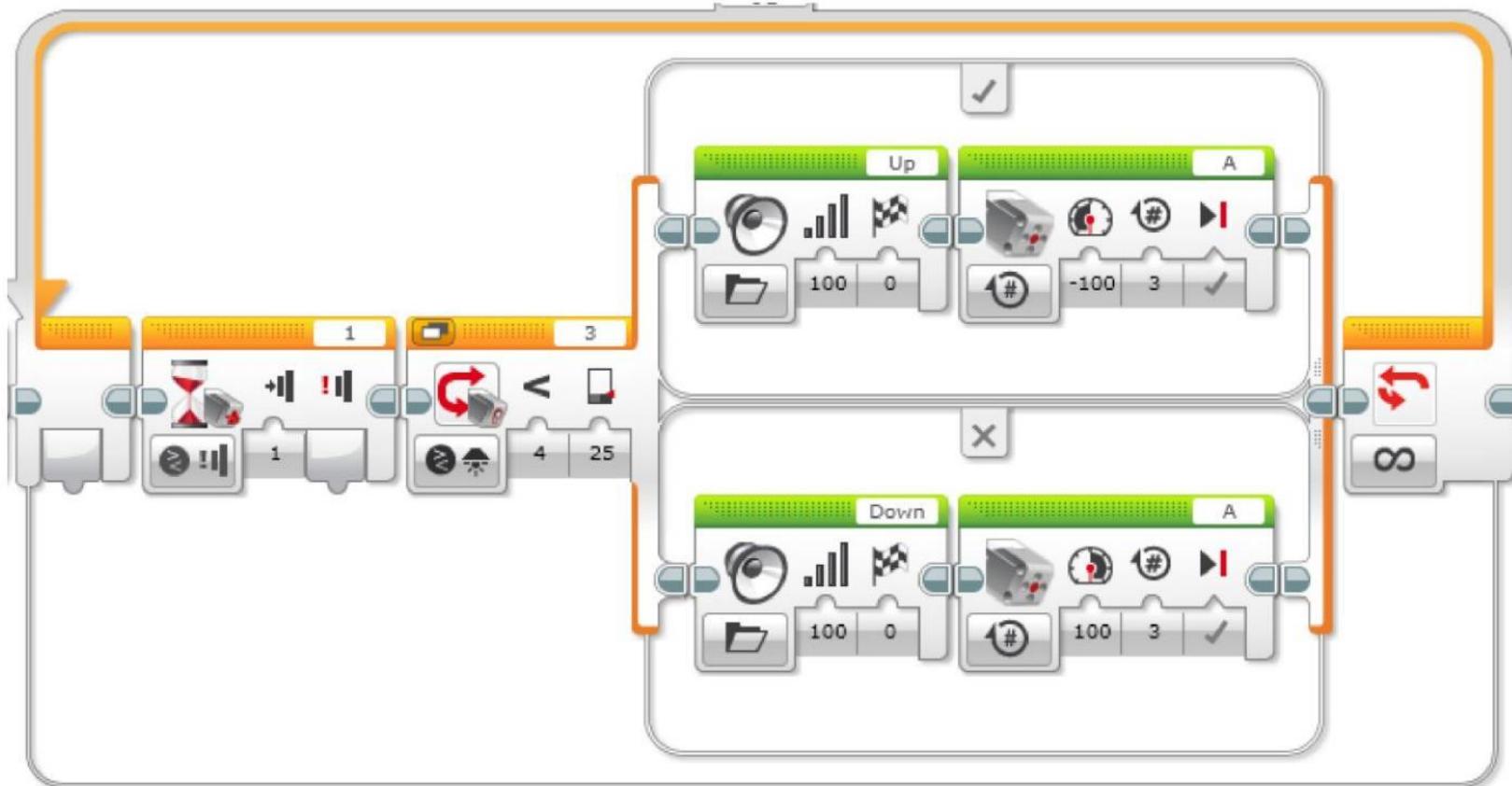


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# EV3 Brick with Sensors & Motors



# Intuitive Graphical Programming



Example of a loop which uses the touch sensor and color sensor to determine which sound file should be played, and which direction to move the small motor. Notice the use of icons which look like the sensors and motors on previous page, as well as dials and common symbols.

# The Challenge

- Related to the theme of the competition
- Research real-world problems
- Develop an innovative solution
- Come up with a creative presentation



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# Season schedule

- Start up over the summer
  - Registration is open
  - Closes when slots are filled
  - Typically mid-September
- Challenge announced August 25th
  - Trash Trek
- Build-season is 10 weeks
- 1 to 2 afternoon meetings/week
- Cost depends on number of members, sponsorships

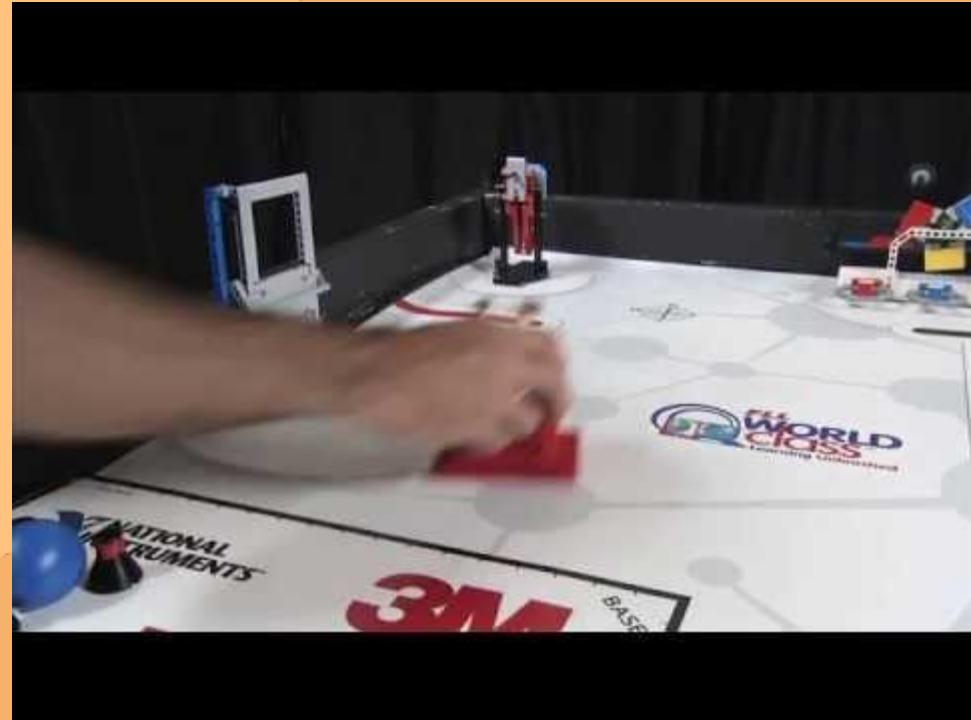


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# 2014 World Class: Robot Video

Theme was  
education

Details explained in  
game manual



<https://youtu.be/po9j6vpuW7A>



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# 2014: World Class Project Video

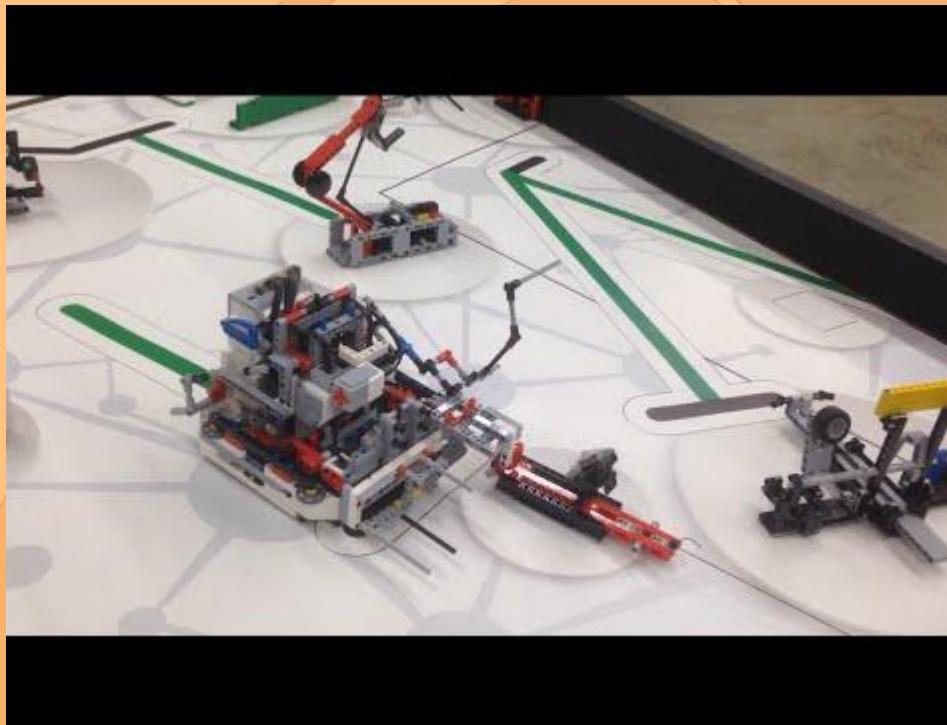


<https://youtu.be/pJtYNHEqWmU>



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# 2014 World Class: Video of Game



[https://youtu.be/xtLPQIn\\_K3k](https://youtu.be/xtLPQIn_K3k)



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# 2014 World Class: Another solution



<https://youtu.be/F3YvUU4jUXg>



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# 2014 World Class: The Project

Real world question, kid created solutions

Public speaking and presentation skills

Has resulted in patents and civic programs



<https://youtu.be/VJ3cs9W83Ug>



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# 2013 Nature's Fury: The Challenge

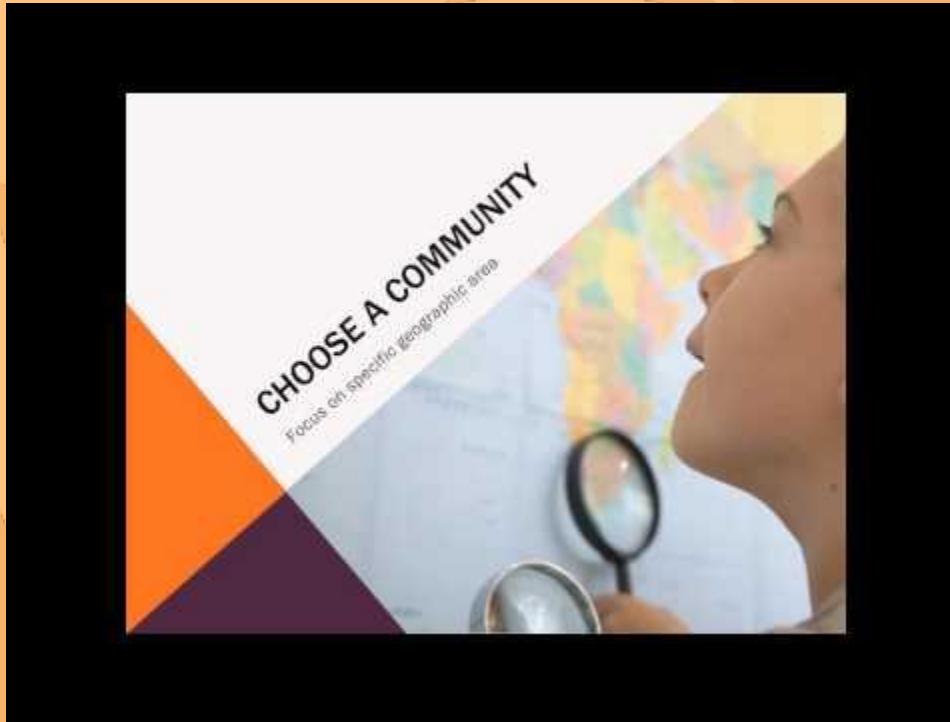


<https://youtu.be/fQWHXF4mpj4>



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# 2013 Nature's Fury: The Project

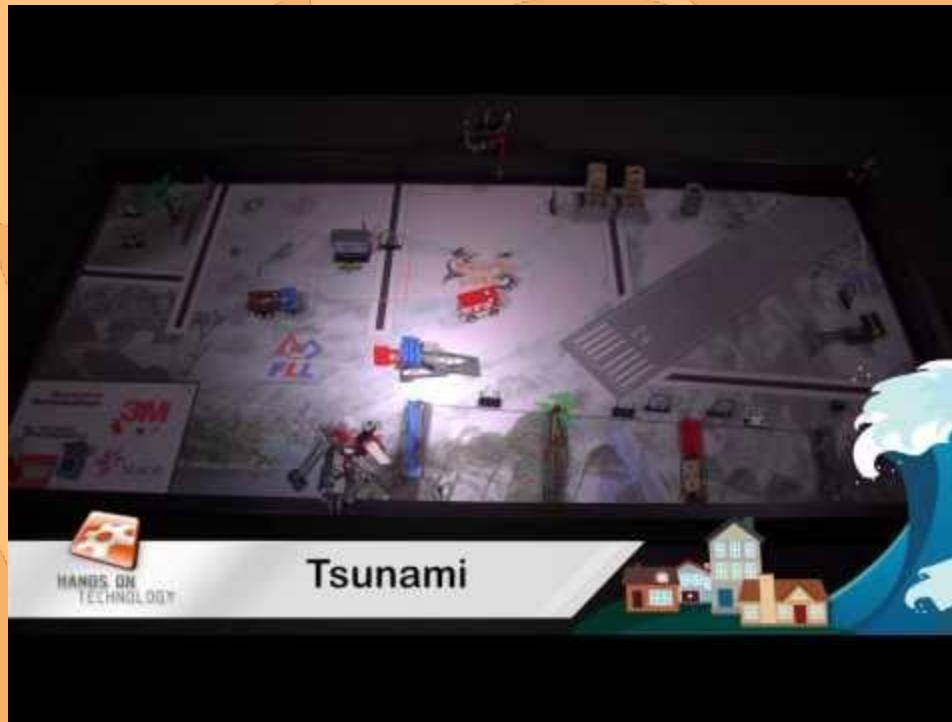


<https://youtu.be/FNa4perHN5c>



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# 2013 Nature's Fury: Robot Game



[https://youtu.be/R\\_fGwrUJ6o](https://youtu.be/R_fGwrUJ6o)



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# 2013 Nature's Fury: Execution



<https://youtu.be/1fdSkyb5tAQ>



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# 2013 Nature's Fury: Presentation



[https://youtu.be/L2\\_-oJ76\\_Pw](https://youtu.be/L2_-oJ76_Pw)



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# The FLL experience

Former team members

Current and former coaches



# Finding a team

- There is a small number of existing teams in Newton
  - School based, home based
  - Some will recruit new members, others are full
- Teams change every few years
- The number of teams does not meet the demand
- If you can't find a team - start one!



# Starting a team

- Finding coaches
- Finding students
- Costs - \$500-\$1000
- Timeline - registration closes in September
  - often fills up before closing
- Registration process
  - Start on the FIRST website



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# Coaching a team

- You too can coach a team!
- Does not require a STEM professional
- Abundance of resources for coaches
  - FIRST web site, google, Youtube
- Other coaches will help - so will we
- Every technical problem has already been solved!
  - And it's all been captured on video



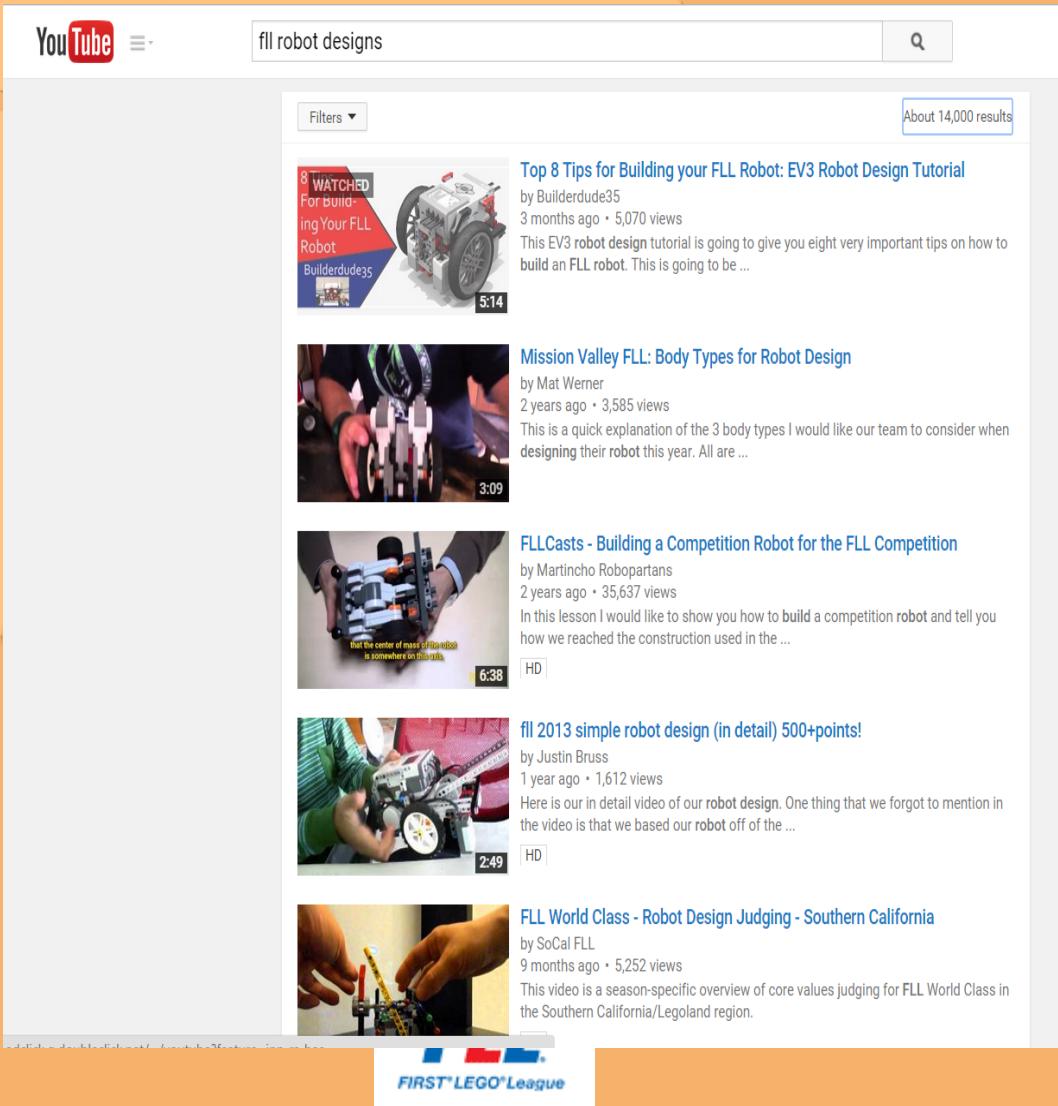
# Official FIRST® online resources

The screenshot shows a web browser window with the URL [www.firstlegoleague.org/challenge/teamresources](http://www.firstlegoleague.org/challenge/teamresources). The page features the FLL logo and navigation links for About Us, Marketing Tools, Challenge & Resources, Events, Parents, and Contact. The main content area is titled "Coach/Team Resources" and includes a sidebar with links to Challenge & Resources (Overview and History, Start a Team, Participation Rules, 2015/2016 TRASH TREK Challenge, Mission Model Building Instructions, Coach/Team Resources, Forums) and a "Preparation" section. A download progress bar for the "TRASH TREK Coaches' Handbook, version 2015" is visible at the bottom.



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# Youtube - FLL robot designs



YouTube search results for "fll robot designs". The search bar shows "fll robot designs". There are 14,000 results.

- Top 8 Tips for Building your FLL Robot: EV3 Robot Design Tutorial**  
by Builderdude35  
3 months ago • 5,070 views  
This EV3 robot design tutorial is going to give you eight very important tips on how to build an FLL robot. This is going to be ...
- Mission Valley FLL: Body Types for Robot Design**  
by Mat Werner  
2 years ago • 3,585 views  
This is a quick explanation of the 3 body types I would like our team to consider when designing their robot this year. All are ...
- FLLCasts - Building a Competition Robot for the FLL Competition**  
by Martinho Robopartans  
2 years ago • 35,637 views  
In this lesson I would like to show you how to build a competition robot and tell you how we reached the construction used in the ...
- FLL 2013 simple robot design (in detail) 500+points!**  
by Justin Bruss  
1 year ago • 1,612 views  
Here is our in detail video of our robot design. One thing that we forgot to mention in the video is that we based our robot off of the ...
- FLL World Class - Robot Design Judging - Southern California**  
by SoCal FLL  
9 months ago • 5,252 views  
This video is a season-specific overview of core values judging for FLL World Class in the Southern California/Legoland region.

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# Google - FLL robot programming

Google search results for "fll robot programming":

**Web** Videos Images Shopping News More ▾ Search tools

About 98,900 results (0.41 seconds)

**Coach/Team Resources | FIRST LEGO League**  
www.[firstlegoleague.org/challenge/teamresources](http://firstlegoleague.org/challenge/teamresources) ▾ FIRST Lego League ▾  
Ask an Expert: Programming and Team Management ... Participants who complete a set of five robot programming projects can earn a certificate of completion.

**[PDF] programming the NXT - FIRST LEGO League**  
www.[firstlegoleague.org/.../2013NXTProgramAgen...](http://firstlegoleague.org/.../2013NXTProgramAgen...) ▾ FIRST Lego League ▾  
2013 Nature's Fury Coach Call. Basic programming of the Mindstorm NXT Robot. • People Introductions. • Deborah Kerr - FIRST ® Senior Mentor. • Jason Yount ...

**[PDF] NXT-G Programming Workshop for FLL Coaches**  
blogs.sch.gr/3dimrodou/files/2014/05/2012Programming1.pdf ▾  
Basic Programming Agenda (Introductory Workshop). • NXT Controller (aka: ... The FLL Robot Set includes the LEGO MINDSTORMS Education NXT Software.

**FLL Coaching Resources | High Tech Kids**  
www.[hightechkids.org/fll-coaching-resources](http://hightechkids.org/fll-coaching-resources) ▾ High Tech Kids ▾  
FLL Coaching Resources. SECTIONS INCLUDE: Coaching; Building Robots;

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# Panel Q&A



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