How To Improve Your FLL Team
(and maybe restore the balance of the force)

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The Bionic Porcupines
& Beehive Robotics

Overwhelmed?





That's OK - Getting to the 80% and Then the 20%

It is like the SAT/ACT

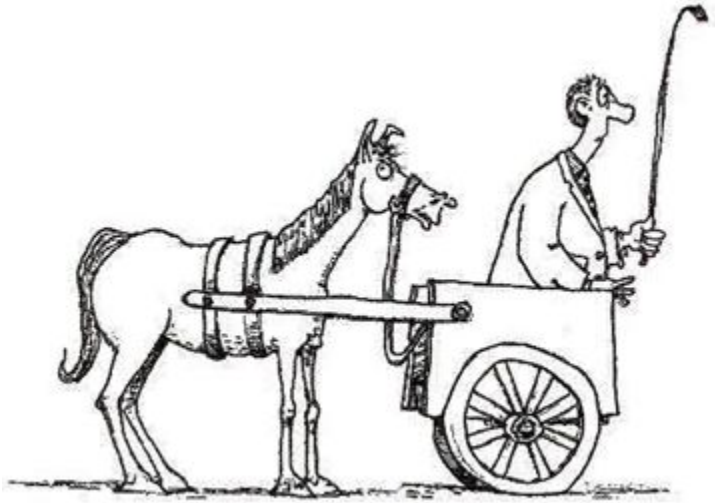
- Start with the Basics
- Then Strategize and Polish

Example:

- Building Complicated Carts Before Driving Straight
- Focusing on Social Media Sharing Before Developing Project

Take Aways:

- Framework to Help with:
  - Successful Practices
- Not Going To:
  - Show How to Build Robot
  - Tell Which Project to Pick




2017
FIRST LEGO LEAGUE
Google
FIRST
2018
World Festival
Houston, Texas, USA
3rd Place
11 46 CLUB OREO 400 315 320
12 79 AQUABLE 395 395 265 370
13 50 BIONIC PORCUPINES 385 210 385 350
14 10 PANDA POWER 385 310 385 320
370 270 305 370





1	2 - Beehive Robotics (5407)	323	222	68	323
2	29 - Harry Bot-ters (6334)	240	240	171	225
3	44 - Rejecting Reality (122)	197	197	197	112
4	30 - Bionic Porcupines 2.0 (3553)	170	170	58	82
					39

Bionic Porcupines 2.0





2015

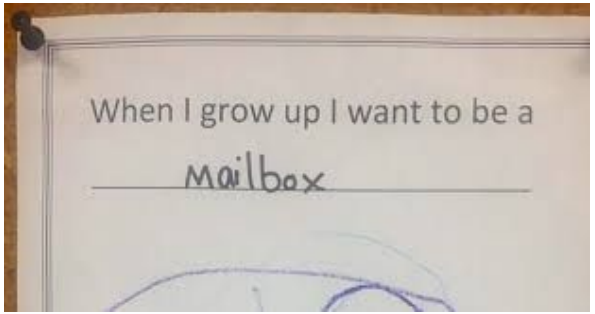
BIONIC PORCUPINES

RANK	TEAM NUMBER / NAME	HIGHEST	ROUND 1	ROUND 2	ROUND 3
1	3553 - Bionic Porcupines	632	441	632	304
2	19034 - Junkyard Dawgs	617	521	297	617
3	122 - Rejecting Reality	612	612	512	341

Set goals and make a timeline

- Have the team set goals to decide what they want to accomplish this season
- List everything the kids can think of that needs to be done and when it needs to be done in the season
    - Go through all three areas: Robot, Core Values, and Project
- Remember you are going to lose most time from mid-November to early December due to Thanksgiving break
- Try to include a scrimmage as it will motivate the team to get things working earlier, give ideas and excitement for the rest of the season





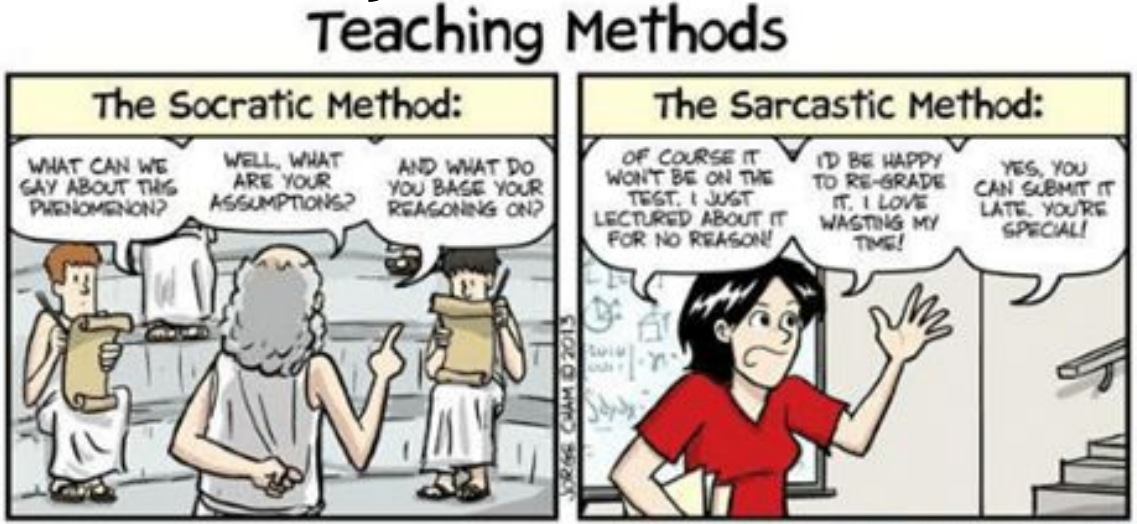
Project Manage & Get Out of the Way

Be a Good Manager

- Kids do the Work, Not the Grind

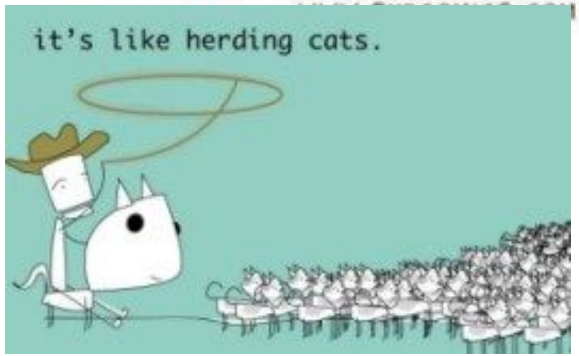
Be a Good Rubber Wall

- Learn the Socratic Method



Know When to Shut Up

- If it is the right direction, then they do not need directions



Prepare and Follow-Up

- For every hour kids put in practice, coaches have several before & after
- Know the Equipment and/or Learn with the Kids

Picking the Project - Wisely



Project development is a mysterious process

1. Is there a (potential) champion
2. Is the project innovative
3. Is the project buildable, programmable
4. Is the project testable
5. Can the project be broken out fairly to the team
6. Does the project have a “hook or Wow” factor
7. How would the project be shared
8. Does the team find this exciting



Core Values

- Different kinds of activities
  - Physical/building
  - Choosing
  - Taking directions
  - Puzzle
- Try to do an activity at least once a week, and break it down afterword

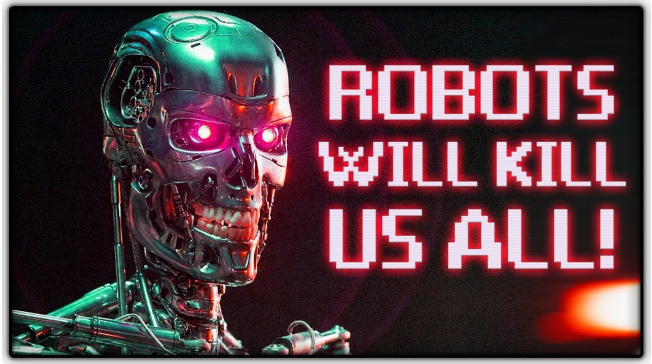
Work the robot game with small teams

There are limited robots, game mats, LEGO pieces, and computers. Some kids won't be able to work effectively (and then they'll distract those who were working). What to do?

- Have the kids split up into small groups of two or three
- Each group can be entirely in charge of the attachments and programming for their mission
- Each group gets to run their robot run in competition (assuming there's time for their robot run)
- Any group of less kids get more done

(Coach's role: make sure kids don't take apart or interfere with what any other group is doing)



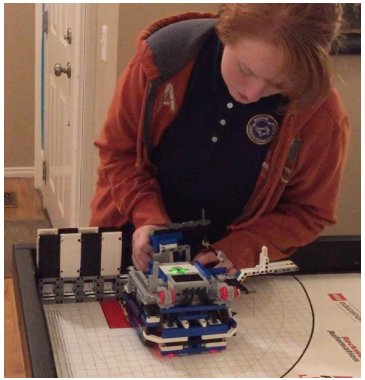


Robots are teenagers

They have personalities, don't always do what you want and are moody

1. Identically built robots will perform slightly differently (they're toys)
2. Variation exists among identical types of sensors
3. Motors wear out over the course of a season
4. Rubber wheels wear out over the course of a season
5. Wires pull out (and you don't know it)
6. Batteries affect robot performance, motors and EV3
7. Running the same program 10 times and observe the difference
8. Explore the failure modes in each mission, use slo-mo on camera



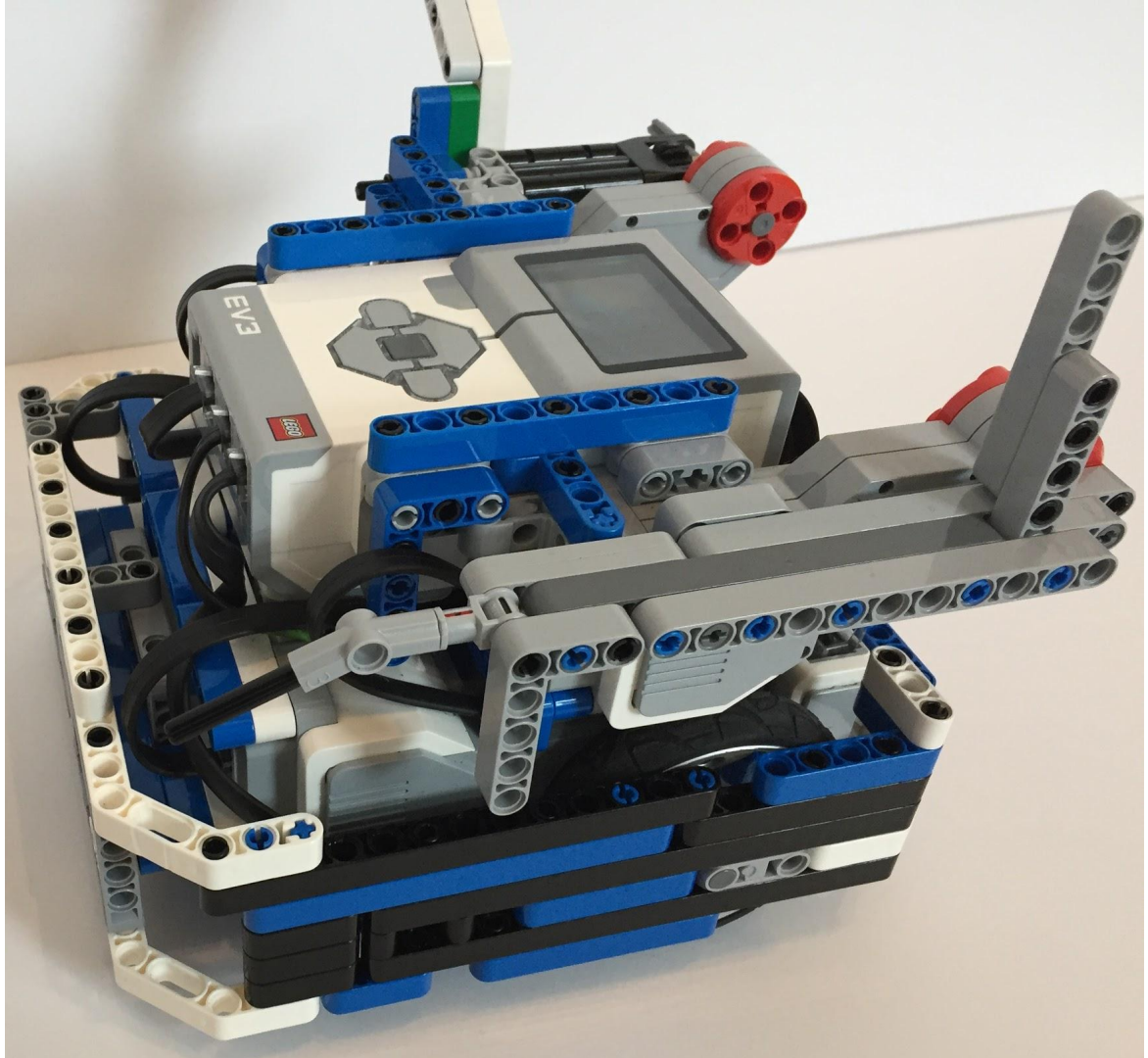


Mechanical Design

- Symmetrical design helps robot drive straight
- Simplicity so the robot only has x things that can break
- Stability helps with the robot not falling apart and only the parts that are supposed to move will move
- Flat front, back and sides (wheel guards) to quickly place robot in desired position and be able use walls for aligning and riding
- Keep the end in mind for sensor and attachment placement

Bpiii

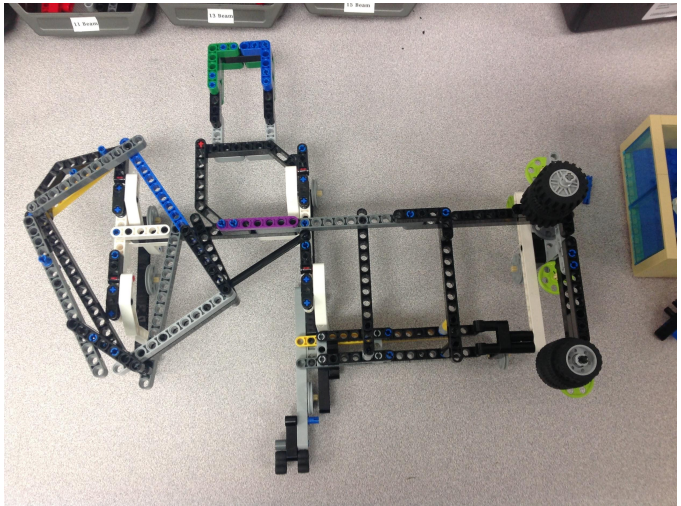
An example:

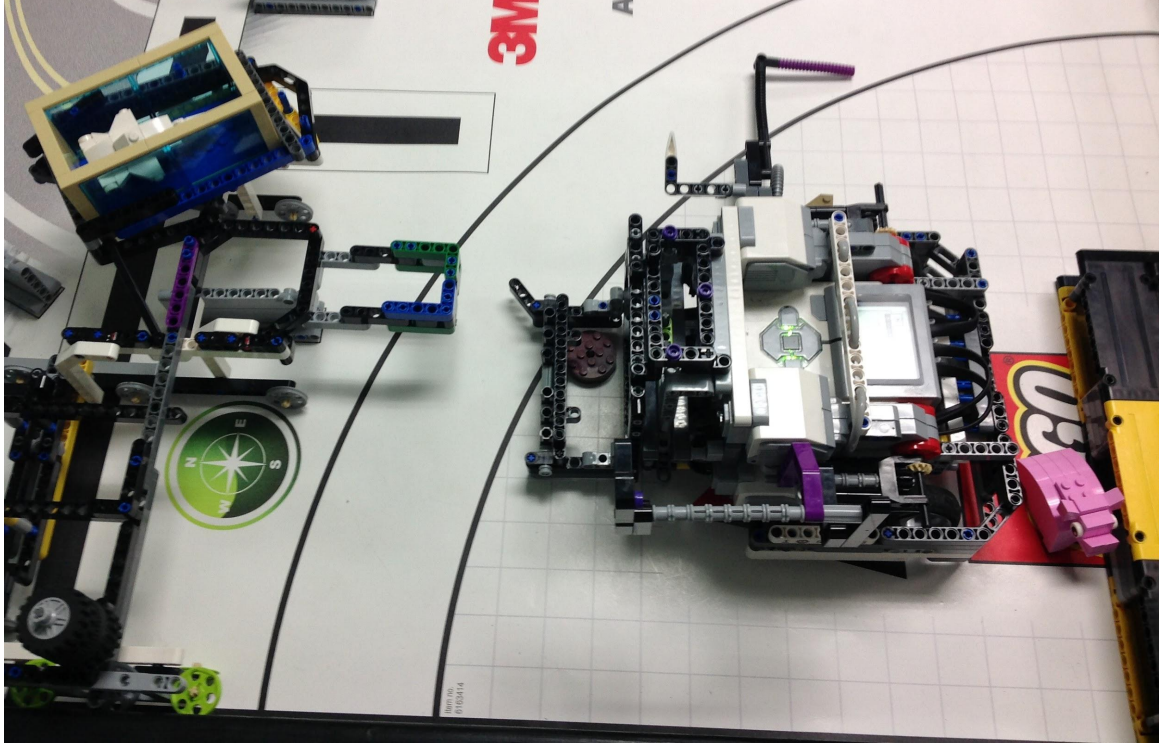


Carts Design

Useful for:

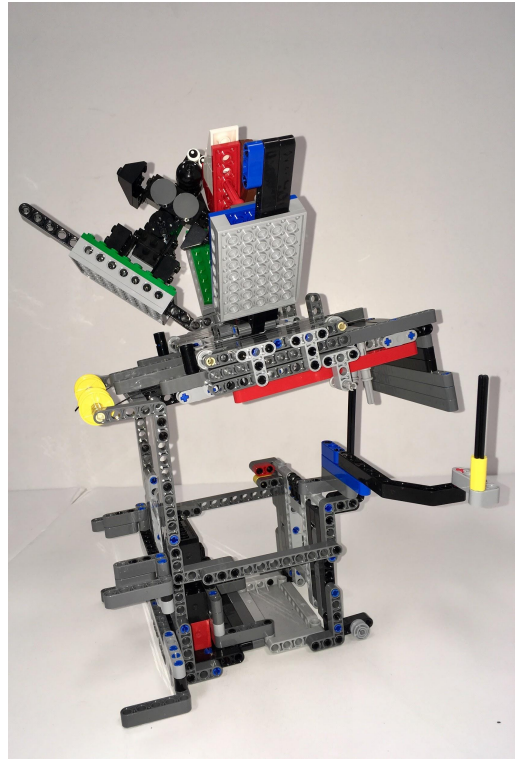
- Reaching difficult areas
- Very specific movements
- You can leave it there





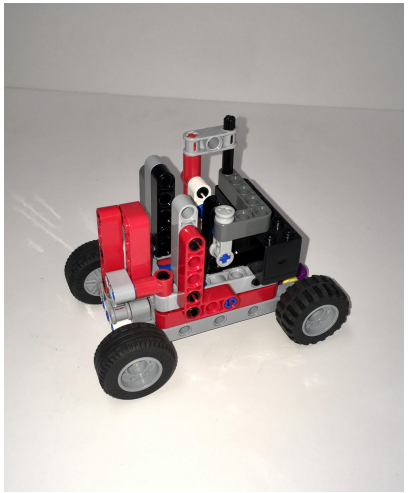
Carts Design - Important things

- Sturdy and simple
- Don’t overuse (Some things are done better on the robot)
- Usually use wall as a rail

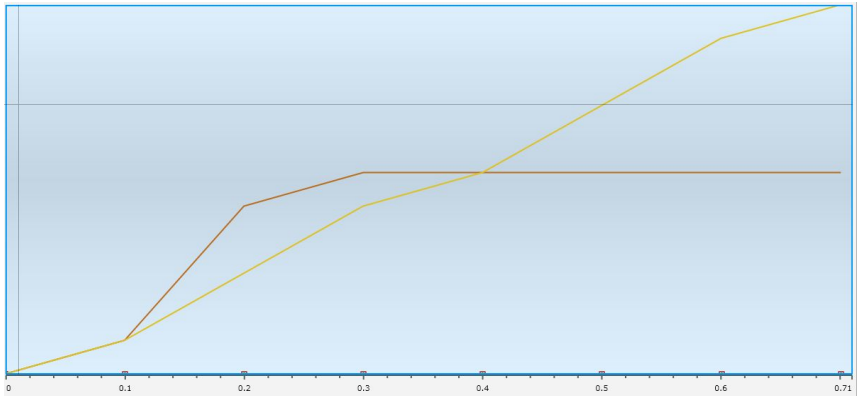


Self propelled cart

(Uses rubber bands wrapped on an axle)->



Programming



- Degrees over rotations, for better precision
- One-wheel turning
  - Data logging to the right
  - The more the line goes up, the more the wheel that is supposed to stay still didn't stay still
  - Yellow was a move steering block, with the steering value set to 50. It is the most inconsistent
  - Orange is a move tank with one wheel moving and one not moving
  - The color you can't see, because it is so consistent, is a large motor block, only running one motor


B + C
0
50
360

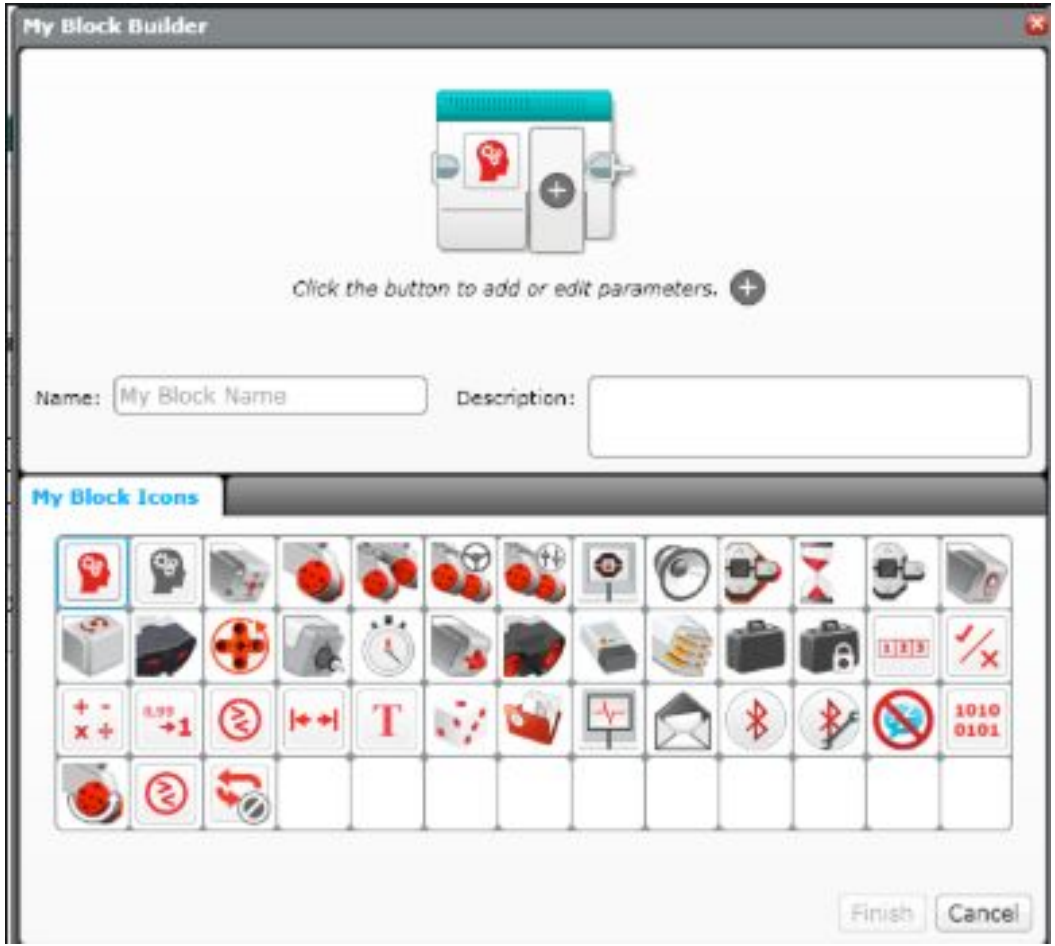

B
50
360

Sensors

- Gyro
  - Turning
  - Driving straight
- Touch
  - Running into walls
  - Starting programs
- Color
  - Line finding
  - Line following
  - Line aligning
- Ultrasonic
  - Stop before wall
  - Follow with wall
- Basic how-to
  - Turn on movement
  - Wait for sensor
  - Turn off movement

MyBlocks

- Find line
- Line following
- Gyro reset
- Gyro turns
- Gyro straight
- Master program
  - Make every run a MyBlock



Practice like you qualify, Qualify like you practice

Minimize the kids apprehension and uncertainty during the qualifier

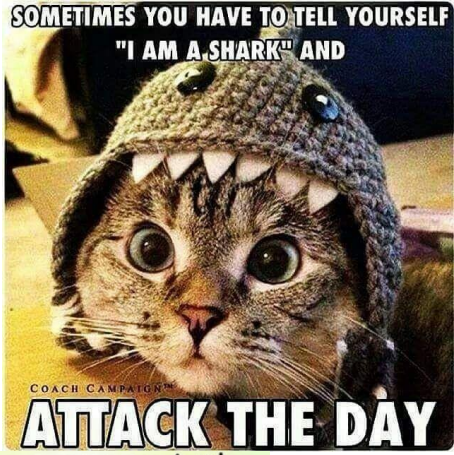
1. Project and robot “freeze” well before the event
2. Pre assign roles and responsibilities
3. Have the team use checklists
4. Check the competition tables for how mat condition is and model condition
5. Practice changeouts of robot attachments and transitions so you know what the team can do in 2:30 minutes
6. Ensure the kids know where they need to stand and move during robot runs and project presentation, choreograph movement (room entry, starting presentation)





Be memorable and stay loose

- Cheer and be enthusiastic when you come in
- Introduce yourselves when you walk in
- Don’t worry when you flub lines, just roll with it
- Do a focusing or energizing game before you go in (theater games work well)
- Practice being in front of judges and walking into the room
- Do a lot of team cheers!!!
- Lots of fun roles (Chooserer, time lord, clock person)
- Be as close to the judges table as you can (It seems really weird, but it works)
- Don’t be shy, the judges want to hear from you
- Dare to be weird!





We all need some encourage-mint from thyme to thyme 😜

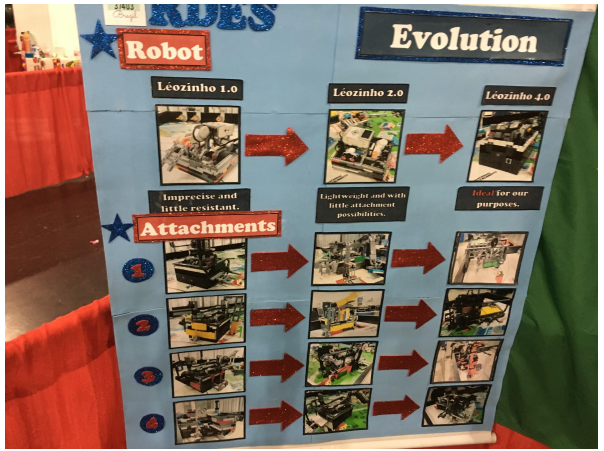


Make it easy for the judges

Your season boils down to a few minutes of terror for a coach

1. Judges frequently do not have much experience with the specifics of the current season
2. Read the rubrics and rules
3. Ask for clarification of rules
4. Ensure your presentations address all rubric elements (match against the rubrics)
5. Give the judges summary sheets
6. If you have a novel mission scoring approach, talk to the judges before the match
7. Be a Judge and Learn





It's Competition Day - Release the team, months of work in half a day

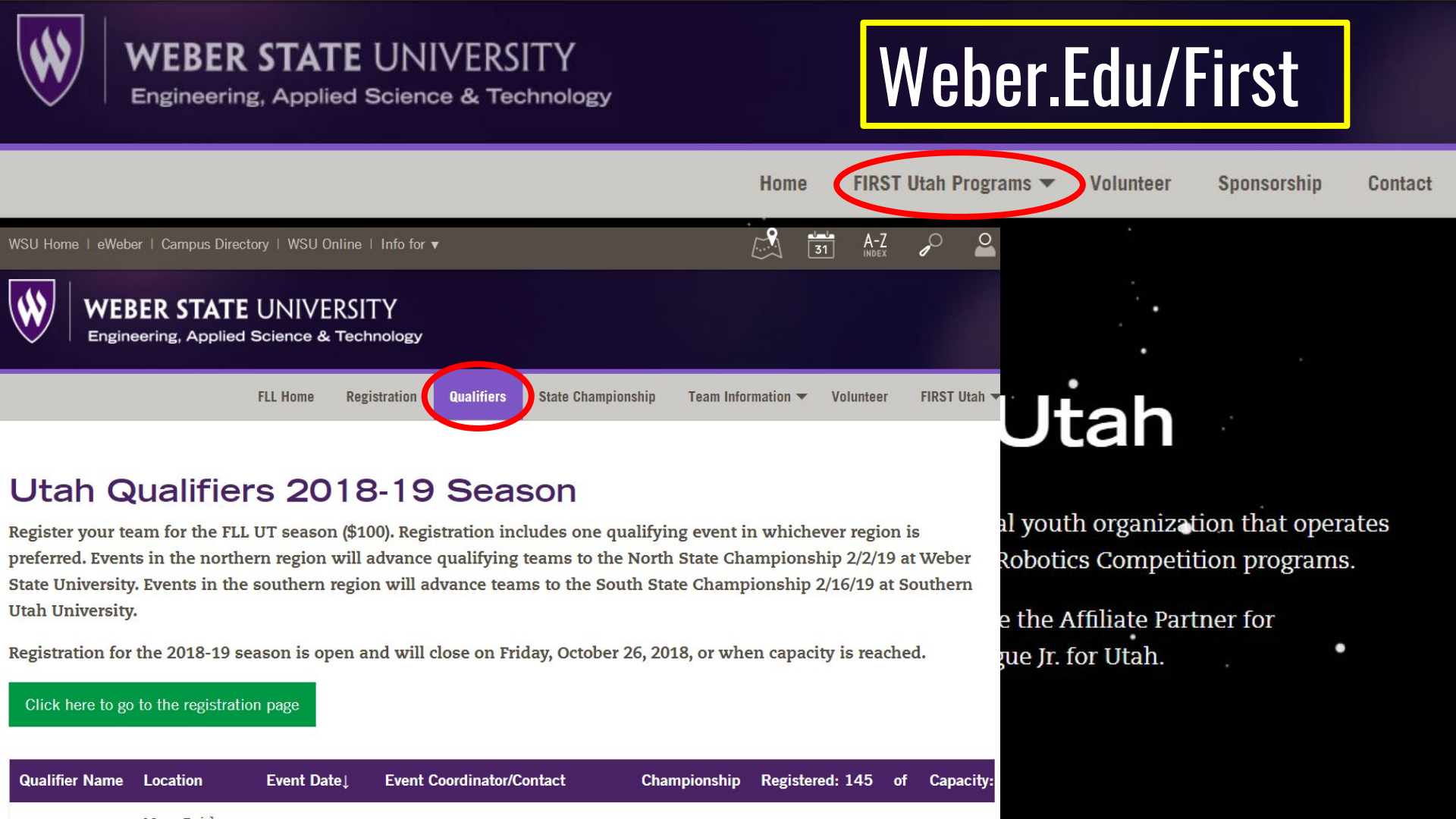


1. Coaches are NOT allowed to do pretty much anything . . . except watch, cheer, and USE core values.
2. Know how to move your robot and project items (cart)
3. Minimize changes to robot and project on qualifier day
4. Encourage your team to talk to other teams
5. Have a giveaway something for other teams, and judges remember you by (state?)
6. Have a checklist of what to bring to the qualifier
7. Keep sharing, offer programming tips, robot design explanation, project skit methods to other teams that goes hand in hand with talking, and learning about other teams
8. Prepare a cheer, banner, story about team (have the kids do this, just instruct them to)



Resources

- firstinspires.org
- ev3lessons.com
- weber.edu/first/fll/default.html
- Facebook Groups
  - Utah FLL Coaches & Mentors
  - FLL Share & Learn
- Tutorials integrated with EV3 programming software
- https://forums.usfirst.org/forum/general-discussions/first-programs/first-lego-league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Weber.Edu/First
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FIRST Utah Programs
Volunteer
Sponsorship
Contact
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Registration
Qualifiers
State Championship
Team Information
Volunteer
FIRST Utah
Utah
al youth organization that operates
Robotics Competition programs.
e the Affiliate Partner for
gue Jr. for Utah.
Utah Qualifiers 2018-19 Season
Register your team for the FLL UT season ($100). Registration includes one qualifying event in whichever region is preferred. Events in the northern region will advance qualifying teams to the North State Championship 2/2/19 at Weber State University. Events in the southern region will advance teams to the South State Championship 2/16/19 at Southern Utah University.
Registration for the 2018-19 season is open and will close on Friday, October 26, 2018, or when capacity is reached.
Click here to go to the registration page
Qualifier Name
Location
Event Date
Event Coordinator/Contact
Championship
Registered: 145 of Capacity:







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Ask about joining team
contact sheet