WELCOME TO FTC!

Rookie Best Practices

September 8, 2018

FTC Team 9901 Techie Titans Manassas, VA

AGENDA

- Introduction
  - FTC overview
  - Season Calendar
  - Last season's FTC game video
- Tips and Best Practices
- Q&A and Robot showcase

INTRODUCTION AND OVERVIEW

ABOUT US

Team 9901 “Techie Titans”

- A 4th year FTC team from Nova Labs Robotics (Reston, VA)
- In our past seasons, we competed at States each year and also at Super-Regionals 2 times
  - ***2015-16 rookie season:*** VA state - Inspire Award 2nd place
  - ***2016-17:*** VA state - Connect Award 1st place & Finalist Alliance (Division winner)
  - ***2017-18:*** Competed at VA state championship

FTC OVERVIEW

- **FTC is more than robot build**
  - Designing, building, and programming robots
  - Outreach, documentation, fundraising, and connecting with others
  - Competition in alliance format
- **Age group:** grade 7-12
- **Team size:**
  - 3 - 15 students
- **Adult mentor/coach:**
  - 2 coach/mentor (both need to pass Youth Protection)
  - Additional mentors / parent volunteers for team support

SEASON CALENDAR

1. **FTC Kickoff:** Sept 8, 2018
2. **Team registration and tournament registration:** Sept - Oct
3. **Qualifying Tournaments:** Nov – Jan
   - You can go to multiple tournaments in VA (2, may be even 3)
   - Also to more than 1 State (VA, MD, PA, etc. - if the State allows)
   - Teams advance to State Championship (through robot game & award categories)
4. **State Tournament:** Feb (*Richmond, VA)
   - Teams compete to advance to SUPER-REGIONAL championship
5. **WORLD championship:** April (*Detroit, MI)

FTC game video from last season

https://www.youtube.com/watch?v=7Wc1LhG2FEs

- General rules
- Season-specific game rules & Scoring
  - Autonomous period (first 30 sec)
  - Driver-controlled period (next 2 minute)
    - Last 30 seconds of driver-controlled period is End game

TIPS AND BEST PRACTICES

TIPS AND BEST PRACTICES

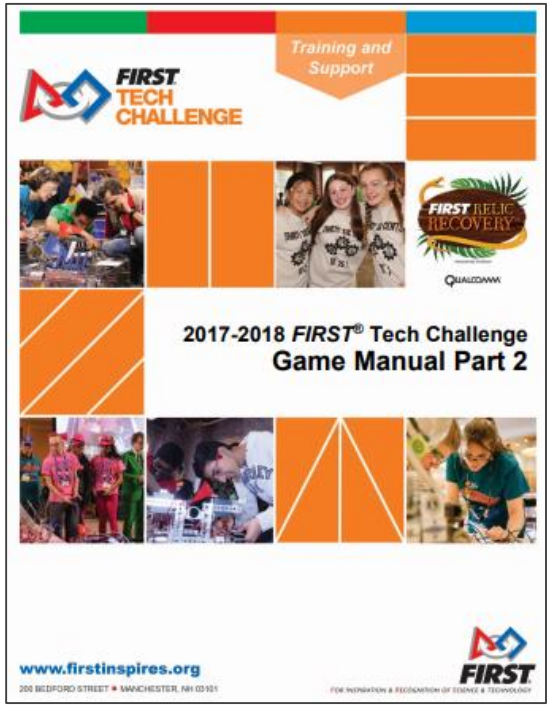
- **Safety first**
  - ➢ Power tools, heavy machines, and even untested robots can cause injury
  - ➢ Safety glasses
    - Wear them - during build, practice & tournaments
  - ➢ Watch for sharp edges and Pinch points
  - ➢ You are responsible for your own safety
  - ➢ Monitor safety practices & use common sense
  - ➢ Have a First-Aid kit handy

TIPS AND BEST PRACTICES

- **Read Game Manual Part 1 thoroughly**
  - ➢ Robot rules (mechanical, electrical, software)
  - ➢ Robot inspections
  - ➢ Judging & Awards
  - ➢ Tournament & Game rules
  - ➢ and more…

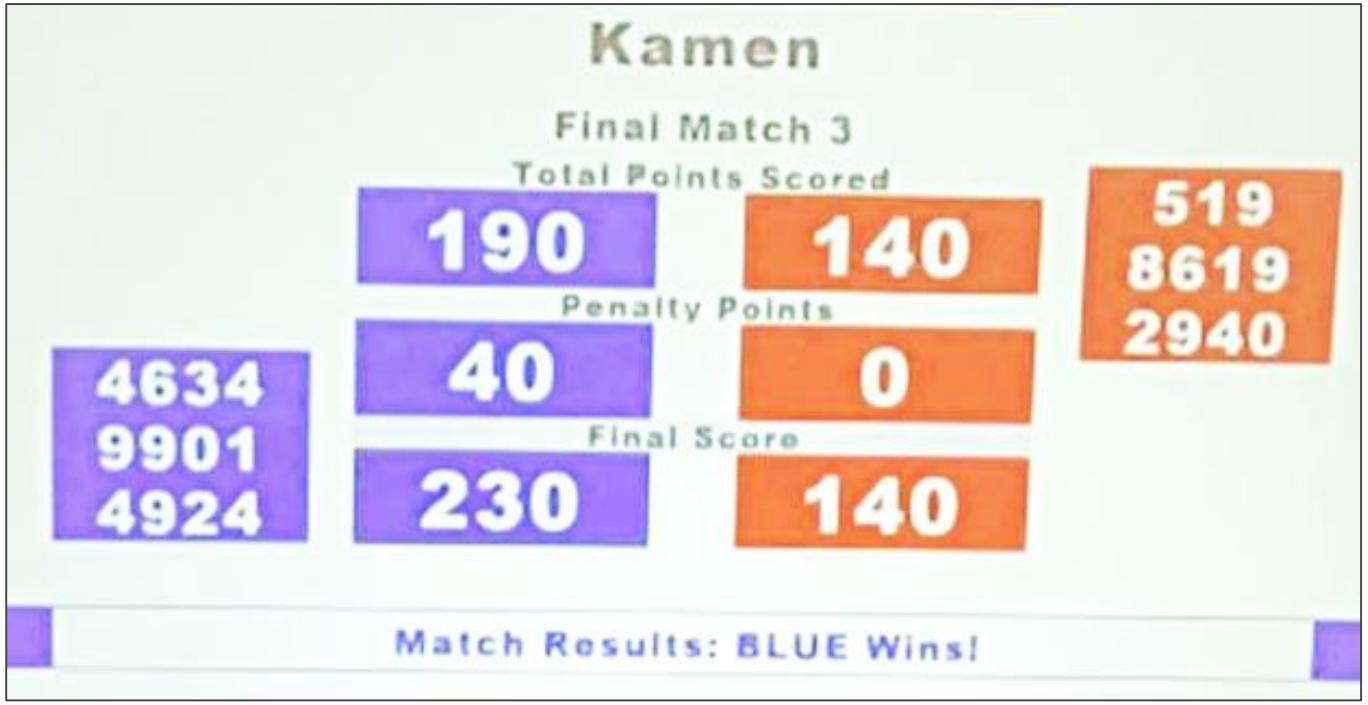
TIPS AND BEST PRACTICES

- **Understand the game requirements** (Game Manual part 2 - will be released today)
  - ➢ Scores
  - ➢ Penalties
  - ➢ Don't forget the one-page game description



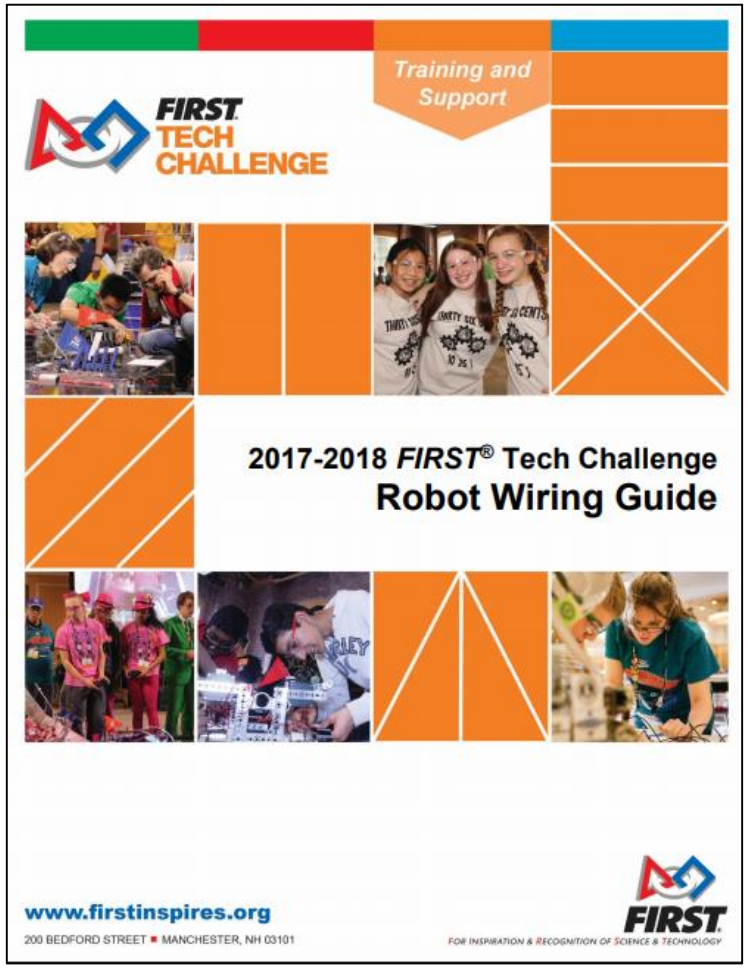
TIPS AND BEST PRACTICES

- **Again, understand the Penalty rules and scenarios**
  - ➢ Be sure to read FTC forum



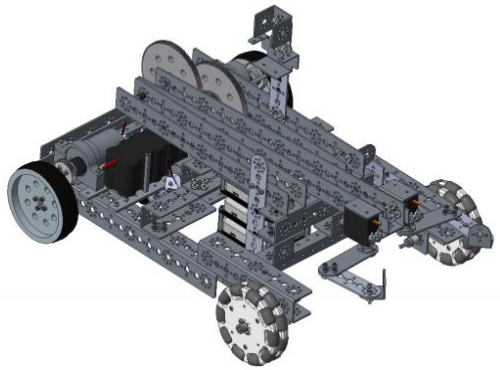
TIPS AND BEST PRACTICES

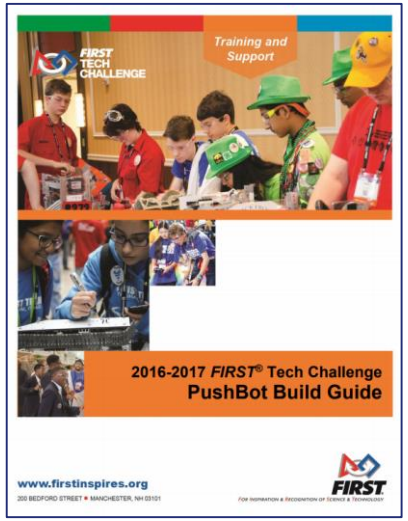
- **Read the Robot Wiring Guide**
  - ➢ Detailed instructions for properly wiring Robot
  - ➢ Common problems
  - ➢ Wire management tips

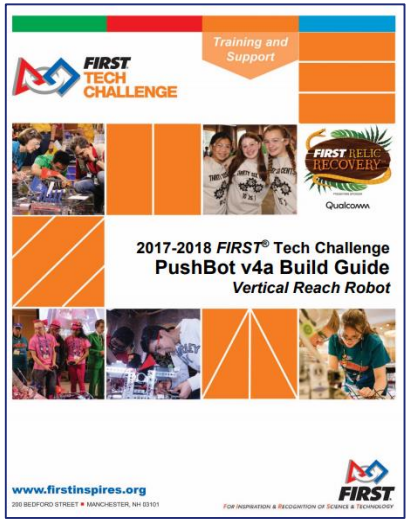


TIPS AND BEST PRACTICES

- **Build a PushBot / Basic Bot**
  - ➢ Intended for Rookie teams to build a simple competition-quality robot
    - Multiple versions of build guide exist
  - ➢ Provides simple, basic instructions and images to -
    - build the robot
    - configure phones
    - set up Programming environment







TIPS AND BEST PRACTICES

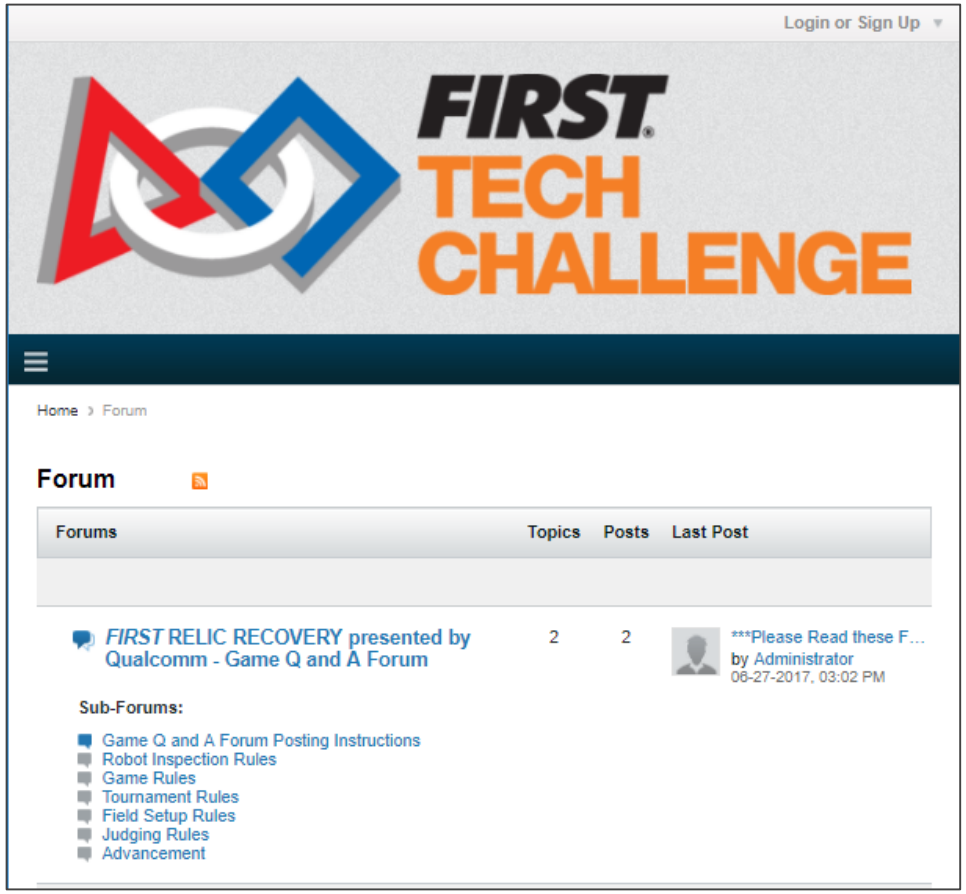
- **Read the FTC Forum Q&A**

  http://ftcforum.usfirst.org/forum.php

  - Anyone may view questions and answer
  - To submit a question, you must have a unique User Name & Password for your team
  - Assign one person to check it weekly

Unofficial forums:

- https://www.chiefdelphi.com/forums/ [Other -> FIRST Tech Challenge]
- https://www.reddit.com/r/FTC/

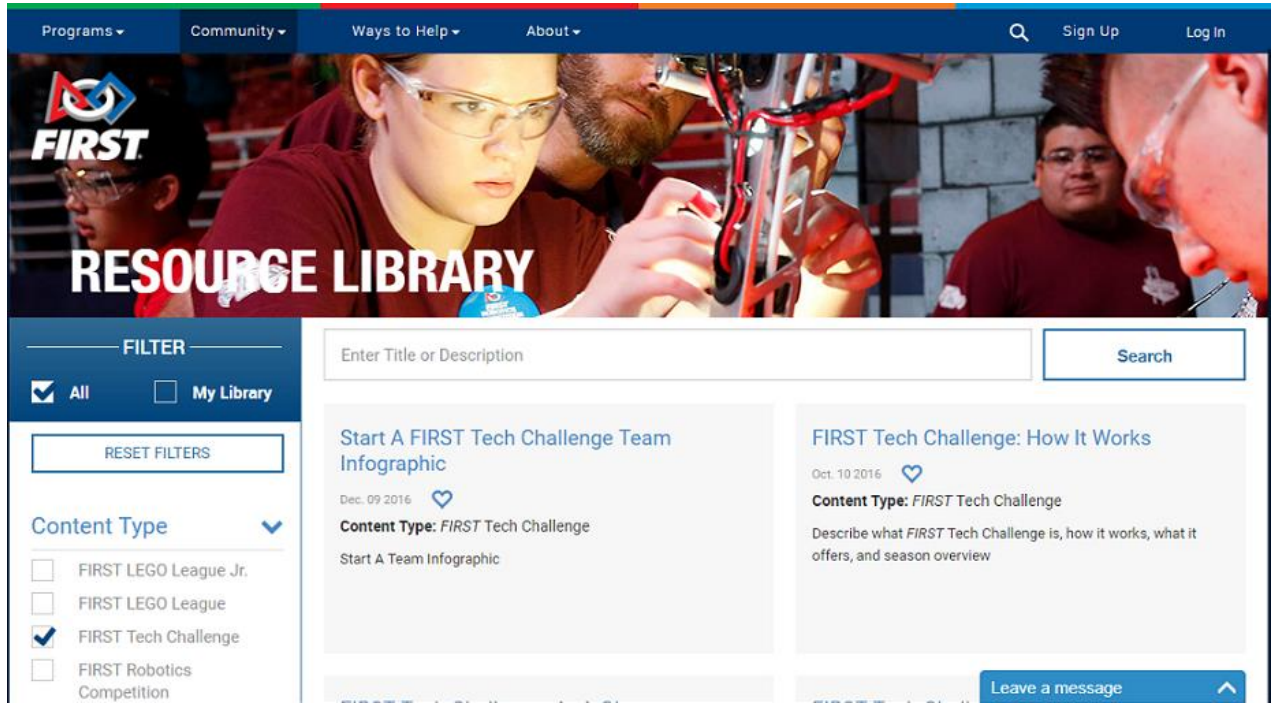


TIPS AND BEST PRACTICES

- **Know the FTC Resource Library**

https://www.firstinspires.org/resource-library

- Game & Season Materials
- Team Management Resources
- Robot Building Resources
- Fundraising Resources
- Programming Resources
- Preparing for Competition



TIPS AND BEST PRACTICES

- **Divide the team in sub-groups**
  - ➢ Manage your time effectively
  - ➢ It always take more time than you think
  - ➢ Not everyone builds the robot
  - ➢ Have a drive team

- **Build and Programming**
  - ➢ Build prototypes with cardboard, foamboard & plastic
  - ➢ Work on programming in parallel
  - ➢ Test incrementally

TIPS AND BEST PRACTICES

- **Design Considerations**
  - ➢ Do few things well in rookie season (or maybe just 1 thing)
  - ➢ Don’t start with 18” cube frame
    - ▪ You’ll need space for attachment and add-ons
  - ➢ Consider defensive bumper & side guards
    - ▪ Remember, there will be 3 other robots on the field
    - ▪ Game elements can go under your chassis
  - ➢ Think about reliability, consistency of performance, & maintainability also
    - ▪ Keep it simple and Keep important structure accessible for repair

TIPS AND BEST PRACTICES

- **Testing**
  - ➢ Test each assembly and then test the final robot
  - ➢ Test each modification
  - ➢ A small change can cause a big side-effect
    - Think about possible effects before making change
  - ➢ Practice in realistic environment (field, perimeter, game element)
    - Especially if you are running Autonomous
  - ➢ Attend Scrimmages if possible

TIPS AND BEST PRACTICES

- **Tools**
  - ➢ Invest on tools
  - ➢ Search online for “Tools for FTC robot”
  - ➢ Remember tool and part names
  - ➢ Organize tools and parts
    - Otherwise, you will waste lots of time looking for parts
  - ➢ Color code tools for different sizes
  - ➢ Label your tools with your team #
  - ➢ Power tools

TIPS AND BEST PRACTICES

- Basic Tools for FTC

Ball-Point Hex Driver

Balldriver Hex Keys

TETRIX Wrench Set

Multi-Nut Pliers

5/16" Nut Driver

Needle nose pliers

Hacksaw

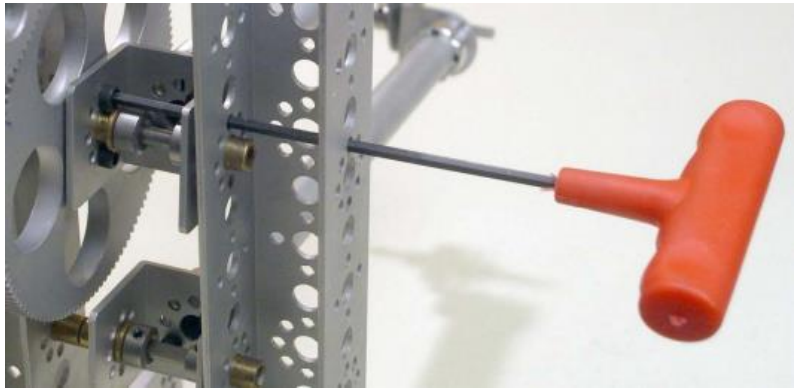
Metal File

Chain Breaker

Tube Cutter

TIPS AND BEST PRACTICES

- **Tools**
  - ➢ Long Allen wrenches can be very helpful for reaching tough places



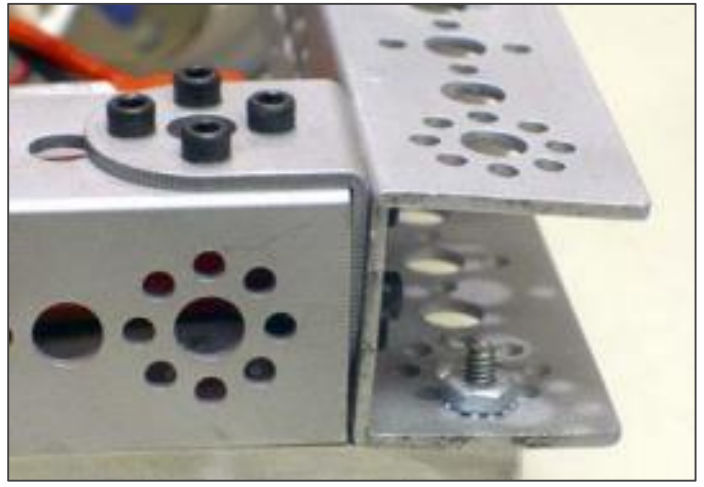
Courtesy: ORTOP.org

  - ➢ Tetrix/Pitsco “Multi-Nut Pliers” is very handy also

TIPS AND BEST PRACTICES

- **Robot Construction**
  - ➢ Make connections and joints strong
    - NOT using enough screws can bring more headache later

  - ➢ Avoid crooked construction
    - It looks sloppy, and unprofessional too



TIPS AND BEST PRACTICES

- **Kep Nuts**
  - ➢ *"Friends Don't Let friends Use Kep Nuts"* - Team #9929
  - ➢ Becomes loose easily with vibration/impact in competition
  - ➢ Ok for quickly building and attaching parts, but consider using *Nylon Lock* ("nyloc") before competition.

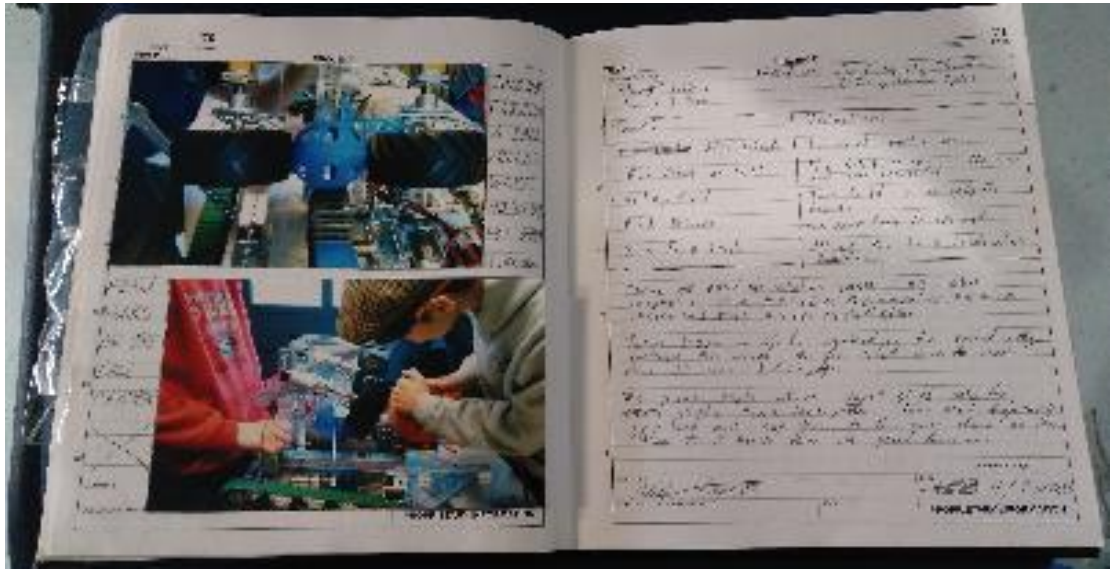
- **Managing ESD** (Electro-Static Discharge)
  - ➢ ESD can "freeze" your robot in competition
    - Other causes - loose Battery or Tamiya connections
  - ➢ Use ESD mitigation best practices and "Static spray"
  - ➢ Attend ***ELECTRONICS*** session

TIPS AND BEST PRACTICES

- **Parts order**
  - Think ahead. It takes time for shipping.
  - Can be out-of-stock also, especially in critical time

TIPS AND BEST PRACTICES

- **Update Engineering Notebook regularly**
  - Check the Guidelines on the Game Manual Part 1
  - Attend the **Engineering Notebook** session



TIPS AND BEST PRACTICES

- **Rookie season target**
  - ➢ Focus on learning
  - ➢ Be practical based on your team's size, experience, and available time.
- **Budget and Fundraising**
  - ➢ FTC is expensive. A typical Rookie season budget can be about $3,000
  - ➢ Apply for Rookie grant(s)
  - ➢ Seek corporate sponsorships and competitive grants
  - ➢ Attend the **FUNDRAISING** session

TIPS AND BEST PRACTICES

- **Tournaments**
  - ➢ Register ASAP when it opens
  - ➢ Consider competing in 2 tournaments
  - ➢ Leave time between them to revise your robot
  - ➢ Consider competing in other states (MD/PA) also
    - If time/budget permits

TIPS AND BEST PRACTICES

- **Competition Readiness**
  - ➢ Practice driving (a lot)
    - Again, have a drive team
  - ➢ Attend Scrimmages
  - ➢ Practice Judging interview as well

TIPS AND BEST PRACTICES

- **Competition Readiness**
  - ➢ Bring Team Roster, Inspection checklist
  - ➢ Make a checklist for parts and tools to pack
    - DON'T forget Engineering Notebook!
  - ➢ Be on time to tournament
    - Remember, it's going to be a long day (7am-6pm)

TIPS AND BEST PRACTICES

- **Have fun also**
  - ➢Team theme, slogan, logo
  - ➢Have some fun at break-time
  - ➢Celebrate milestones and accomplishments
  - ➢Enjoy yourself at tournaments
  - ➢Have great team spirit always!

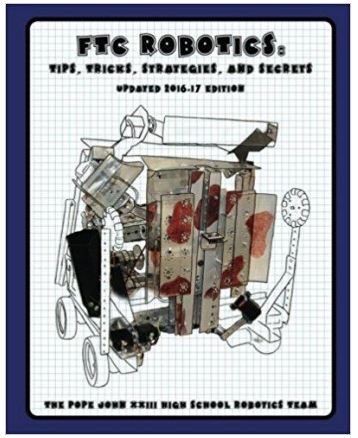
TIPS AND BEST PRACTICES

[For Mentors] Read the Mentor Manual

- Mentor's role
- Registration
- Team meetings
- Student role and responsibilities
- Season Planning tool
- Building Robots
- Tournaments
- Judging & Awards
- Community Outreach

LINKS

- https://www.firstinspires.org/robotics/ftc/start-a-team
- https://www.firstinspires.org/robotics/ftc/game-and-season
- https://www.firstinspires.org/resource-library
- https://www.firstinspires.org/resource-library/ftc/game-and-season-info
- https://www.firstinspires.org/sites/default/files/uploads/resource_library/ftc/2016-2017-season/pushbot-build-guide.pdf
- https://www.tetrixrobotics.com/sharedimages/resources/TETRIX_FTC_Set_PartsTable.pdf
- http://ftcforum.usfirst.org/forum.php
- http://roboplex.org/ftc/ftc-tools-tips/
- Book: *FTC Robotics: Tips, Tricks, Strategies, and Secrets: Updated 2016-17 Edition*



Q&A and Robot Showcase