FTC versus FRC Decision Guide for New Teams

How-to Guide
Written by FRC 6328

6328

MECHANICAL ADVANTAGE

LITTLETON MA

Overview

The purpose of this guide is to help new organizations decide between the FIRST Tech Challenge (FTC) and FIRST Robotics Competition (FRC). They are both incredibly rewarding STEM programs, but require vastly different resources and time commitments. Our goal is to give you an overview of both programs as well as some key differences, so you can pick the best FIRST Program for your organization. This will set your group up for long-term sustainability.

FIRST Tech Challenge

FIRST Tech Challenge, or FTC, is the FIRST program for 7th-12th graders. The FTC game is released in September each year, and the design and build season runs September to January. Competitions can start as early as October and run through April. Teams meet at least once a week during the build and competition season.

Robots are about the size of a microwave oven and are constructed from a standard kit of robot parts as well as custom parts that meet the game and robot rules. Teams should also have 2 or more adults mentors on the team.

FIRST Tech Challenge

FTC Teams need a workspace, such as a classroom, to build their robots, with a 12’ by 12’ open area to serve as the field. You should plan on buying these tools as well:

- Dremel tool or disk sander
- Hex keys
- Hand drills
- Small screwdrivers
- Tape
- Tie wraps
- Wrench metric set
- Wrench SAE set
- Zip ties
- Laptops
- Power strips
- Allen wrenches/T hex keys
- Ball hex screwdriver
- Band saw
- Bench grinder
- Belt sander
- Chain breaker
- Deburring tool
- Drill press
- Drum sander
- Hack saw
- Jigsaw
- Metal file
- Needle Nose Pliers
- Nut Driver
- Sheet metal bender & break
- Table saw
- Vise

Example of an FTC Field

FIRST Tech Challenge

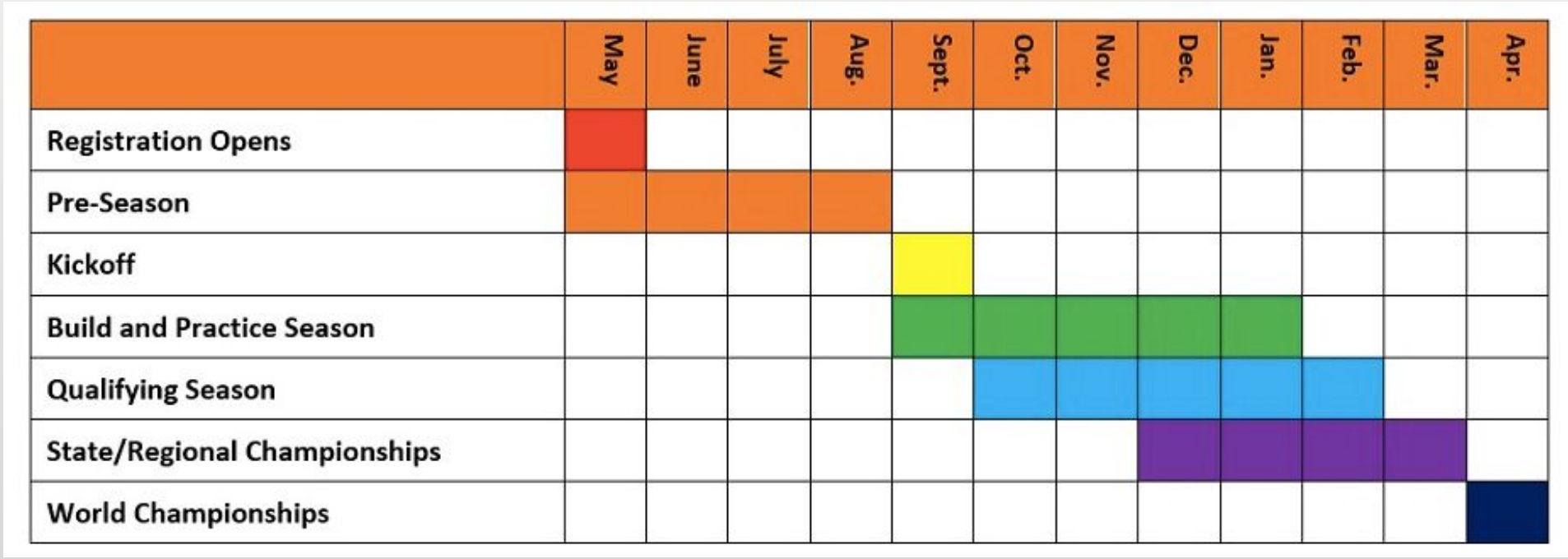
It can cost from $1,000-$5,000 to start an FTC Team. The table below shows the major costs:

Item	Cost
Competition Set	$580
Control & Communication Set	$265
Electronic Modules & Sensors Set	$150
Registration Fee	$275
Qualification Tournament Registration Fee	$150 per event
States Registration Fee	$200
Team Shirts	$300-$500+
Tools & Robot Parts	$500-$1000+
Travel Costs	Varies based on events team attends

There are grants available for FTC teams to help with these costs. Teams can also hold fundraisers (carwashes, bake sales, pasta dinners, etc.)

FIRST Tech Challenge

Here is an overview of the FTC season schedule.



	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Registration Opens												
Pre-Season												
Kickoff												
Build and Practice Season												
Qualifying Season												
State/Regional Championships												
World Championships												

FIRST TECH CHALLENGE

FIRST Robotics Competition

FIRST Robotics Competition, or FRC, is the FIRST program for 9th-12th graders. The FRC game is released in January every year. Previously, FRC teams would only have 6.5 weeks to build a robot from scratch, but since 2020, teams are able to work on their robots right up until competition. At competitions, teams compete on alliances of 3 teams each (6 teams on the field at once).

Robots are 120 pounds and have ranged from 2-6 feet tall depending on the game. The robots are made from custom of the shelf parts as well as parts teams design and manufacture. Machine shop power tools are required to build FRC robots. FRC teams should have a minimum of 2 adult mentors, but it is recommended to have more than 2.

FIRST Robotics Competition

FRC teams need a large meeting space to build their robot. Some teams work out of classrooms at schools, while other teams work at donated space at local companies. Teams will need access to power tools and a machine shop. Common machines that teams use are drill presses, bandsaws, table saws, mills, lathes, CNC routers and CNC mills. Some teams also use equipment at local companies, such as water jets and sheet metal manufacturing machines.

Teams also need access to computers to run CAD and programming software.

These tools are critical for FRC teams to have:

- Allen wrenches/T hex keys
- Metric & SAE wrenches
- Zip ties
- Hand drills
- Impact driver
- Clamps
- Electrical crimpers
- Wire cutters
- Screwdrivers (ball hex, Philips head)
- Band saw
- Bench grinder
- Belt sander
- Chain breaker
- Deburring tool
- Drill press
- Drum sander
- Hack saw
- Jigsaw
- Metal file
- Needle Nose Pliers
- Nut Driver
- Table saw
- Vise

FIRST Robotics Competition

It can cost $30,000+ to start an FRC Team. Depending on what area the team is in, the team will either attend regional events or district events. The cost of both type of registrations are listed in the table below. There are rookie team grants available to help with these costs , but all FRC teams need to recruit corporate sponsors to remain sustainable.

Item	Cost
Rookie Team Registration Fee (includes kit of parts and 2 district event registrations or 1 regional)	$6000
Additional Regional Registration	$4000
Additional District Registration	$1000
District Championship Registration	$4000
World Championship Registration	$5000
Tools	$1000-$5000+
Robot Parts	$2,000-$10,000+
Travel	Varies depending on events team goes to
Team Shirts	$500
Printing/Outreach Materials	$300

FIRST Robotics Competition

Here is an overview of the FRC season schedule. As you can see, FRC is a year-round activity, as the offseason is a busy period for many teams.

- **May-December:** Offseason [technical training meetings (CAD, mechanical design, programming, machining, etc.), community outreach, fundraising, corporate sponsor recruitment, student recruitment, mentor recruitment]
- **January:** Kickoff (game released for the season) & build season begins
- **Late February – Early April:** District & Regional Competitions
- **Early – Mid-April:** District Championship Events
- **Mid-Late April:** World Championship Events (Houston & Detroit)

Similarities

- You build and program custom robots in both FTC & FRC
- Work with adult mentors
- Learn engineering, project management & teamwork skills
- Participate in community outreach events
- Participate in local, regional & world-level competition events
- Compete on alliances at events (FTC: 2 robots per alliance, FRC: 3 robots per alliance)

Differences

- **Cost**
  - FTC is far less expensive than FRC
- **Resources**
  - FRC requires a lot more resources than FTC
    - ***Time:*** FRC is year-round for many teams, during main season meet multiple times a week, FTC teams meet less frequently
    - ***Space:*** FRC requires larger space and access to industrial machining tools, FTC can easily function out of a classroom or basement with a basic set of tools
    - ***Number of Mentors:*** Need more mentors on FRC team than FTC
    - ***Number of Students:*** FRC Teams are typically larger than FTC Teams
- **Ages**
  - FTC can run through middle & high school; FRC is intended for high school age students only

Making the Decision

It can be difficult to decide which of these FIRST programs is right for your organization, so evaluating resources and time commitment is important when deciding. At the end of the day, **they are both incredibly inspiring STEM programs that will teach your students engineering skills as well as critical life skills.** The most important question to ask yourself is which program will be most sustainable in the long-term? You want to see your team thriving for years to come. If you are unsure about being ready for the scale of FRC, we recommend starting with FTC. Your team can always decide to transition to FRC at a later time when the team has a solid foundation set.

Additional Resources

Start an FTC Team Checklist:
https://www.firstinspires.org/sites/default/files/uploads/resource_library/ftc/start-a-team-checklist.pdf

Start an FTC Team Basics:
https://www.firstinspires.org/robotics/ftc/start-a-team

Start an FRC Team Basics:
https://www.firstinspires.org/robotics/frc/start-a-team

FRC Pricing & Payment:
https://www.firstinspires.org/robotics/frc/pricing-and-payment

FIRST Resource Library:
https://www.firstinspires.org/resource-library

FRC 6328 Team Resources:
http://littletonrobotics.org/about-m-a/resources/

Need more information? Feel free to email info@littletonrobotics.org with any questions you have.