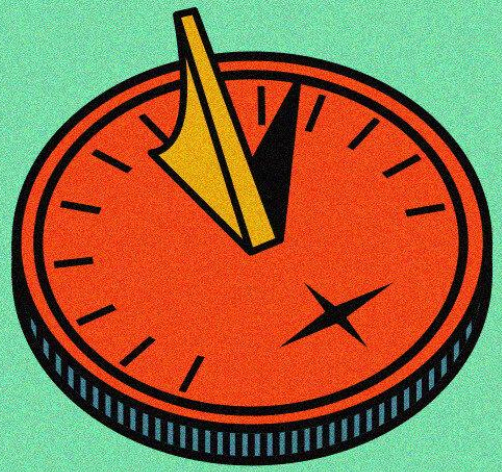
FIRST®

AGE™

PRESENTED BY Qualcomm

2025 NM FTC KICKOFF

FIRST TECH CHALLENGE | FIRST AGE presented by Qualcomm



DECODE™

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Designing & Building Basics

Presented by Gear Masters #10348

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Sept 6, 2025

Designing & Building Basics

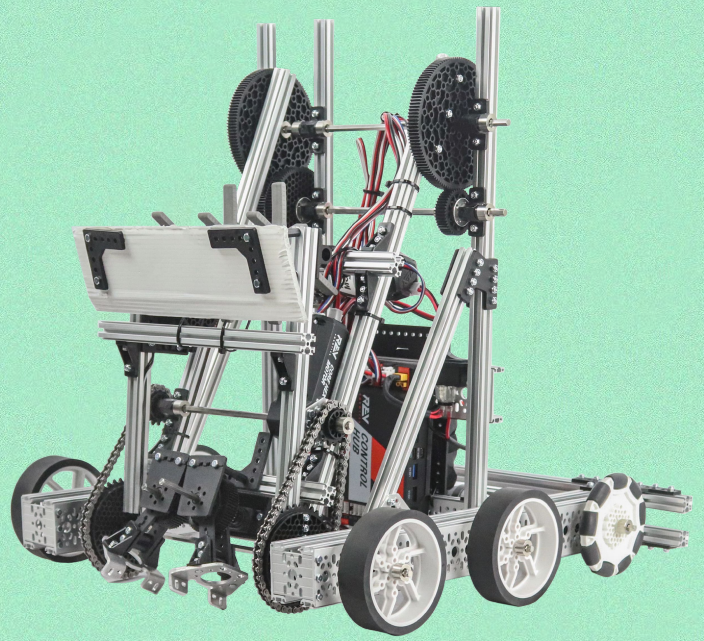
Design – Where Do We Start?

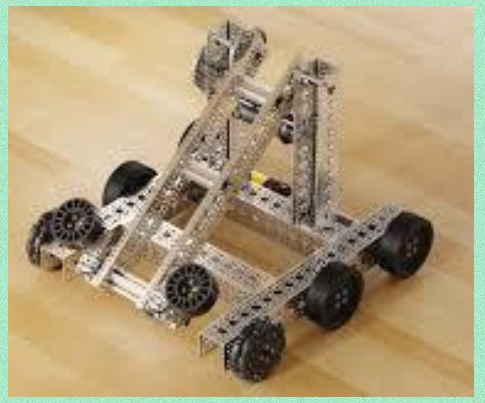
- Brainstorm
  - Strategy – What are you going to try to accomplish? Which parts of the challenge will you prioritize? What will your robot do in Autonomous, End Game, the rest of the match? How will your robot complement other robots?
  - Overall Design – What will you need to accomplish your strategy? What kind of mechanisms will we need? What kind of chassis and special considerations do we have?
  - Chassis – Drive Base (2 or 4 wheel drive, omni wheels, mecanum wheels)
  - Subsystem Design – What systems will be need to complete our strategy?

Designing & Building Basics

Starter Bots

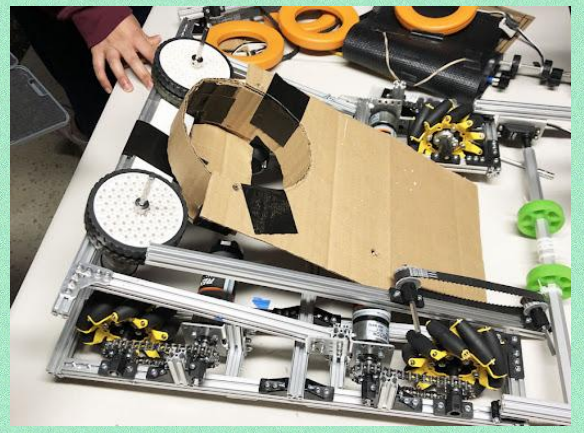
- Rev
- Tetrix
- GoBilda
- Robits
- Previous Years' Designs
- Previous Years' Videos
- Robot in 3 Days (RI3D)





Designing & Building Basics

Prototyping



- Chassis – Base for your robot and the rest of your design
- Subsystem Design – How your robot actually completes the challenge components
- Sketching – Visualize your ideas to think through issues and share your ideas with other
- Prototype – You can start building prototypes to try your ideas. FTC build systems are great for experimenting and quickly building prototypes. Learn and build multiple prototypes or iterations to find the best solutions.
- CAD (TinkerCAD, OnShape, Fusion 360) – Computer Aided Drafting can be used to design your robot, and design 3D-printed parts. Beginners can get started with TinkerCAD, and more advanced users can use sophisticated systems like OnShape to design their entire robot.
- Documentation & Collaboration (Google Drive, Padlet)
- Photos – It's important to document your engineering journey. Take pictures often!

Designing & Building Basics

Building Systems

- Rev
- GoBilda
- Studica
- Robits (AndyMark)
- Tetrix

Designing & Building Basics

Custom Parts and FTC Limitations

- FTC Legal parts (https://ftc-resources.firstinspires.org/ftc/game/manual)
- COTS (Commercial Off-the-Shelf parts) - Single degree of mechanical freedom (DoF)
- Custom Parts
  - 3D Printing
  - Metal (CNC, waterjet, hand-cut)
  - Wood
  - Plastic parts
- Pre-built parts/kits/systems
- Motors, servos, sensors, and electronics

THANK YOU!

If you have questions, please reach out through our coach at:

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