



**FIRST**  
**TECH**  
**CHALLENGE**

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October 2020 Update v4

ULTIMATE GOAL<sup>SM</sup>  
presented by Qualcomm:  
Season Guidance for  
COVID-19 Interruptions

*FIRST*<sup>®</sup> is a global robotics community that prepares young people for the future.



For 31 years, *FIRST* has been a thriving robotics community that prepares children of all ages, all over the world, for the future. During these uncertain and challenging times, we are committed more than ever to delivering the life-changing experiences our programs offer to young people. We're doing our best, like all of you, to stay up to date on the rapidly evolving impacts of the pandemic while planning for the future. Everyone at *FIRST* is working hard to anticipate and navigate the uncertainties to ensure we'll be able to provide every participating team a valuable and enjoyable experience, regardless of learning environment this season.

Thank you for joining us as we explore new and exciting ways to deliver our programs with your safety and wellbeing as our top priority. This guide explores a variety of options for how your season and key components of the *FIRST* experience can be implemented in-person, remotely, or a combination of both.

Due to the COVID-19 pandemic, we anticipate that you will encounter unique challenges during the *FIRST*<sup>®</sup> Tech Challenge ULTIMATE GOAL<sup>SM</sup> *presented by Qualcomm* season and we are here to provide support and guidance for navigating these scenarios. This guide allows for an à la carte series of options to better accommodate you this season and allow your students to continue to get the most out of their *FIRST* experience.

This guide is designed to provide suggestions and options, but it is intentionally not prescriptive; considerations for what is best for your local situation should be prioritized. **Local health and safety regulations and guidance should precede any of the recommendations in this guide.**

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## Section 1 - Materials Management and Handling

### Follow Local Guidance

Prior to putting a material handling plan in place, it is recommended that you reach out to your organization as well as local health offices to determine the guidance for your area for handling shared materials.

### Create a Team Safety Plan

Instilling a culture of safety is a value that every individual in the *FIRST*<sup>®</sup> community must embrace as we pursue *FIRST*'s mission and vision. As you plan to have a safe season, you can consider the implications of infectious disease and incorporate elements that help minimize the risk of spreading COVID-19. Elements of this plan can include use of collaboration tools, identifying precautions, social distancing measures, and establishing policies around sharing materials and tools.



Prior to putting a safety plan in place, it is recommended that you reach out to your organization as well as local health offices to determine the guidance for your area.

The following are examples of resources you can use as you assemble your plan.

- [How to Protect Yourself and Others](#)
- [Guidance for Cleaning and Disinfecting Public Spaces, Workplaces, Businesses, Schools and Homes](#)
- Consult your school, school district, and other sources of policies for your area.
- Safety requirements for participating in *FIRST* and *FIRST*<sup>®</sup> Tech Challenge
- [Youth Protection policy](#)
- *FIRST* Tech Challenge [Game Manual Part 1 Remote Events](#)

### Testing and Building Safety Plan Example

*If you are sending supplies home with students, consider sending home a safety plan that covers a variety of topics, including, but not limited to:*

1. Expectations that team members follow safety guidelines created by you and your team
2. Use of personal protective equipment (PPE), such as safety glasses and masks
3. Adult supervision
4. Tool safety
5. Inspection and maintenance of tools and parts
6. Sharing of tools and materials
7. Operation of motors, use of limits for motion, and the ability to quickly shut off components
8. Awareness, identification, and protection from pinch hazards

## Ordering Additional Materials

To limit the amount of equipment that is shared by students, you may want to purchase additional tools/supplies. The list below contains essential tools that are often shared by students for the REV Competition Kit and Edu Kit. For other kits see supplier websites for additional tools.

- [5.5mm Nut Driver \(REV-41-1119\)](#)
- [Allen Wrench Kit \(REV-45-1882\)](#)
- [#25 Chain Tool \(REV-41-1442\)](#)
- **Coming Soon** [REV suggested power supplies](#)
- Storage bins

## Storing Materials

Consider creating a plan that follows policies put in place by your organization and health officials for organization and storage of materials. Examples include:

- Recently cleaned materials can be kept in separate boxes with labels that can be changed to indicate the date of cleaning.
- Materials can be separated for use by individual participants and stored labeled containers, cubbies, or areas.
- Use of equipment can be limited to one group of participants at a time and cleaned and disinfected between use.
- Electronic devices can be cleaned prior to sharing with others.

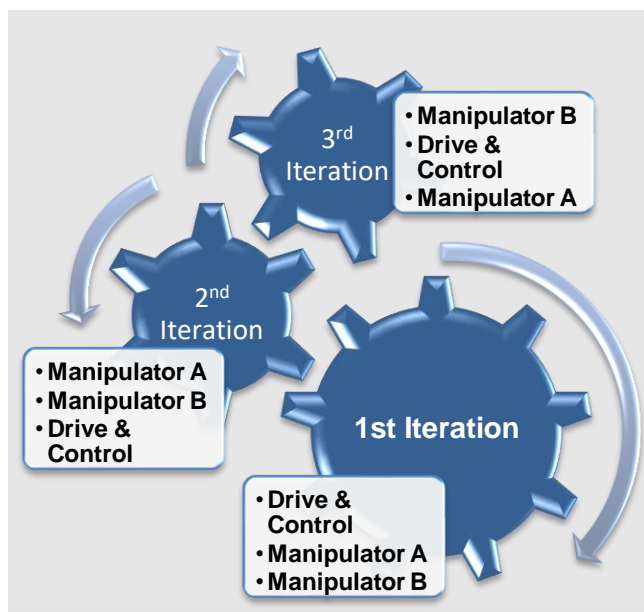
## Dividing Materials

- Use plastic bags to separate and store parts to be distributed to students.
- If you can invest in individual storage containers, this will enable compartmentalization and minimize the sharing of parts.
- Students can design and develop prototypes to create a plan for the robot systems. They build separately with responsibility for each component. If local restrictions allow this could be completed in cohorts, which could help reduce sharing of materials.



## CAD and Iteration for Disinfecting Time

To provide time between use of materials and equipment here are some suggestions for activities of how to rotate hands on activities.



1. Iteration cycles and rotation of components through students or cohorts.
2. Have students store parts, then utilize CAD to create a hands-off period to allow for decontamination time and less risk of cross-contamination.
3. Use the Robot Parts Distribution guidelines below to hold students accountable for supplies. Have them keep an inventory list of parts used, and then return any remaining inventory to you organized as you delivered it to them.

Note: It is recommended that you follow your organizational and local health official guidelines for handling and cleaning shared materials.

## Distribution of Materials

### Robot Parts Distribution

Your team can use a parts distribution list for tracking materials. An example of a material list for the REV EDU Kit and the REV Education bot can be download from the link below:

- [Parts Distribution Download](#) (xls)
  - The Excel file contains a complete parts list for the robots listed with the kits separated out with suggested parts for:
    - Manipulator A
    - Manipulator B
    - Drive and Control
    - See the links below for pictures and item list of the two kits.
      - [REV EDU Kit](#)
      - [FIRST Tech Challenge Starter Kit V3](#)

*If you are a Class Pack purchaser with the expansion set, it is equal to the FIRST Tech Challenge Starter Kit V3 so you can use the FIRST Tech Challenge Starter Kit V3.*

The spreadsheet contains one tab with the complete robot parts list, for the REV EDU

Kit (Edubot Sheet) and the *FIRST* Tech Challenge Starter Kit V3 (REV Competition Set Sheet). In this tab, it will enable you to see the total parts in the kit, and how many are located in each parts distribution. There are empty columns for amount used, and amount returned so that you can use them to create additional sheets for students use using pivot tables. See the link below for how to modify and use pivot tables:

[Microsoft Pivot Tables](#)

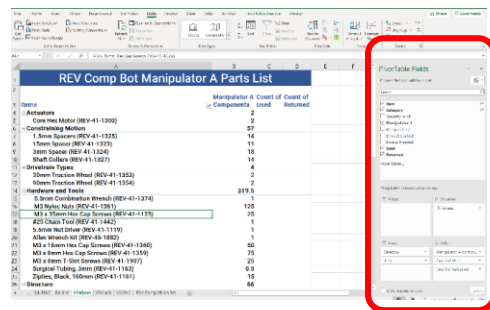
Item	Category	Quantity in Kit	Manipulat 1
15mm Plastic 120 Degree Bracket (REV-41-1311)	Structure	6	
15mm Plastic Indexable Motion Bracket (REV-41-1313)	Structure	4	
15mm Gearbox Motion Bracket (REV-41-1315)	Structure	4	
15mm Plastic Variable Angle Bracket (REV-41-1318)	Structure	4	
15mm Plastic Servo Bracket (REV-41-1319)	Structure	2	
15mm Plastic Inside Corner Bracket (REV-41-1320)	Structure	32	
15mm Plastic Lap Corner Bracket (REV-41-1321)	Structure	16	
15mm Extrusion, 150mm - 45° Ends (REV-41-1430)	Structure	4	
15mm Extrusion, 225mm - 90° Ends (REV-41-1431)	Structure	8	
15mm Extrusion, 420mm - 90° Ends (REV-41-1432)	Structure	16	
400mm x 350mm x 4mm Corrugated Plastic Sheet (REV-41-1839)	Structure	2	
15mm Metal Bent Core Hex Motor Bracket V2 (REV-41-1433)	Structure	4	
Ultraplanetary Outside Mounting Bracket (REV-41-1621)	Structure	4	
Ultraplanetary Bent Mounting Bracket (REV-41-1623)	Structure	4	
15mm Metal 90 Degree Bracket V2 (REV-41-1480)	Structure	16	
M3 Standoff, 40mm (REV-41-1492)	Structure	8	
U Channel Endcap (REV-41-1687)	Structure	4	
15mm Metal Bent Servo Bracket V2 (REV-41-1485)	Structure	4	
45mm x 15mm C Channel, 408mm (REV-41-1762)	Structure	4	
45mm x 15mm C Channel, 248mm (REV-41-1767)	Structure	2	
5.5mm Nut Driver (REV-41-1119)	Hardware and Tools	1	
Zipties, Black, 160mm (REV-41-1161)	Hardware and Tools	50	
Surgical Tubing, 3mm (REV-41-1163)	Hardware and Tools	1	
M3 x 8mm Hex Cap Screws (REV-41-1359)	Hardware and Tools	200	
M3 x 16mm Hex Cap Screws (REV-41-1360)	Hardware and Tools	100	
M3 Nyloc Nuts (REV-41-1361)	Hardware and Tools	300	
5.5mm Combination Wrench (REV-41-1374)	Hardware and Tools	1	
M3 x 8mm T-Slot Screws (REV-41-1907)	Hardware and Tools	50	
Allen Wrench Kit (REV-45-1882)	Hardware and Tools	1	
M3 x 35mm Hex Cap Screws (REV-41-1125)	Hardware and Tools	50	
#25 Chain Tool (REV-41-1442)	Hardware and Tools	1	
Core Hex Motor (REV-41-1300)	Actuators	2	
Ultraplanetary Gearbox Kit & HD Hex Motor (REV-41-1600)	Actuators	2	

REV Comp Bot Manipulator A Parts List			
Items	Manipulator A	Count of Used	Count of
<b>Actuators</b>		<b>2</b>	
Core Hex Motor (REV-41-1300)		2	
<b>Constraining Motion</b>		<b>57</b>	
1.5mm Spacers (REV-41-1325)		14	
15mm Spacer (REV-41-1323)		11	
3mm Spacer (REV-41-1324)		18	
Shaft Collars (REV-41-1327)		14	
<b>Drivetrain Types</b>		<b>4</b>	
30mm Traction Wheel (REV-41-1353)		2	
90mm Traction Wheel (REV-41-1354)		2	
<b>Hardware and Tools</b>		<b>319.5</b>	
5.5mm Combination Wrench (REV-41-1374)		1	
M3 Nyloc Nuts (REV-41-1361)		125	
M3 x 35mm Hex Cap Screws (REV-41-1125)		25	
#25 Chain Tool (REV-41-1442)		1	
5.5mm Nut Driver (REV-41-1119)		1	
Allen Wrench Kit (REV-45-1882)		1	
M3 x 16mm Hex Cap Screws (REV-41-1360)		50	
M3 x 8mm Hex Cap Screws (REV-41-1359)		75	
M3 x 8mm T-Slot Screws (REV-41-1907)		25	
Surgical Tubing, 3mm (REV-41-1163)		0.5	
Zipties, Black, 160mm (REV-41-1161)		15	
<b>Structure</b>		<b>66</b>	
400mm x 350mm x 4mm Corrugated Plastic Sheet (REV-41-18)		1	
15mm Extrusion, 150mm - 45° Ends (REV-41-1430)		2	
15mm Extrusion, 225mm - 90° Ends (REV-41-1431)		4	
15mm Extrusion, 420mm - 90° Ends (REV-41-1432)		7	
15mm Gearbox Motion Bracket (REV-41-1315)		2	
15mm Metal 90 Degree Bracket V2 (REV-41-1480)		8	
15mm Metal Bent Core Hex Motor Bracket V2 (REV-41-1433)		4	
15mm Metal Bent Servo Bracket V2 (REV-41-1485)		2	
15mm Plastic 120 Degree Bracket (REV-41-1311)		3	
15mm Plastic Indexable Motion Bracket (REV-41-1313)		2	
15mm Plastic Inside Corner Bracket (REV-41-1320)		16	
15mm Plastic Lap Corner Bracket (REV-41-1321)		8	
15mm Plastic Variable Angle Bracket (REV-41-1318)		2	
45mm x 15mm C Channel, 248mm (REV-41-1767)		1	
Ultraplanetary Bent Mounting Bracket (REV-41-1623)		2	
Ultraplanetary Outside Mounting Bracket (REV-41-1621)		2	
<b>Supporting Motion</b>		<b>52</b>	
End Cap Bearing (REV-41-1322)		16	
Motion Pattern Spacer (REV-41-1846)		4	
15mm Bearing Pillow Block (REV-41-1317)		16	
Through Bore Bearing, Long (REV-41-1329)		10	
Through Bore Bearing, Short (REV-41-1326)		6	
<b>Transmitting and Transforming Motion</b>		<b>45</b>	
20 Tooth #25 Sprocket (REV-41-1340)		2	
5mm X 135mm Hex Shaft (REV-41-1349)		2	
#25 Master Links (REV-41-1366)		1	
#25 Roller Chain, 10 Ft (REV-41-1365) Per foot		4	
125 Tooth Gear (REV-41-1333)		1	
15 Tooth #25 Sprocket (REV-41-1339)		2	
15 Tooth Gear (REV-41-1331)		4	
15mm Hex Pillow Block (REV-41-1316)		2	
30 Tooth Gear (REV-41-1332)		2	
40 Tooth #25 Sprocket (REV-41-1343)		1	
45 Tooth Gear (REV-41-1334)		2	
5mm X 400mm Hex Shaft (REV-41-1362)		2	
5mm X 75mm Hex Shaft (REV-41-1347)		6	
5mm X 90mm Hex Shaft (REV-41-1348)		1	
60 Tooth Gear (REV-41-1335)		4	
72 Tooth Gear (REV-41-1336)		2	
90 Tooth Gear (REV-41-1337)		3	
High Strength Hex Hub (REV-41-1147)		4	
<b>Grand Total</b>		<b>545.5</b>	

The screen shot of the pivot table created with the items for Manipulator A is located to the left.

- Sheet name: V3ManA.

You may print the table from the sheet or modify the pivot table. To see the pivot table properties, click anywhere in the table and the options will pop-up on the right.



Note that when the table was created the items that had a quantity of 0 were hidden.

You may consider exporting and sharing the sheets with your team, it will enable the students to digitally track the materials using the collaboration methods suggested above. You may also consider deleting the suggested parts distribution list and creating your own tables as needed.

The list enables the flexibility of using the suggested lists, modifying them to fit your needs, or using them as a collaboration tool for your team.

You may want to customize the file to limit student confusion.

- For example, delete the Edubot sheets if you are using the competition bot.

## Section 2 – Content

Content for the *FIRST* Tech Challenge revolves around the design process for the team and robot to compete in ULTIMATE GOAL<sup>SM</sup> presented by Qualcomm. Content resources to consider include Building and Prototyping, Prototyping and Testing, Learning CAD, Running Blocks Programming Offline, Using Thinkscope, and *FIRST @ Home*. CAD is covered further in the Student Collaboration section.

### Building and Prototyping

#### Building and Prototyping Strategy 1

Divide up the kit of parts into the drive system and manipulators. For a group of three students, the parts could be divided up so that each student has something to work with.

**Manipulator A:** Student has supplies to build manipulators that involve DC motors. They use the power supply below to test and operate mechanisms.

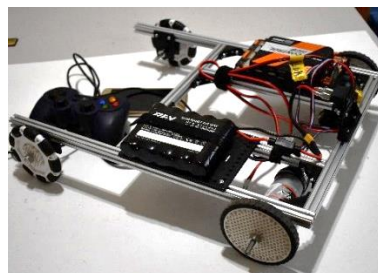


**Manipulator B:** Student has supplies to build manipulators that involve servos. They use the programmable servo to power and test the servos in their manipulator.



**Drive and Control:** Student(s) has supplies for them to build a chassis and operate the chassis with the Control Hub. They are responsible for testing and programming programs created by the team.

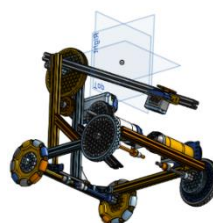




**Strategy 2 Building and Prototyping**

Divide up parts directed by the students; they develop their own strategies and process. Consider how to enable the students to direct the process, they may have more buy-in if they are offering the solution to the problem. This strategy would be helpful for students that have build time together early in the year.

Students come up with designs first, and then parts are allocated, as needed, from the teacher for each design.



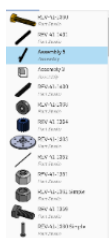
Students can express to the teacher what they need based upon their design, and the teacher can then send out the parts that are required per student for testing. This strategy could be more time-intensive on the teacher's role and requires the student to have a fundamental knowledge of building a robot.



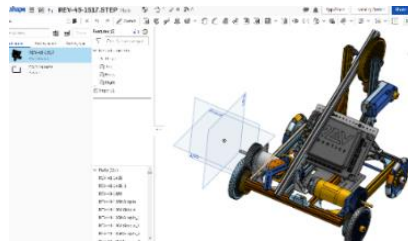
**Strategy 3 Building and Prototyping**

In a worst-case scenario where you have restrictions that will not allow students to have any interaction with parts, see the resources below for CAD. Students can build, collaborate, and model the 3D robot in CAD. If restrictions are lifted where students can build, they will have models to work with.

Students learn Computer-Aided Design with tools such as OnShape, Solidworks, or Fusion 360



Students collaborate on the design and model within the design.



## Learning CAD

Students can use the materials above for prototyping and testing ideas of how they might achieve their design goals. The step files for the robot will allow them to see a 3D view of the EDU Bot. They can take the design ideas they have tested and create them in CAD and run simulations to determine if the final design will work with all subassemblies. This skill is an essential part of the design process for engineers and can lead students to certifications for careers. The more there is an emphasis on this process, the better your students will be prepared for the future.

FIRST has several CAD resources available to you, see the Links and Strategies below. The tools will require the importing of CAD files from the manufacturers.

- The STEP files for the REV EDU Kit of parts is available here:
  - [Edu kit](#); [Upgrade Kit](#)
  - The full REV Repository is available here: [REV CAD Repository](#)

You will need to know the SKU # to reference for each part step file. Assembly of the robot or subassemblies can be completed in CAD software programs.

Look for tutorials on the following topics:

- How to assemble a model
- Animating a model
- 2D technical drawings
- How to collaborate on team models

<https://www.onshape.com/cad-blog/how-to-set-up-your-first-robotics-team-in-onshape>

## OnShape by PTC

PTC Onshape has an entirely web-based platform for design and modeling of many different things. They support it with a wealth of tutorials that students and teachers can go through. These enable them to learn how to use the platform and how to collaborate with your team on designs.

<https://www.autodesk.com/education/home>

## Autodesk Fusion 360

Autodesk also has a CAD platform called Fusion 360. They have a robotics curriculum that you can use to learn the program and how to design and create your robot. They also have a program called Simulate where you can load your CAD design into a playing field and simulate the design to gather some more information on what challenge your robot might have in interacting with the game element and the field.

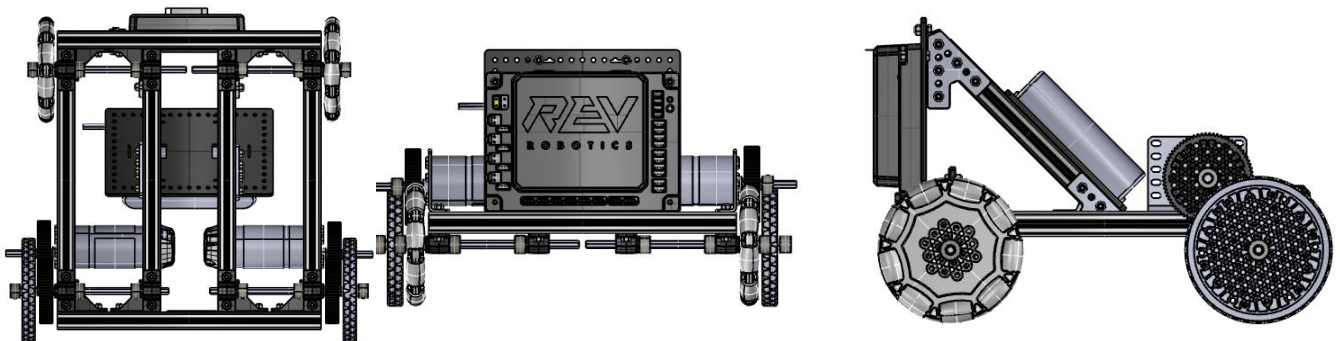
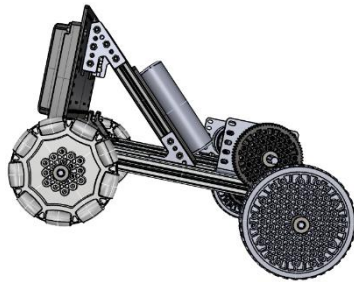
## Solidworks

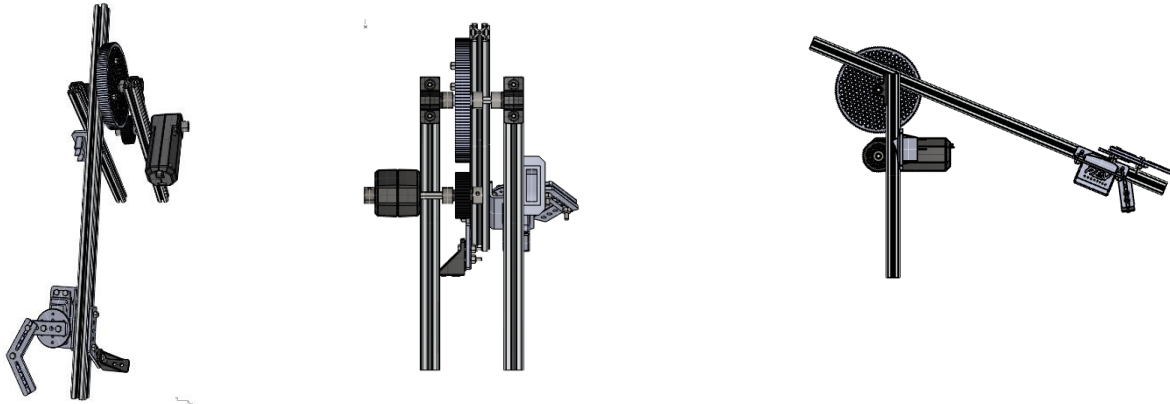
[https://files.solidworks.com/pdf/EDU\\_FIRST\\_Flyer.pdf](https://files.solidworks.com/pdf/EDU_FIRST_Flyer.pdf)

Solidworks provides free software to students and competition teams. Use the flyer above to access the software and resources available. They have a great way of setting up learning pathways for students with industry credentials.

## CAD Assemblies

Here are some examples of the EDU Bot CAD file divided into a manipulator CAD file and a drive/control CAD file.





## Prototyping and Testing

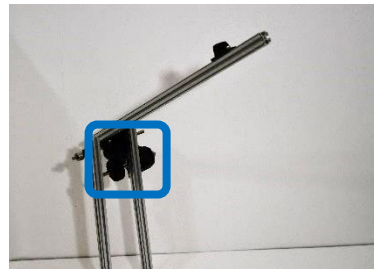
### Prototyping and Testing Strategy 1

#### Manual Test Motors

If additional power supplies are not ordered to test motors, students can do a standing test to determine if the mechanism has enough torque. Does the arm hold its own strength, or does it fall?



This arm will not hold its own weight. It will fall quickly.



When a gear ratio is added, it holds its weight more efficiently.

### Prototyping and Testing Strategy 2

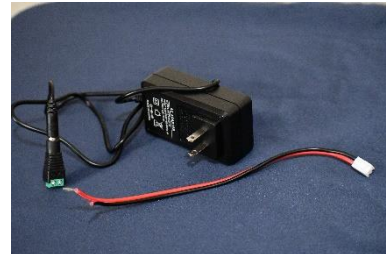
#### Test Servos with Programmer

Servos can be tested with the SRS Programmer if the Competition Set is purchased. See the REV robotics video below for testing servos: [REV Programmable Servo](#)



### Test with Additional Power Sources

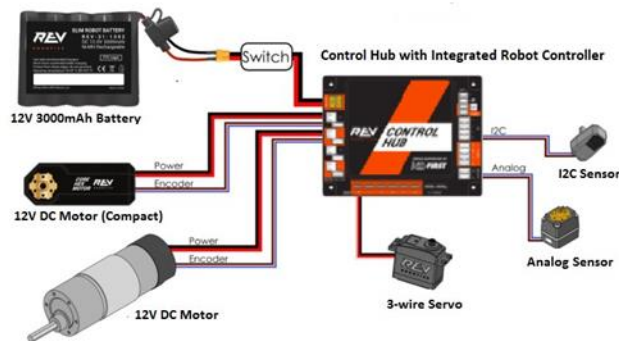
Consider purchasing additional power supplies and motor controllers for motor testing. There are 12-volt power sources that you could consider along with motor controllers to run motors independent of the hub. It is important to make sure that any purchase has the proper UL safety rating, that you are matching the source to what you will be running, and that you can control the speed of the current delivered. See the REV website for possible testing supplies.



### Running Blocks Programming Offline and Sharing Op Modes

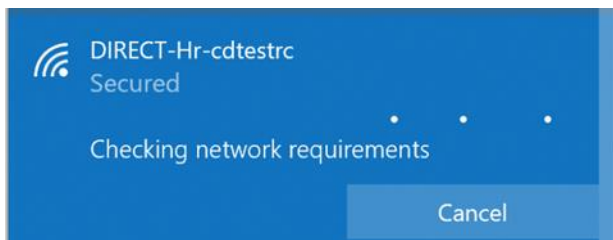
To access the Blocks programming platform, students use a robot controller (Control Hub or Expansion Hub and phone). The robot controller runs on a Java-based app, which is accessed through a web browser. The IP of the app is accessed through the web browser on the local Wi-Fi network, produced by the hub or phone. It is possible to run the Blocks editor without the robot controller after it has been configured, and programs are created. To do this follow the directions below:

#### Getting the Editor



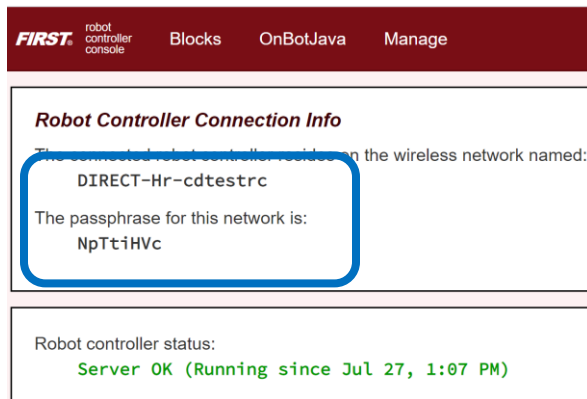
Configure the robot using the *FIRST* Tech Challenge GitHub Wiki directions listed here: [https://github.com/ftctechnh/ftc\\_app/wiki/Configuring-Your-Hardware](https://github.com/ftctechnh/ftc_app/wiki/Configuring-Your-Hardware)

Ensure that you have a configuration with several motors and servos.



Choose the Wi-Fi network of the control hub or expansion hub.

For Competition Teams this should have your team number



On the phone, if you do not know your Wi-Fi network and password, it is found under the program and manage. Once you select this on the driver's station, you can see the network username and password, as well as the IP address.

Type the IP address into the web browser and click on the Blocks tab.

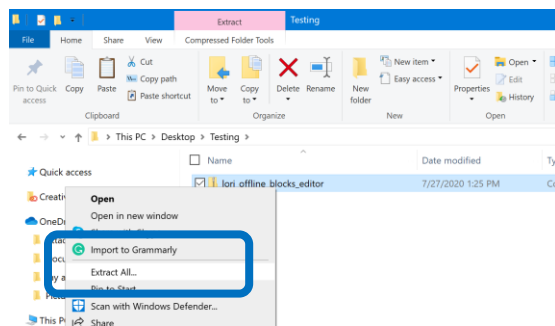


Once you are in the Blocks programming environment, click on the Download Offline Blocks Editor

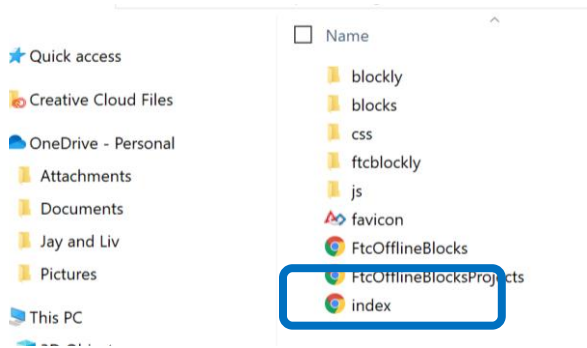
### Running the Editor Offline



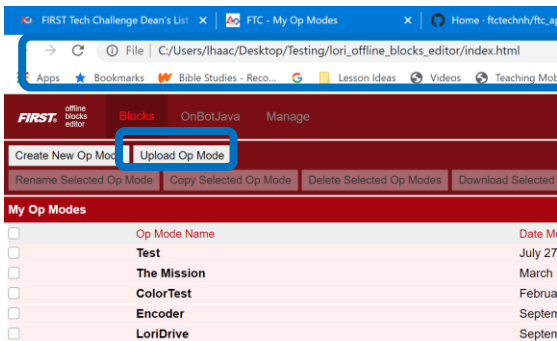
When the zip file downloads, it will download to your browser default location. The file is saved with the active configuration file name. This file can be uploaded and shared in your team file sharing method. Other team members can then download the file and use it to program.



In the location that you have downloaded the zip file extract it to a separate file where you will store the code that you will develop.



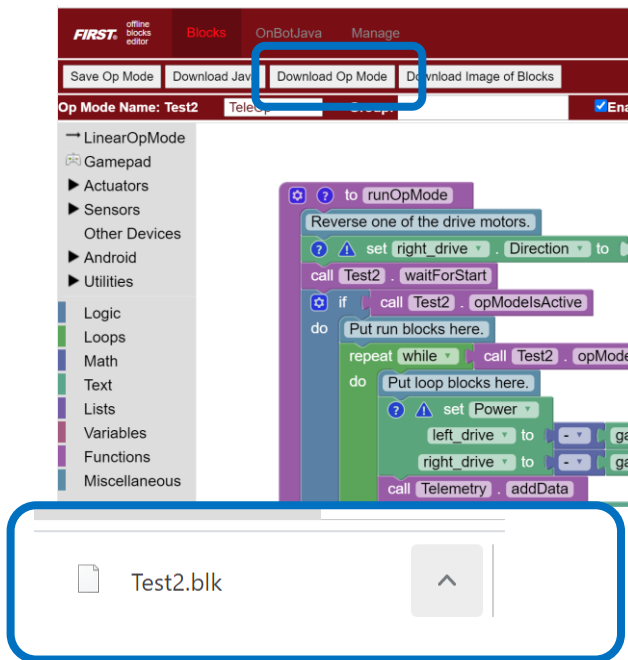
Once the file is extracted select the index file to open the program.



Note: The web address is running locally on the computer.

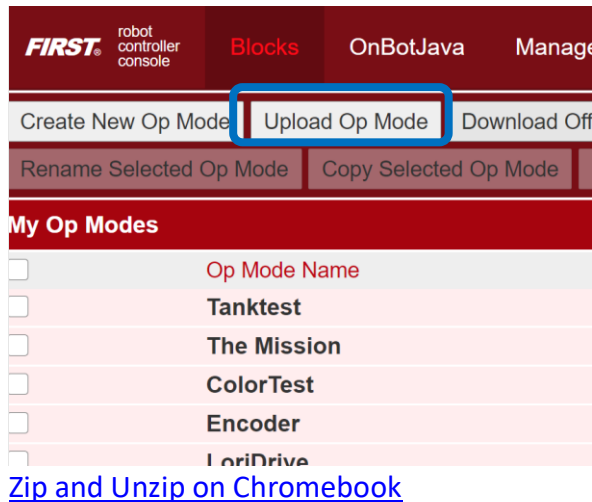
You can now upload op modes and create new op modes that are saved to the file on the computer.

### Downloading and Sharing



As you edit and modify your program, you will want to make sure that you save it. You can choose the Download Op Mode to share the file in your team file sharing method.

Note: When you select download Op Mode, it will save the blk file in the browser downloads. This file can then be transferred using your team file sharing method.



As you share files, you can then upload an Op Mode, which has been shared with you from other team members.

This process can also be completed using Google Drive on a Chromebook. The student's files can remain on their Drive once copied there from the zip file. They should also be able to share and store code in this same way for Google users.

## Thinkscape Content

Coaches may find resources available for *FIRST* Tech Challenge on Thinkscape. The Coach's Playbook has been designed to help you manage your *FIRST* Tech Challenge team throughout an entire season:

- The Playbook is divided into semi-weekly game plans.
- It assumes that you will meet 90 minutes, twice a week, for a total of [N] weeks.
- You can adapt these game plans to fit your team's preferred schedule and skill-level but assumes Kickoff is week one.

Class pack purchasers will find the Crossroads Curriculum and Teacher Resources also on Thinkscape. There will be unit by unit guidance on how you can adapt the curriculum if you are teaching completely remotely.

Resources are available on the *FIRST* dashboard after team or class pack registration.



Look for communication on other resources that are included in this workspace following registration.



## *FIRST @ Home*

Continue to develop *FIRST* skills using the resources on [FIRST @ Home](#). This site contains carefully chosen activities that align with STEM learning experiences and represent an opportunity to build a variety of technical skills, career preparedness and holistic skills that range from high tech, to low tech, to no tech. In addition to links from our partners to explore *FIRST* core values, coding, computer aided design, robot mechanics, electronics and STEM or Career and Technical Education, we have created free and flexible lessons that can be used in a variety of learning environments. Use these resources to supplement your *FIRST* season and continue STEM learning throughout the year.

## Section 3 - Student Collaboration

### In person

As mentioned at the introduction of this guidance, **your local health and safety regulations and guidance should precede any of the recommendations in this guide**. If you are required to social distance in your classrooms or for your team gatherings, strategies below may be useful to think about how you might organize our *FIRST* experience this season.

### Student Cohorts

One of the solutions some schools and organizations are implementing is student cohorts. If you are using this strategy, there are two methods that can work for your situation:

- 1) Have all members of a team in the same cohort. This will ensure that they are able to collaborate in person when that small group rotates to in person class time.
- 2) Have team members split between cohorts and assign specific tasks to each group using the guidance in the team meeting guides for splitting up teams. This solution will provide time between teams to clean and sanitize materials.

### Team Meetings

Our friends at FLL Tutorials in collaboration with *FIRST* Robotics Competition team 8027, have created a sample plan for team meetings that you can view [here](#). This is one example of how you can use local health department and government guidelines and orders to facilitate team meetings. The following are details to consider when planning and creating a plan that works for your local scenario:

- Who needs to attend the meeting?
- Can a large team be divided into smaller cohorts based on task to complete?
- How can you use remote tools when possible to facilitate meetings and collaboration?
- What are your local social distancing requirements?
- What is the other local health organization guidance regarding gatherings and how does that impact your plan?
- What documentation of this plan will you create and share with all stakeholders?
- To whom will this plan be shared with?
- How long should each meeting be? (consider that things make take longer with safety measures like social distancing.

## Remote Collaboration

### Remote Collaborations Practices

- Involve the team in the discussions.
- Keep Core Values at the forefront of how to work together.
- Have students create new team norms for working remotely.
- Keep the whole team involved by ensuring everyone has a role that is valuable to overall team success.

### Digital Tools

One of the challenges with remote collaboration is the inspiration that happens by working together and making improvements in real time. Being remote sometimes makes this difficult when programming or editing documents.

Our friends on *FIRST* Robotics Competition Team 8027 created a video [tutorial](#) for setting up a remote desktop so students can collaborate in real time while coding.

Choose a [Video Conferencing service and apps](#) to host your meetings

- Review settings to ensure safety for the participants.
- Limit meetings to invited team members and specific invited guests only.
- Practice using the tool with the team, so all are comfortable with the platform and its features.

Other useful digital tools for sharing include:

Remote Collaboration – [Google Classroom](#), [Zoom](#) or [Discord](#)

Collaborative Whiteboards- [Miro Whiteboards](#), [Whiteboard](#) or [Jamboard](#)

Interactive slideshows – [Peardeck](#)

Social Learning – [Flipgrid](#)

Collaborative Brainstorming - [Google Drawings](#) or [Teams Whiteboard](#)

Create Multimodal Content - [Buncee](#) or [Adobe Spark](#)

Surveys or Interactive Stories - [Google Forms](#) or [Microsoft Forms](#)

Project Management or Organization – [Trello](#) or [Freedcamp](#)

CAD - [OnShape](#), [Fusion 360](#)

Bring the FUN! - [Meme Generators](#) or [Kahoot](#)

### Project Management and Remote Check In

Students managing projects and all of their courses at home can be a challenge. Encourage students to use the [Parents' Guide for Managing FIRST at Home](#) to help your students implement time management with a Core Values mindset at home. This same guide could be used with teams also to manage their projects.

### Gracious Professionalism Check In

Wondering how to align a team meeting or remote classroom to ensure Gracious Professionalism is present in all you do or just ensure all students have a platform to share and be heard? Use this [guide](#) to compose your meetings and spark ideas for questioning techniques in a remote environment, and how to incorporate student voice and choice in activities.

### Youth Protection

All *FIRST* activities, including online team meetings, are expected to follow the standards set in the [Youth Protection Program](#) in addition to those set by the school or organization hosting the team and/or activity.

What you might see/hear/learn during an on-line meeting

- When you have a remote meeting, you are virtually walking into someone's home.
- When hosting a *FIRST* team meeting, it is important for you set up your home environment to ensure anything the team members see live from your home feed is appropriate.
- Team members home life will vary, and you may see/hear/learn about home situations that go beyond the normal role of a mentor/coach, which may require your advocacy, guidance or help.

### Parent and Caregiver at Home Considerations

Finding yourself with a lot to manage and struggling with resources to manage it all? *FIRST* is here to help. One of the most valuable elements of *FIRST* are the life skills it instills in students in the face of challenges. One of these skills is time/project management. Within this [guide](#), you will find resources to help you and your child develop and implement time management with a Core Values mindset at home.

### Accessibility

What do I need to consider getting ready for a remote team experience? Whether you have a retuning team or new team members, there are important access considerations to understand that lead to positive experience for all participants. Don't assume the team members have the necessary technology and permission to use it, the time to participate in team meetings, other limitations or responsibilities the team member may have because of family needs (parental work schedules/commitments/etc.).

Advocacy for your students starts with you. Below are some considerations to think about and resources to help you ensure you are modeling your *FIRST* core values as an adult leader.

[Gathering Information from Families](#) quick tips on gathering the most useful information from families to make accommodations for *FIRST* team members.

## Parent Questions

Start with a phone call or parent survey to the caregiver to understand the following considerations.

1. Understand what technology they have access to.
  - a. Do they have internet/a computer/smart phone/Zoom or Microsoft Teams or other communication platforms?
  - b. Do they have the bandwidth and internet access stability?
2. How much access does the child have?
  - a. Are they sharing their computer or mobile phone with other members of the household?
  - b. Does the computer or phone have a camera?
  - c. How well does the internet work?
  - d. Are there limits on the amount of data for their phone or internet?
  - e. What permissions/limits does the team member have to use the home technology i.e. computer, smart phone, internet?
  - f. There are websites created by educational entities for interactive learning (Nearpod as an example) that can assist the team with their teamwork. Would the family allow their child to use this type of platform?
3. What resources are available at home for the child to use?
  - a. Paper/pens/pencils/ items that can used to make things (cardboard, and carboard tubes, blank paper, scissors, glue, storage container for work completed during the meeting, a space)
4. Would the parents like to participate/support the team and if so, how much and what might they like to do?
  - a. What kind of communication/platform would be helpful to the family and how often?
  - b. Are the parents comfortable if the students build with mechanical components at home?
  - c. Are they willing to supervise the students during the building times?
  - d. How/when should parents communicate with you?
5. Discuss days and times for team meetings to determine if there are family needs that impact participation?

Resources to support creating an accessible experience

[Training modules](#) to learn how to help all students be successful:

If a parent confides that their child has a specific diagnosis so the coach is aware, [here](#) is a guide to help determine what information should be gathered.

## Student Question

**FIRST Kit**

### 5 Questions to Ask Team Members

- 1 What are you looking forward to as a FIRST team member?**  
*This sets the tone for a respectful conversation.*
- 2 What makes you smile or feel happy?**  
*This helps you understand the youth's favorite activities, strengths, reason they chose to be a part of FIRST, etc.*
- 3 What makes you angry or sad?**  
*This lets you know what triggers there may be to behaviors so you can anticipate them.*
- 4 What does it look like when you are angry or sad?**  
*This will let you know what you will see if a youth is angry or sad (gestures, facial expressions, etc).*
- 5 What should we do when that happens?**  
*This lets you know what calming techniques work for the youth.*

**Remember:** You don't need to know a diagnosis!  
You just need to know what will help the team member to be successful on your team.

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- The more white space in the document, the easier it is to read and use
- If you expect the team member to write on the paper – leave enough space for the student to easily write, draw, design etc.
- Use headings for each section of the document
- If you use color contrast, (words on a colored background), make sure there is enough contrast that the words are easy to read
  - Black on white or white on black – easy to read
  - Red background with yellow words – hard to read
- How much color are you using? Is one color on top of another color? If so, how easy is it to read the words that are a different color from the background color?
- If you have Microsoft Word, after you create a document you can click on the Review menu and then click on check accessibility and icon. The system will review your document and make recommendations on issues with accessibility.

## Section 4 - Adult and Student Collaboration

### Accessing Experts Remotely

Mentoring a team remotely is different, and we know you have a lot of questions, and want some guidance on how to begin as you and your team members get ready to start the upcoming season. You are not alone in this experience. Use the new [FIRST Mentor Network](#) to connect with other mentors to share ideas, stories, resources and support so everyone has a better remote experience.

In addition to the *FIRST* Mentor Network, topic experts can be found and engaged through social media channels or virtual visits. Coaches should plan to take the lead on these platforms but can facilitate questions and conversations between their team members and adult experts.

Don't overlook the experts from your own school or community. Your school's physical education instructor, representatives from a local sports team or the designer of a local playground may all be interested and willing to talk to your team via webinar or virtual meeting. Make sure any expert you engage understands the age level of the students on your team.

### Free Professional Learning

Our friends at [Ariel](#), who are leaders in developing experiential training programs have shared two courses that are relevant to preparing for the various scenarios that we will experience this season: *Leading and Engaging Remote Teams* and *Teaching in a Virtual Classroom*. A summary of the courses is listed below along with the information on accessing the courses.

#### Leading and Engaging Remote Teams

This module is designed for leaders who are new to engaging remote teams. You'll be able to learn new techniques and behaviors to ensure you are engaging your people, whether that is your adult peers or students. This module can be completed at your own pace and you are able to get what you want out of the experience. One of the tasks is to create your SMART goal outcomes. Here are some considerations for your goals related to *FIRST*:

- How can you use *FIRST* Core Values to build trust and engage your remote team?
- What team dynamics do you want to ensure are still experienced in a remote environment?
- How might team building be achieved in a remote environment?

#### Teaching in a Virtual Classroom

This module is designed for educators who are teaching in a virtual classroom.

By the end of this experience you will be able to:

- Engage your virtual student audiences more effectively.
- Develop stronger and more intentional physical and vocal presence for class

presentations.

- Make more authentic, trusting connections with remote students.
- Deliver more engaging virtual presentations.
- Facilitate more successful student interactions.

You can access the Ariel course here <https://www.ariel-digital.com/first>, using **Registration code:** first-at-home

Equity, diversity and inclusion training modules

<https://www.firstinspires.org/resource-library/training-equity-diversity-inclusion>

Youth Protection Program

<https://www.firstinspires.org/resource-library/youth-protection-policy>

Helpful Articles

[Collaborative Learning in the Age of Social-Distancing](#), Digital Promise – The science of collaborative learning and setting the tone for accountability.

## Section 5- Community Engagement

### Recruitment

With all the guidance here and other creative solutions in our community, the *FIRST*<sup>®</sup> GAME CHANGERS<sup>SM</sup>, powered by *Star Wars: Force for Change* season will play on! Along with a normal season comes recruiting your team.

Problem-solving is at the core of *FIRST* Tech Challenge, regardless of the season. Remind students that their own experiences during lockdowns and social distancing will be especially useful as starting points for brainstorming new ways to move and motivate people to be active this season. The hands-on learning experience is central to *FIRST* Tech Challenge.

Remember: The students will take their cues from you, as their coach. Reminding them that the conditions presented by COVID-19 are temporary but their work on the team can have a long-lasting impact.

## Thinkscape Forum

Our *FIRST* community has a variety of ways to access resources and information from forums, how-to videos, websites and social media platforms.

FTC Classpack Thinkscape platform hosts the curriculum and professional learning community.



Inspire Today's Kids  
To Build Tomorrow's Leaders

## Professional Learning Communities

A *FIRST* community for peer to peer connections, crowd sourcing ideas and connecting with *FIRST* staff to share ideas, lessons and resources or help solve problems and put core values into practice.





## Section 6 - Events

*FIRST* Tech Challenge registered teams may have the option to compete in Traditional Events or Remote Events this season. Remote Events are designed to allow teams to participate in a full *FIRST* Tech Challenge season experience remotely.

Local Program Delivery Partners will choose to offer Traditional or Remote Events in your region based on current conditions and local rules. If your Program Delivery Partner chooses the Remote Event option, your team will be able to participate in judging sessions for the same awards as Traditional Events. Judging sessions will be via video conference but will follow the same format as Traditional Events. Remote Event teams will play ULTIMATE GOAL on a half-field in their robotics lab and upload those scores to the event host for their Remote Events. For details on how Remote Events will be played this year check out *FIRST* Tech Challenge [Game Manual Part 1, Remote Events](#). For details on how Traditional Events will be played this year check out *FIRST* Tech Challenge [Game Manual Part 1, Traditional Events](#).

Regardless if your team participates in Traditional or Remote Events, both pathways lead to merit-based advancement to *FIRST* Championship. Your Program Delivery Partner can also choose one format and transition to another over the course of the ULTIMATE GOAL season.

[FIRST Tech Challenge Competitive Qualifying Teams ONLY - Staggered Events Schedule](#)  
Staggered events will be a tool that regional territories use to provide a more traditional *FIRST* event experience at various times during the season or at times that vary from the typical schedule. This information will be released in late September 2020.

### [FIRST Tech Challenge season schedules](#)

This year's game ULTIMATE GOAL will be released September 12, 2020, via live broadcast. Just like every year, Program Delivery Partners have the flexibility to schedule their regional FTC events anytime from October through early March. This year we expect many Program Delivery Partners will push the start of their events out further into that timeframe due to uncertainties due to COVID-19. *FIRST* Tech Challenge events are listed [here](#) once we receive those event dates from Program Delivery Partners. Keep an eye on the schedule in your region through communication with your region Program Delivery Partners and the link provided.

This is not an exhaustive list; we will be working to bring you new ideas from the community as the season progresses. Remember we are in this together and build from these to make your season work! Don't forget to share your great ideas with the community using the Thinkscape platform and [FIRST Community](#), keep our [mission](#) and your team's unique situation in mind when planning your season!