

MANUFACTURING

Manufacturing is the process of creating the individual parts for the robot. The manufacturing process takes the designed robot, makes it into parts, and compiles the parts in preparation for assembly.

Use this worksheet to start your manufacturing process and get your robot up and running.



MANUFACTURING

- ☐ Go through this worksheet and its questions with your team
- ☐ Includes **following elements:**

1. Prerequisites and Materials
2. Converting the Design
3. Delegation and Safety
4. Process of Manufacturing
5. Extra Parts

01

PREREQUISITES AND MATERIALS

DISCUSSION

Think about the type of robot your team wants to build and the machines and materials your team has access to.

1. What are some tools your team needs in order to manufacture your robot?

1. What are some ways your team can acquire the tools you need?

1. What tools are needed for your team to assemble an adept and durable robot?

01 PREREQUISITES AND MATERIALS



ACTIVITY

Think about what tools your team needs in order to build your robot.

Check off which materials your team has in order to start the manufacturing process:

- ☐ Battery Powered Drills
- ☐ Wrenches
- ☐ Screwdrivers
- ☐ Hacksaw
- ☐ Stock Materials (round stock, tube, metal sheets, polycarb, Delrin)

If possible, also acquire:

- ☐ Metal Lathe
- ☐ Milling Machine
- ☐ CNC router
- ☐ Chop Saw
- ☐ Band Saw
- ☐ Arbor Press

Check out this document for more: [Tool Recommendation](#)

02 CONVERTING THE DESIGN



DISCUSSION

Identify the robot mechanisms that need to be manufactured based off of your team's robot design.

1. How will your team be designing your robot?

1. What are some ways your team can make your design as manufacturable as possible?

1. What vendors offer structure products to design with?

02

CONVERTING THE DESIGN



ACTIVITY

Group your team's part drawings corresponding to each of your robot's mechanisms in order to create manufacturing assemblies.

Mechanism 1:

Mechanism 2:

Mechanism 3:

Mechanism 4:

Mechanism 5:

Mechanism 6:

03 DELEGATION AND SAFETY



DISCUSSION

Think about what tools are need to manufacture your team's robot.

1. What are some ways your team can conduct safety and technique training sessions? [FIRST® Safety Guide](#)

1. When is the most suitable time your team can begin manufacturing training?

1. How will your team delegate the creation of parts to members trained to operate manufacturing tools and machines?

04 PROCESS OF MANUFACTURING



DISCUSSION

Think about the priorities and agenda your team has to manufacture your robot.

1. What machines/tools does your team need in order to build each part?

1. How can your team contact manufacturers and acquire accurate tools to build your robot?

1. What timeline does your team have to design, manufacture, and test your robot?

05 EXTRA PARTS



DISCUSSION

If you have extra time, think about how your team can use your resources.

1. What are some parts on your robot that have a lot of strain and could potentially break during competitions?

1. Does your team have resources to create extra parts?

1. How can creating extra parts benefit your team?
