

Robotics Club Resources

I made this for anyone who wants to run a Robotics Club. You do not have to be great with math, physics, engineering, programming, or electronics to lead these students. You and the students will pick things up as you need to. This is just to help you get started. Please make the club your own.

The Robotics Club competes in Colorado's annual National Robotics League Competition. This event is sponsored by [RMTMA](#) (the Rocky Mountain Tooling and Machining Association). They want students to connect with local machining and manufacturing companies. Each team/school has a manufacturing sponsor to collaborate with, ours is _____. They visit us and we visit them. Students get a taste of the design and manufacturing processes and envision themselves working in that field. If you need engineering advice, talk with your sponsoring machine shop.

Contacts

Amy Primrose - President of NRL Colorado & Denver Precision Products (120th & Main)
Email: amy@denverprecision.com

Secretary of NRL Colorado
Email: nrlcolorado@rmtma.org

Machine Shop
Email:

Google used to send NRL stuff to my spam, which was incredibly annoying. I hope the same does not happen for you. Add them to your contacts to help prevent this and check your spam folder.

Groups

When the Robotics club started in the 18-19 school year, we only had one group of students with one robot. Since then our numbers have grown and we have had two teams the past few years. Usually a group of upperclassmen and a group of underclassmen. You can organize the groups as you see fit. Some years it is a little more chaotic, but it runs smoother when each group has some student leadership. One student wanted to start a new group with a new robot next year, which isn't a bad idea. Some schools have 3-4 robots. There can be too many cooks in the kitchen and going down to 3-4 students per robot could be a good idea.

Some students may not really contribute to the robots, but don't have another place to go and have friends there. I made sure they are also welcome and try to involve them as much as they want.

Online Resources

[National Robotics League](#)

[National Robotics League Colorado](#) (has more resources)

- Rules & Regulations
- Technical Regulations
- Welcome Packet and Commitment Letter (must be signed and sent to NRL Colorado)
- Media Release Form (you and each student must sign this by competition day)
- Liability Waiver Form (you and each student must sign this by competition day)
- Safety Inspection Checklist
- And more...

Meeting Schedule

We met once a week after school for an hour, twice a week second semester until competition day (April-ish) in D0412. That room is where our awards are on display and where our tools and parts are kept. It is not the most ideal space, but it has been our space. It would be better to have big flat tables and possibly tile floors to sweep up parts that fall on the floor. We had a rolling magnetic sweeper, but it was taken/misplaced.

The primary focus of each club meeting is to prepare for the competition at the end of the year. Some days were dedicated to learning about CAD design, 3D printing, spray painting, and anything else we needed. Some days the students just want to hang out and not as much is done. Post-competition we have built and launched rockets (Estes) [Amazon for rocket bundles, Hobby Lobby for engines is usually cheapest], built [marshmallow shooters](#), [KiwiCo kits](#), and more.

NRL has a suggested timeline with their resources. It is a good timeline to follow.

We generally did things in this order:

- Review reflections from previous year
- Reach out to students on interest sheet, put up recruitment posters
- Brainstorm new ideas, narrow down ideas
- Safety has become lax recently. I think it would be good to review safety protocols and equipment early on. You or someone from the sponsor could talk about OSHA with the students.
- Break down into teams
- Assign/elect leadership for each team
- Sign and submit Commitment Letter for each team to NRL Colorado
- Find out about current budget (by Sept)
- Refine ideas to what we need help with or what we need to buy against budget
 - As you purchase materials, turn receipts into Brittany Clear monthly (do not hold onto them)
- Determine fundraising (talk with Brittany Clear and Marty)
- Contact manufacturing sponsor to start plans to tour (by mid-Oct)
- Take whiteboard drawings and build measurable prototypes with cardboard/CAD/paper
- Share plans/files with sponsor and discuss anything they can machine/weld/manufacture for us
- Tour sponsoring machine shop (we have taken two district SUVs before, but you can take one small bus) (by mid-Nov)
- The rest of the time is taking apart, reassembling, testing, driving, fixing, and documenting everything along the way. Many teams wait until crunch time which is stressful for everyone. It is best not to procrastinate and to communicate openly with NRL Colorado and your sponsor.
 - It takes time to take parts to/from the sponsoring machine shop (they have million dollar orders to fit into their schedules), to order parts to the school, to pick parts up from the store, etc. only to find out that they do not fit or work and you have to do it again.
- Have Media Release and Liability Waiver paperwork signed by students and parents, scanned/emailed to NRL Colorado
- Send names of teams/students (first names only)/staff/robots to NRL Colorado (by Mar)
- Attend the 8th grade open house to recruit for next year
- Finish documentation
- Compete in April
- Reflect after competition for next year (ASAP after competition)
- Send thank yous to sponsors, NRL, donors, families, others
- Post-competition: clean up and organize, Smash Bros or Mario Kart Tournament, rockets, other stuff.

Stores (new or replacement parts and tools)

Document what you buy so you know what you have already purchased and what sizes they are.

- [McMaster Carr](#)
 - Chains and sprockets and more.
- [Hobby Town \(online or in-store locally\)](#) (frequent visitor)
 - RC car parts, motors, paints, servos, Spektrum receivers, and more. May consult for advice.
- [Batteries Plus](#)
 - Technician (Denver location) has built battery kits for us in the past. May consult for advice.
- [Gears Eds](#) (information) / [Depco LLC](#) (storefront)
 - Both of our teams and several of our competitors use the Heavy Metal Chassis as the base for our robots. You should reach out to them at sales@depcolc.com to get the education kit.
- Ace Hardware (frequent visitor)
 - Rods, bolts, screws, washers, glues, epoxies, paints, and more.
- Lowe's/Home Depot
 - Tools and polycarbonate sheets.
- Harbor Freight
 - Tool cabinets, tools. Typically not the best, but less expensive.

Current Resources

Everything is currently in D0412. I strongly recommend the students organize the tools and parts and to keep them organized. It is so easy for everything to be lost. Some of these were personally purchased and donated, but most were purchased with club funds.

- Closet
 - Awards (first giant check, championship gears, a LEGO trophy, and a shirt for display)
 - [Fingertech Robots](#) (One year the students were struggling to envision how to build the designs they wanted and how they would function so we purchased these small kits as an initial prototype)
 - Former shields and spare polycarbonate (Lexan)
 - Former documentation
 - Free 24-25 Academic Year Calendars (hole-punched to fit in binders), extras for final versions
 - 2 robots (hammer and horizontal blade)
 - Nuts, bolts, spacers, pulleys, rods, bands, belts,
 - 2 Spektrum controllers and spare receiver (4 AAs each)
 - AA batteries, IKEA ones are rechargeable
 - 3 1600 mAh NiMH (Nickel Metal Hydride) batteries (2 from kits, one built from Batteries Plus) with 2 chargers
 - Adhesives (epoxy, JB Weld, duct tape, masking tape, electrical tape, 2-sided tape)
 - Polycarbonate spray paint (spray paint outside or in lab room with hoods on)
 - Hawk Stickers from football
 - One shield from COVID to test weapons behind
 - PPE (gloves, eyewear, masks, ear plugs)
 - Brush
 - [Stencil](#) to label materials, use paint pens ([like these](#) or online), [how to clean stencil](#)
 - Broom and dust/pan
 - Spare PVC parts for marshmallow shooters
 - Rocket kits and 3 cars with engines, chutes, wadding, igniters, launch pad/rod, and controllers (the rod is too thick, so we use bits of fountain drink straw)
 - Each launch controller takes 4 AAs

- **Toolbox**
 - Toolkit
 - Screwdrivers
 - Calipers
 - Rulers, meter sticks, tape measure
 - Scale (robots must be \leq 15 pounds)
 - Box Cutters
 - Pliers
 - Clamps
 - Wire cutter/stripper
 - Protractor
 - Vices (vacuum and drill press with nuts/bolts to secure)
 - Hole saw blades
 - Rotary brushes (drill)
 - Drill bits
 - Cutting surface
 - Dissection mats (to test weapons, absorb blows)
 - Shelf/drawer mats
 - One shield from COVID to test weapons behind
 - Drill Press

Some tools were borrowed from me and my family/friends for a season. Here are tools we borrowed that the club may want to consider purchasing.

- Drill
- Riveter
- Jigsaw
- Hand/Table saw
- Metal/plastic fFiles
- Scissors
- Tin snips
- Mallet
- Drum/drill sander
- PVC cutter
- Voltmeter

Students and Staff

2023-2024 roster (removed seniors since they won't be here 24-25)

We have a long list of students from the 8th Grade Open House who signed up who were interested in Robotics Club. You can reach out to these students in the Fall. We just put up posters and used word of mouth to attract our group.

Thank you for being willing to take this club on and keeping it alive. These students are creative and kind-hearted and generally amazing to be around. You are always welcome to reach out to me if you have any questions or for donations. I do not mind volunteering as a consultant, if time permits.

Austin Spreng
720-448-4476
astnsprng@gmail.com