
All About Robo Rangers

— All you need to know about the —
Robo Rangers 4-H Club

We're a 4-H Club



4-H was created by an act of Congress and celebrated 100 years in 2014! It is America's largest youth development organization with over 6 million members following the 4-H mottoes "learning by doing" and "to make the best better." 4-H is delivered by the Cooperative Extension Service—a community of more than 100 public universities across the nation in partnership with the US Department of Agriculture. 4-H started as a way to bring new agricultural technology into rural communities, and has expanded over the years to encourage youth development in all aspects of life. Our club, which is supported by the Frederick County office of the University of Maryland Extension, focuses on Robotics.

The 4 H's in 4-H stand for Head, Heart, Hands, and Health, and their significance is found in our 4-H Pledge:

I pledge...

my **head** to clearer thinking,
my **heart** to greater loyalty,
my **hands** to larger service, and
my **health** to better living for
my **club**, my **community**,
my **country**, and my **world**.

We Build Robots!



Robo Rangers offers opportunities in two robotics competitions:

- The annual 4-H Robotics Challenges at the Maryland State Fair
- FIRST® Tech Challenge (FTC) STEAM Powered Robotics Team

The 4-H competition teams form in April-May and meet through the summer preparing to compete in Timonium on the last Sunday in August. There are two levels of competition - the Lego Challenge, using Lego NXT and Lego EV3 robots, and the Robotics Engineering Challenge, using VEX robots. 4-H competition teams are open to ages 8-18.

The FTC STEAM Powered Robotics team gears up late summer for the FIRST® competition season that starts in September and runs through March. The FTC team recommended ages are 12-18.

Robo Rangers members can participate in both competition forums!

And new in 2020 ~ Robo Rangers will have a Clover program to introduce robotics and 4-H to kids ages 5-7!

**4-H age is age as of January 1 of the program year*

4-H Lego Challenge



Robo Rangers fields teams in the Maryland State 4-H Lego Challenge at both the junior (ages 8-10) and intermediate (ages 11-13) levels. Each year, the 4-H Lego Challenge has a different theme. The 2020 theme is "Agriculture Innovations." Prior themes have included "First Responders," "Be the Change," "Honoring Military Service," and "4-H20."

We use NXT and EV3 Lego based robots. For this challenge, the teams program their robot to autonomously complete objectives based on the year's theme for the game. Every objective the robot completes scores points, adding towards the total score. Each team completes three rounds with the best score counting toward the final score.

Additionally, each team gives a technical presentation to a panel of judges. In the tech talk, teams explain how their robot works and how they worked together as a team to complete the challenge.

Lego teams also plan and perform a community service project related to the theme of the year. At the fair, the team makes a visual presentation to a panel of judges explaining their service project.

4-H Robotics Engineering Challenge



Robo Rangers fields teams in the Maryland State 4-H Robotics Engineering Challenge (REC) at both the intermediate (ages 11-13) and senior (ages 14-18) levels. For the REC challenge, we use VEX robots, which are more advanced, with metal parts and more complex mechanisms.

The REC competitions run a little differently than the LEGO ones. In each match, there are two teams that fight head-to-head to score as many points as possible in order to win the match. The matches consist of two phases:

- A 30 second autonomous period where teams cannot control the robot manually, and must rely on a sequence of pre-written code to move the robot.
- A 2 minute manual control phase where each driver will take control of the robot to complete objectives and score points.

REC teams are also judged on a tech talk about their robot construction, team work, and community activities, and their Engineering Notebook, which they create during the course of the season documenting their process of designing, building, programming, and testing their robot.

FIRST® Tech Challenge (FTC)



The Robo Rangers STEAM Powered Robotics team of self-motivated 13-18 year olds participates in the FIRST® Tech Challenge. For the FTC competition, we use primarily Actobotics and REV robotics systems and components to construct robots of greater sophistication and flexibility. The team signs up for 2-3 competitions each season, adjusting and refining its robot as the season progresses.

For each FTC match, teams are randomly assigned to either a red alliance or a blue alliance of two teams each, and the alliances compete against each other. Like the 4-H REC competition, there is a 30 second autonomous period followed by a 2 minute driver controlled period. In the final 30 seconds of the match, drivers attempt to park in a point scoring zone and/or complete tasks that can only be done in the end game period of the match.

FTC competition awards are given for robot performance as well as for community outreach, design, and exhibited values such as professionalism, teamwork, creativity, and innovation. Judging at competitions is done through a number of ways including team presentations, pit interviews, and review of teams' engineering notebooks. Winning teams advance through a series of qualifying and championship tournaments to a world championship in April.

**FIRST® > (For Inspiration and Recognition of Science and Technology)*

Robo Rangers Clover Program



Starting in 2020, kids ages 5-7 can join Robo Rangers as a Cloverbud!

The Clovers will meet after the monthly business meetings throughout the year. During the competition seasons, there will be a second one hour meeting each month.

Clovers will:

- ★ Work as a group with Lego Boost Robots to learn early fundamentals of robotics
- ★ In place of competition, work on projects to submit at the Frederick County Fair
- ★ Engage in group projects to learn about the values of 4-H

Clovers will be encouraged to join in all club events that are age appropriate

The 4-H Ingredient



Remember, Robo Rangers is not just a robotics club, we're a 4-H robotics club. This means that:

- We have monthly meetings throughout the year
 - ◆ Usually second Sunday of each month at 2:00 pm at the Extension Office
- We have officers and committees, providing many opportunities for leadership
- Club members prepare a record book each year documenting their activities and personal growth
- We engage in demonstrations throughout the year, providing opportunity for public interaction, including:
 - ◆ Demonstrating our robots in the 4-H building at the Frederick Fair
 - ◆ Demonstrating our robots at the annual Ag Week at the FSK Mall
 - ◆ Demonstrating our robots at the 4-H/FCPS STEMfest at Butterfly Ridge Elementary School
 - ◆ Providing a robotics activity night during 4-H Camp each summer
- Club members are able to enroll in other 4-H projects to learn and grow in other directions

Fees and Fundraising



4-H annual dues are \$10 per member, collected when you register online. There is an additional \$2 per member insurance fee that is collected by the Club.

The FTC charges an additional fee (usually \$75-\$100) to cover competition registration costs. Team members should also be prepared to pay for a couple of hotel nights as the team travels to competitions in Jan-March.

Obviously, these fees do not begin to cover costs! We rely on fundraising to keep our fees low and affordable. Our fundraising efforts have included:

- ★ Sponsorships
- ★ Restaurant Nights
- ★ Walmart Days
- ★ Grants

We ask that all members and their families assist with and support our fundraising efforts!

Adult Involvement



There are many opportunities for adult involvement in our Club, including:

- ❖ Team Coaches
- ❖ Field trip planning
- ❖ Service project planning
- ❖ Guest speaker planning (tied into Lego competition theme)
- ❖ Fundraising planning and participation

Team Coaches should join 4-H as Adult Volunteers. There is an approval process, which includes an application, background check, and orientation. Although this is a bit more involved than may be found in other organizations, it serves to protect the organization and its members, as well as educate the volunteer. Other adult supporters are encouraged, but not required, to become Adult Volunteers, as 4-H requires two vetted Adult Volunteers at all events.

Becoming an Adult Volunteer helps share the responsibility and the reward of supporting our kids in their exploration of robotics!

How to Join

4-H Online

Youth and Adults join 4-H through 4-H Online at <https://v2.4honline.com/>

➤ For detailed instructions on enrollment, see <https://extension.umd.edu/4-h/youth-families/4-h-online>

1. Create a Family Profile
 - Ø State: **Maryland**
 - Ø Institution: **University of Maryland**
 - Ø County: **Frederick**
2. Add Members and complete enrollment
 - Ø Club: **Robo Rangers**
 - Ø Project: **Robotics**
3. You will receive email confirmations when:
 - (1) enrollment has been submitted, and
 - (2) enrollment has been approved.The \$10 enrollment fee is not charged until enrollment is approved.

The University of Maryland, College of Agriculture and Natural Resources programs (4-H) are open to all and will not discriminate against anyone because of race, age, sex, color, sexual orientation, physical or mental disability, religion, ancestry, or national origin, marital status, genetic information, or political affiliation, or gender identity and expression.

Welcome to Robo Rangers!

We are excited to have you
join us!

See more about us on the web:

[https://extension.umd.edu/frederick-county/4h-youth-development/
robo-rangers](https://extension.umd.edu/frederick-county/4h-youth-development/robo-rangers)

<https://www.steampowered12873.com/home>

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